

Nursing Home Cost and Ownership Type: Evidence of Interaction Effects

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Due to steadily increasing public expenditures for nursing home care, much research has focused on factors that influence nursing home costs, especially for Medicaid patients. Nursing home cost function studies have typically used a number of predictor variables in a multiple regression analysis to determine the effect of these variables on operating cost. Although several authors have suggested that nursing home ownership types have different goal orientations, not necessarily based on economic factors, little attention has been paid to this issue in empirical research. In this study, data from 150 Virginia nursing homes were used in multiple regression analysis to examine factors accounting for nursing home operating costs. The context of the study was the Virginia Medicaid reimbursement system, which has intermediate care and skilled nursing facility (ICF and SNF) facility-specific per diem rates, set according to facility cost histories. The analysis revealed interaction effects between ownership and other predictor variables (e.g., percentage Medicaid residents, case mix, and region), with predictor variables having different effects on cost depending on ownership type. Conclusions are drawn about the goal orientations and behavior of chain-operated, individual for-profit, and public

This study was supported under contract with the Virginia Department of Medical Assistance Services and, in part, by National Research Service Award F32HS00001, to Greg Arling, from the National Center for Health Services Research and Health Care Technology Assessment. The opinions expressed are those of the authors and not of the sponsoring agencies.

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and nonprofit facilities. The implications of these findings for long-term care reimbursement policies are discussed.

The nursing home industry has experienced dramatic growth over the last two decades. The aging of the population, increases in the prevalence of chronic disease, and greater access to care through the Medicaid program have contributed to major increases in both private and public costs. For example, nursing home costs have risen from \$480 million in 1960 to \$32 billion in 1984—an annual growth rate of 19.1 percent [1]. Because of this substantial escalation in cost, much attention has been focused recently on public expenditures for nursing homes, which constitute approximately half of total payments. A number of recent studies have analyzed factors that predict variation in cost for Medicaid nursing home residents.

Cost analysis in the nursing home industry is a complex subject. Ordinary cost function analysis normally considers the factors of efficient production that predict cost, under the standard microeconomic assumption of a cost minimization strategy by the organizations involved [2]. Nursing homes, however, do not operate under the free market conditions which are required for such an analytic framework. State governments, through the Medicaid program, are in a monopsonist position as the primary payers for nursing home services. As a consequence, most nursing home providers tailor operating strategies to regulatory constraints and reimbursement levels imposed by states. Scanlon [2] has pointed out that, even though providers seek to attract private-pay patients, who typically are charged higher rates, Medicaid patients represent the major segment of the market. Only a small minority of homes can afford to ignore this large group and operate with a strategy of serving private-pay patients exclusively.

Scanlon [2] and Palmer and Vogel [3], among others, use a standard economic approach to analyze the nursing home market. They take into account behavioral differences between ownership types, however, and the impact of regulatory policies, theorizing that nursing home providers do not respond in a homogeneous manner to perceived environmental constraints. Rather, provider reactions differ significantly, based on the goal orientation of the ownership class. They suggest that for-profit nursing homes are profit maximizers, while nonprofit and publicly owned homes wish to maximize size and quality subject to no loss constraints. These latter two groups will increase quality and provide more amenities to the extent that they are able to generate sufficient additional revenue from internal or external

sources, e.g., attracting private payers or obtaining subsidies from sponsoring organizations [3].

Nonetheless, despite indications that underlying behavioral differences do exist between nursing home ownership classes [4], nursing home cost studies have paid only cursory attention to this issue. In fact, the majority of nursing home cost studies have employed single-equation multiple regression analysis without examining interaction effects or testing separate models by ownership class.

The objective of this study is to examine the relationship between ownership type and nursing home costs. We hypothesize that ownership classes will adopt different strategic operating approaches when reacting to environmental constraints and, therefore, that they do not have the same production function. Although the hypothesis is implied in the literature, it has not yet been empirically tested. Through OLS regression analysis, we will examine interactions (which are evidence of different production functions) between ownership and other independent variables in predicting intermediate care facility (ICF) operating costs for residents at 150 nursing homes in Virginia. We will test separate regression equations to compare the effects of independent variables between ownership classes. From the results of these analyses, conclusions will be drawn about organizational behavior and its effect on cost.

RELEVANT RESEARCH

Bishop [5] and Palmer [6] provide comprehensive surveys of nursing home cost function studies. Research has consistently shown that ownership class is a significant predictor of cost. Bishop indicates that nonprofit and government providers were found to have costs ranging from \$2.50 to \$7.00 per day higher than for-profit homes. Palmer reported similar results, pointing out that there is insufficient evidence to form valid conclusions about causal factors. Most studies consider all proprietary homes to be in the same class, i.e., they dichotomize for-profit and nonprofit ownership types. However, Birnbaum et al. [7] did test for the effect of chain membership and found that it was not a factor in predicting costs nationally. They did, however, find that chains compared to other ownership types had significantly lower costs on a regional basis, i.e., after correcting for reimbursement differences between states. Also, Schlenker and Shaughnessy [8] reported no significant effect on cost for chain membership in a study of Colorado

homes. None of the reviewed studies explored ownership differences by testing for interaction effects.

Other variables have been considered as possible predictors of cost behavior. Patient severity has yielded inconsistent results. Palmer points out that many studies use measures of patient condition that are ordinal in nature, and differences in level of patient condition do not indicate equivalent differences in care requirements. None of the studies has validated a linkage between a severity status index and cost of care. A handful of studies have attempted to include quality as a predictor variable [9,10], but with little success. Palmer concludes that, to date, no accepted measure of quality has been defined.

Percentage of Medicaid patients has been used as a predictor in a number of studies, again with inconsistent results. It has been suggested that a greater proportion of private payers, who are generally charged higher rates, will lead to higher costs for both Medicaid and non-Medicaid patients. Presumably, more amenities are required to attract the private payer, and Medicaid patients may share in these amenities. Schlenker and Shaughnessy [8] reported that percentage Medicaid patients in the facility had a negative impact on costs; however, the effect disappeared when case-mix measures were introduced into the equation. They assumed, therefore, that Medicaid patients had a lower severity level than did non-Medicaid patients. Birnbaum et al. [10] reported higher costs for homes in Massachusetts with all private payers, but found the reverse effect in New York, indicating that differences in reimbursement and regulatory conditions seemed to have affected operating strategy.

Size, region, and the fact that a home is certified to accept skilled-care as well as ICF patients are commonly used predictor variables. Both Bishop and Palmer conclude that size does not materially affect costs. Lee and Birnbaum [11] tested for evidence of systematic reallocation of costs from SNF to ICF patients in New York homes, but found no evidence of such behavior. Region may have a strong impact in some states because of widely varying input prices and labor market conditions [6,10].

STUDY CONTEXT

Virginia's nursing home population consists of approximately 22,000 residents in 164 facilities. Medicaid is the dominant payer (68 percent), followed by private pay (27 percent) and a small proportion of Medicare and other sources (5 percent). Thirty-nine percent of the

state's facilities are chain operated (i.e., three or more homes under one ownership), and several of these chains are multistate or national in scope. Thirty-nine percent are individual for-profit, 14 percent non-profit, 9 percent public, and 6 percent hospital based. Occupancy rates run at about 92 percent, and do not vary appreciably by ownership type or geographic region.

Medicaid nursing home reimbursement is a facility-specific per diem rate, which is set prospectively each year based upon the facility's reported costs from the previous year. There are two rate categories—one for SNF (8 percent of Medicaid residents) and the other for ICF (92 percent of Medicaid residents). Operating costs are reported and rates are set separately for the two categories of residents. In 1985, reimbursement rates were subject to regional ceilings (\$46.07 in Northern Virginia and \$38.77 in the rest of the state). Facilities with operating costs up to the ceilings were reimbursed according to costs, while facilities above the ceilings received only the ceiling amounts. In comparison to other states, Virginia is quite restrictive in applying its SNF designation. Residents who qualify for Medicaid SNF are similar in health and functioning to the Medicare Skilled Care resident.

Prediction of operating costs will be influenced by the contextual factors of the Virginia system. Since each facility is paid a single per diem rate for all its ICF residents, we would expect the effect of case mix on cost to be dampened, i.e., there should be considerable variation in costs even when controlling for case-mix severity. Facility size, proportion of Medicaid residents, and certification for SNF/ICF (versus ICF only) should help explain additional cost variation although, based on previous studies, we would expect facility size to have only a negligible impact on cost. Finally, the state has one economic region, northern Virginia (suburban Washington), with significantly higher production costs (especially labor) and a higher proportion of private-pay residents. We would expect these factors to lead to higher operating costs in this region.

METHODOLOGY

Data for the analysis were obtained from a 1985 study of 164 Medicaid-certified nursing homes in Virginia. Ten hospital-based homes were omitted from the sample because of incomplete cost data. Also omitted were two individual proprietary homes with fewer than ten Medicaid patients. These homes concentrated almost exclusively on the private-pay market. Finally, two outlier public facilities that had

excessively high reported costs were dropped from the analysis. The final sample consisted of 150 homes.

Sixty-four homes were classified as chains, i.e., owned by for-profit organizations that had three or more homes. There were 52 for-profit homes not affiliated with chains (termed individual for-profit), 23 nonprofit, and 11 city/county-sponsored homes. Nonprofit and public homes were combined in the analysis because they were thought to have similar operating approaches and their small numbers precluded separate treatment. Four chain, ten independent for-profit, and one nonprofit home are located in northern Virginia (suburban Washington), and receive a higher level of Medicaid reimbursement because of higher input costs (an average of \$7.30 per patient-day).

The dependent variable was 1984-1985 reported Medicaid ICF, per patient-day operating cost, according to Virginia Medicaid cost reports. A further breakdown into patient care/non-patient care cost categories was not possible. The analysis does not include SNF costs because of differences in cost-reporting procedures. SNF operating costs were difficult to separate from total costs, and certain items, such as supplies, are reimbursed separately under SNF, while they are incorporated into the ICF per diem. Also, the numbers of SNF facilities and residents were so small that a separate analysis was not feasible. It should be noted that SNF residents represent only 8 percent of all Medicaid residents in Virginia. Nonetheless, the results of the study should be qualified because SNF costs were not analyzed.

The case-mix index, which was applied to all Medicaid patients in the 150 homes, was derived in a recent study carried out by the authors [12]. This study involved time measurement of direct nursing care for a representative sample of 558 Medicaid residents in 12 facilities in Virginia. Residents were independently assessed for health and functional characteristics, and then grouped (using AID analysis) into six mutually exclusive classes that were homogeneous with respect to skill-weighted nursing time. Classes with highest resource use were characterized by specialized (i.e., skilled nursing) care requirements and severe ADL dependency. The six-group classification scheme explained 53 percent of the variance in nursing time. The means for the six groups ranged from 0.45 to 1.79 (sample mean = 1.00). The total spread in care requirements, therefore, was slightly less than 4 to 1, which is consistent with other findings on nursing home patient-care requirements [13,14]. The index was applied to all ICF Medicaid patients in Virginia nursing homes in the summer of 1985, using assessment records on file in the state's computerized long-term care information system. An average case-mix score was then computed for

each provider. Scores for the 150 homes in this study varied from 0.81 to 1.23 (mean = 1.00).

The percent Medicaid variable reflects the proportion of Medicaid patients to all other patients. While there are small numbers of Medicare and VA patients in some homes, the vast majority of non-Medicaid patients in Virginia are private payers. The SNF/ICF variable refers to Medicaid certification of the home as SNF/ICF (1) or ICF only (0). The urban variable (scored 1 = yes, 0 = no) is based on a community size of 50,000 or more. Capacity is a continuous variable representing the number of licensed beds. Regional location is a dichotomous variable (scored 1 = Northern Virginia, 0 = rest of the state). Ownership is represented by two dummy variables (scored 1,0) designating chain and independent for-profit homes. Public/nonprofit is the reference group.

In the analysis, a set of independent variables—case mix, percent Medicaid, presence of skilled beds, region, rural/urban location, size, and ownership class—were used in a multiple regression equation as predictors of nursing home operating cost. Three selected variables were then used in separate equations for different ownership types. Interaction effects were tested by comparing differences in degree, direction, and level of significance of regression coefficients.

RESULTS

Descriptive statistics (Table 1) are presented by ownership type. Public/nonprofit facilities reported significantly higher costs and higher case-mix indexes than both for-profit groups. The differences in average operating cost are consistent with other studies. The majority of facilities in northern Virginia were independent for-profit homes. Chain homes were largest in average size, with the highest percentage of Medicaid patients and the largest percentage of dual (SNF/ICF) certified facilities. Independent for-profit providers had the lowest percentage of Medicaid (highest percentage of private-pay) patients.

Significant differences between ownership classes were evidenced in the comparison of reported cost with reimbursement. All three groups had homes that report costs above the reimbursement level, and each had an average net reimbursement deficit. These facilities reported costs exceeding their regional reimbursement ceilings. Chains had the lowest percentage of homes with costs that exceed reimbursement (8 percent), and the lowest average dollar differential between the two (\$.51). A majority of public/nonprofit providers spent more on

Table 1: Facility Characteristics for Total Sample and Ownership Types

<i>Variable</i>	<i>Total</i> n = 150 Mean/% (SD)	<i>Chain</i> n = 64 Mean/% (SD)	<i>Individual For-Profit</i> n = 52 Mean/% (SD)	<i>Public/ Nonprofit</i> n = 34 Mean/% (SD)
Operating cost (per patient-day)	37.15 (6.82)	34.81* (4.55)	36.82† (7.37)	42.07*. [†] (7.13)
Case mix	1.00 (.07)	.99* (.06)	.99† (.09)	1.03*. [†] (.06)
Proportion Medicaid	.79 (.21)	.84* (.19)	.73* (.19)	.79 (.18)
Capacity	135.6 (68.4)	149.25 (60.01)	127.23 (64.36)	122.74 (85.04)
North Virginia	10%	06%	19%	03%
Urban	58%	63%	54%	56%
SNF/ICF facility	36%	48%*	35%	24%*
Percent of facilities with costs > reimbursement	27%	08%*	29%*	64%*
Cost in excess of reimbursement (per patient-day)	\$1.71 (\$3.99)	\$0.51* (\$2.47)	\$1.26* (\$2.91)	\$4.64* (\$5.91)

*.[†] $p < .05$, paired comparison t -test, or Chi-square.

Medicaid patients than they were reimbursed, with the average \$4.64 per patient differential being appreciably higher than for either for-profit type.

At the next stage of the analysis, a regression analysis for the entire sample was performed, using the seven variables as predictors of operating cost. Results are presented in Table 2. The model explained 39 percent of total variance in reported operating cost. Chain and independent for-profit homes had significantly lower costs than public/nonprofit homes. Case mix was also significant, with higher costs associated with more severe case mix. Finally, northern Virginia reported higher costs than the rest of the state. Percent Medicaid, presence of skilled beds, and urban status were not significant at the .05 level.

Next, product interaction terms were tested through a series of models. Significant interactions were found for ownership by case mix, region, and percent Medicaid. The introduction of these interaction terms increased the R^2 to .47. In order to explore these interactions

Table 2: Multiple Regression for Daily Operating Cost

<i>Independent Variables</i>	<i>Regression Coefficients</i>		<i>Significance</i>
	<i>Unstandardized</i>	<i>Standardized</i>	
Case mix	16.81	.180	.012
Percent Medicaid	-2.94	-.094	.203
Northern Virginia	7.71	.340	.0001
Capacity	-0.006	-.060	.413
SNF/ICF	1.79	.126	.093
Urban	1.45	.105	.139
Independent for-profit	-6.24	-.436	.0001
Chain	-7.01	-.510	.0001
Intercept	26.38		
R^2	.38		
F	11.22		
N	150		
Mean of Dependent Variable	37.15		

further, regression analyses were performed separately for each ownership type.

Results of the separate regressions are shown in Table 3. In the model for all facilities, case mix and region had significant positive effects, while percent Medicaid was nonsignificant. The effects of these variables, however, were quite different in the separate models by ownership type. Percent Medicaid was found to have a strong, highly significant, negative impact on cost, regardless of case mix, in chain homes. It was not a factor in independent for-profit homes. However, it was marginally significant ($p = .089$), with a positive effect, for public/nonprofit homes. Case mix had a significant effect for public/nonprofit homes, but was not significant for the other two ownership classes. The impact of region was highly significant for independent for-profit homes, marginally significant for chains and nonsignificant for public/nonprofit homes; however, the latter two classes were only minimally represented in northern Virginia.

The three models differed in the proportion of variance explained. Multicollinearity was not found to be a factor in this or previous models. Instead, it appeared that the lower R^2 values for the individual for-profit and public/nonprofit facilities were the result of somewhat smaller sample sizes (i.e., greater impact of measurement error) and

Table 3: Multiple Regression for Daily Operating Cost by Ownership Type

<i>Independent Variables</i>	<i>Ownership Type</i>		
	<i>Chain</i>	<i>Individual For-Profit</i>	<i>Public/ Nonprofit</i>
	<i>Reg. Coef. (Signifi)</i>	<i>Reg. Coef. (Signifi)</i>	<i>Reg. Coef. (Signifi)</i>
Case mix	8.88 (.227)	13.03 (.230)	37.21 (.049)
Percent Medicaid	-14.66 (.0001)	-.748 (.854)	11.10 (.089)
Northern Virginia	3.72 (.074)	11.01 (.0001)	8.60 (.201)
Intercept	38.06	22.31	-5.35
R^2	.471	.377	.248
F	17.78	9.71	3.31
N	64	52	34
Mean of Dependent Variable	34.81	36.82	43.07

the relatively weaker effects of the predictor variables for these ownership types. Despite differences in explained variance, all three models were statistically significant.

DISCUSSION

Consistent with previous research, we found operating costs to be highest among nonprofit and governmental nursing homes and those facilities in a region of the state with higher input costs. We also found evidence for cost variation by case-mix severity and percentage of Medicaid residents in the facility.

The findings further suggest, however, that nursing home providers use different strategic approaches in reacting to environmental constraints. Variables commonly used in nursing home cost analyses were shown to have significantly different impacts on nursing home cost for three ownership categories—chains, independent for-profit, and public/nonprofit.

Chains had the highest percentage of Medicaid patients and the lowest reported operating cost of the three groups. Cost was not significantly affected by patient severity in these facilities. Chains appear

either to have targeted the Medicaid market or to have been less successful than other ownership classes in attracting private-pay patients. Chain facilities that had a higher percentage of private-pay patients reported correspondingly higher Medicaid costs. Despite the strong negative relationship between percentage Medicaid and operating costs, only a small proportion of chain facilities (8 percent) reported daily operating costs that exceeded their Medicaid reimbursement rate, i.e., few chain homes seemed to have cross-subsidized by using private-pay revenues to cover Medicaid operating losses. Much higher percentages of individual for-profit and public/nonprofit facilities—29 percent and 64 percent, respectively—had daily costs in excess of reimbursement.

Chain facilities appear to provide a standard, relatively low-cost level of care that is concentrated on the Medicaid market and is insensitive to case-mix variation. Since Medicaid patients provide less income than private payers, this strategy would appear to contradict the hypothesized tendency toward profit maximization. On the other hand, chains may gain an advantage from the standardization of their product. Planning and control can be maximized through uniform policies for nursing, housekeeping, dietary, and administrative functions. Economies of scale may be more easily achieved when individual facilities in the system have the same patient characteristics and operating conditions. Competition for the private-pay patient involves a degree of risk that chains, for the most part, may be unwilling to take. It necessitates an investment in special programming and facility amenities, as well as flexibility to tailor operations to local conditions.

The strong negative relationship between percentage of Medicaid patients and operating cost is evidence that chains do incur higher costs when they target the non-Medicaid market. They tend, however, to maintain control over these costs, keeping them within the range of their Medicaid reimbursement rate. It remains to be seen whether chains will attempt to gain a larger share of this market in the future. That is, whether chains will be able to achieve the diversification of their product, respond to local conditions, and, at the same time, maintain the systemwide standards and centralized planning and control which have allowed them to become such a prominent force in the marketplace in the last decade.

Individual for-profit homes had the lowest percentage of Medicaid patients, but also had low costs which did not vary significantly by case-mix severity. Overall, they appear to target private payers to a greater degree than other ownership classes. This is more true in northern Virginia (only 52 percent Medicaid versus 77 percent else-

where), which has a more affluent elderly population and a higher proportion of private-pay patients. A significant proportion (29 percent) of individual for-profit facilities in the state as a whole report operating costs above Medicaid reimbursement, a basic indication of cross-subsidization behavior. Six of the ten such homes are in northern Virginia. Independent for-profit providers appear to have a greater ability to react to local environmental conditions and tailor their operating strategies accordingly. When there is a sufficient local market of private payers, they appear to tolerate Medicaid patient operating losses in order to provide the amenities that will attract the private-pay patient. In the absence of such a market, they contain costs to operate within Medicaid reimbursement.

Public/nonprofit homes report the highest per diem costs, with 64 percent reporting daily costs in excess of Medicaid reimbursement. The positive effects of percent Medicaid and patient severity on operating cost, plus the higher overall case-mix index for these facilities, suggests an emphasis on access to care, both for more severe case types and for indigent patients. Although public/nonprofit facilities report costs that are \$4.64 on average higher than their reimbursement, they do not seem to rely on non-Medicaid patient revenue to cross-subsidize Medicaid care. The effect of percentage Medicaid on cost was marginally significant in a positive direction. It appears, therefore, that public/nonprofit facilities recover their costs primarily through subsidization from sponsoring agencies, e.g., local governments and religious organizations. Higher operating cost in public/nonprofit facilities provides at least indirect evidence that these facilities attempt to maximize the amount of care provided, which is consistent with previous theory. Without longitudinal data, we were unable to test the hypothesis that they also seek to increase size of operation.

It should be pointed out that we combined public and nonprofit facilities into one group because of small sample sizes. The two ownership types may differ in their behavioral characteristics. Nonprofit providers may, for example, be less capable of subsidizing their operations from external sources, e.g., churches or foundations, in comparison to public providers which rely on tax revenues from local governments. Also, many nonprofit providers are religion-affiliated and may give priority in admission to members of their religious bodies.

Also, hospital-based facilities were eliminated from the study because of incomplete cost data. These providers had significantly higher case-mix severity and were estimated to have had substantially greater operating costs. Similarly, the SNF population, which was also eliminated from the study, would be expected to have more severe

cases and higher cost of care. Therefore, case mix might have explained a higher proportion of variance in operating costs if the total population of facilities and residents had been included in the analysis.

The conclusions from this study also need to be qualified when considering other environments where the regulatory or reimbursement climate may be quite different. In the handful of states that have adopted patient severity as a reimbursement criterion, case mix should have an appreciably stronger effect on cost. States such as Minnesota, which tie the allowed private-pay price structure to Medicaid reimbursement levels, should yield different outcomes for the percent Medicaid variable. However, as we pointed out earlier, the Virginia Medicaid reimbursement system—a facility-specific, prospective per diem payment system, based on historical cost, with different levels for ICF and SNF patients—is similar to that of many states [15]. The findings should be generalizable to states that apply the SNF definition to a higher proportion of residents than in Virginia. We are suggesting that the key contextual factor is rate-setting by overly broad categories (whether ICF or SNF) that fail to capture variation in patient severity and resource use.

This study has implications for long-term care reimbursement policy. We would suggest that Medicaid reimbursement, using facility-specific, per diem rates based on historical costs, encourages all ownership types to display higher costs in order to obtain higher reimbursement. This should be true whether they are motivated by profit, growth, or commitment to increased quality of care. Ability to demonstrate higher costs will depend on access to private-pay residents (tempered by capacity to respond to local market conditions) among for-profit facilities, and level of subsidization from sponsoring organizations for nonprofit and governmental facilities.

Further, if these reimbursement systems lack sensitivity to case-mix variation (e.g., rates set by broad categories such as SNF/ICF), “heavy care” Medicaid patients will be given lowest priority in admissions, especially by for-profit facilities. Certain ownership types, e.g., for-profit chains, may be able to achieve greater efficiencies of operation by providing a standardized product targeted to “lighter care” residents. Given this orientation, we would be concerned about their capacity to serve medically complex or severely impaired cases adequately. Nonprofit and governmental facilities would be expected to admit and offer more services to severe case types. However, the “cost-based” features of the rate-setting process provide few incentives for them to be efficient. Individual for-profit facilities should display the greatest variation in admissions and levels of service. They would

emphasize responding to local market conditions and offering the amenities necessary to attract the private-pay resident. Without regulation of their rates, the private-pay resident would likely be charged substantially more than the Medicaid resident, especially in settings with high demand relative to the supply of nursing home beds.

Broad differences in costs among ownership types, even after taking case mix into account, are symptomatic of inefficiencies of operation and/or multiple standards of care. Neither is consistent with the policy goals of efficiency, quality, and access to care. From the results of our study, we would suggest that long-term reimbursement systems might better meet these goals through standardized pricing (versus facility-specific, "cost-based" approaches) according to defined case types that adequately reflect variation in resident care requirements. Of course, prices should be set realistically, based upon valid cost studies, and should be adjusted for regional economic factors affecting input costs. Under circumstances where occupancy rates are high and/or private-pay residents represent a sizable market share, their rates might be regulated in line with Medicaid rates. This should reduce differences in costs among facilities and increase access for the "heavy care" Medicaid patient. On the other hand, regulation of rates may limit choice for private-pay patients who seek higher levels of service. Moreover, without higher private-pay rates, the overall level of care may be reduced in some facilities, and especially those that cross-subsidize Medicaid patient care with private-pay revenues.

Results from this study point to the importance of examining differences in organizational and economic goals among nursing home ownership types, especially as they affect cost behavior. Previous nursing home cost studies would merit reanalysis in light of the interaction effects that we have postulated. Variables that account for behavioral differences should be included in future studies. Also, recent development and validation of long-term care case-mix indexes [12-14] should improve our understanding of the effect of patient severity on cost behavior. Better measures of quality of care and efficiency of operation are also required. We were not able to surmise, for example, whether higher operating costs were an indication of higher quality, inefficiencies in operation, or both. Further insight into organizational and economic behavior in the nursing home industry should lead to more effective reimbursement policies that promote quality and access to care, while they encourage efficiency of operation.

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