Determinants of Nursing Home Costs in Florida: Policy Implications and Support in National Research Findings

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THE NEED FOR LONG-TERM CARE (LTC) in institutions has increased dramatically over the past 30 years in the United States because of the increasing life expectancy and higher prevalence of chronic diseases in the population, fundamental changes in the American family structure and living arrangements, and the high mobility of the present-day Americans. Medicare, and especially Medicaid coverage of nursing home care for eligible populations, translated this need into effective demand in the mid 1960s. The 1954 amendments to the "Hospital Survey and Construction Act of 1946" (the Hill-Burton Act) already included grant assistance for the construction of LTC institutions. This coverage reinforced the vigorous industry response to the growing demand for LTC, increasing the number of skilled nursing facility (SNF) beds from about 200,000 in 9,000 homes in 1954 (*1*) to more than 1,400,000 beds in 18,300 facilities in 1977 (*2*). In other words (*3*):

> The number, size and total bed capacity of long term care facilities increased dramatically after 1954 . . . . while the number of long term facilities tripled, bed capacity increased eight times. There are now almost as many beds in long term care facilities as in hospitals in the United States.

Nursing homes today contain more than 1 million elderly, or about 1 in 20 persons over 65 years at any given time. However, as many as 20 to 25 percent of the nation's elderly will reside in a nursing home at some time (*4*). This statistic is reflected in the fact that the elderly overall spend 4 times, and those age 75 and over more than 6 times, as many bed-days in nursing homes as in hospitals—16,000 nursing home days versus 4,000 hospital days per 1,000 population over 65 in 1978 (*5*).

This high demand for nursing home care, met by eager industry response, led to dramatic increases in the nation's nursing home bill, both in absolute and relative terms. Nursing home expenditures rose from $28 million in 1940, less than 1 percent of the health expenditure total; to $480 million in 1960, nearly 2 percent; to $3.8 billion 10 years later, at 5.5 percent; and, finally, to $20.7 billion for the year 1980, or 8.4 percent of total health expenditures.

The average annual increase in these expenditures at a 17.2 percent rate from 1950 to 1978 makes the nursing home sector the fastest growing health care component over that period. The average total monthly charge increased at an average annual rate of 10.6 percent from 1964 to 1977, from $186 to $689 (*6*). More than one-half of the 1977 total was paid for through Medicaid funds, accounting for more than one-third of total title XIX expenditures of $17.1 billion for that year (*7*). On the other hand, a much smaller portion of Medicare (title XVIII of the Social Security Act) expenditures went for nursing home care, because of the more restricted scope of that program's nursing home component.

Health planning and regulatory activities are increasingly focusing on long-term care, as evidenced in State health and health systems plans and in numerous Federal and State laws, rules, and regulations governing nursing homes. However, despite extensive government regulation of nursing home costs, which include expenditure "caps" in effect in many States that are burdened with ever-rising Medicaid outlays for institutional long-term care, this area of the health sector has received little research attention until recently. For example, the wealth of cost-related data found in the mandated "Medicaid Cost Reports" has rarely been

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subjected to thorough analysis, nor has a sound theoretical basis for such analysis been established. This omission is in contrast to the attention devoted to the nation's hospital sector, which is larger in absolute terms, but whose growth rate has been slower than that of the less glamorous nursing home industry.

It is commonly agreed that the increasing life expectancy of a larger number and greater proportion of the elderly will require increasing investment and expenditures for both institutional and noninstitutional long-term care services. The likely expansion of the nursing home industry and the concomitant need to study and analyze related issues was clearly stated in the general conclusions of the U.S. Senate's Special Committee on Aging's report on "Nursing Home Care in the United States: Failure in Public Policy" (*8*):

> There is every reason to believe that the need for high-quality long-term care facilities will continue to increase. One of the major reasons is that more and more people are living longer and longer. Individuals with multiple disabilities and advanced age are likely candidates for institutionalization.

Nursing Home Cost Factors

The nursing home production function is characterized by a productive capacity in terms of beds set up and staffed for use. The service orientation of the nursing home industry accounts for the predominant share of such variable cost components as dietary (food), laundry and linen, and nursing and supportive care in terms of total costs. Salaries alone account for about two-thirds of the total cost. Some major factors determining the cost of care mentioned in the literature are the level of care, bed size, location, profit or nonprofit status, and utilization (occupancy rate) (*9*). In an early study of long-term care facilities, ownership and size were found to be related: the average number of beds in skilled nursing homes was 18 in proprietary, 43 in "voluntary," and 69 in public facilities in 1955 (*10*). Since that time, the number, size and, consequently, total bed capacity of nursing homes has increased substantially, and the composition of the industry has changed. Of import for this study is the statistical relationship between size and unit cost, if any, and particularly the possibility of a "U-shaped" form of this relationship, when it is charted. This property would allow the determination of a hypothetical "optimal" size, that is, the lowest unit-cost size.

Another factor extensively covered in the health planning and institutional health care literature is the use or occupancy rate. Its impact on hospital costs led to the promulgation of a national minimum hospital occupancy standard of 80 percent in the National Resource Standards for Health Planning of March 28, 1978. For nursing homes, such high occupancy rates are not unusual due to the long-term and more "predictable" nature of residency in these facilities and to the high demand for long-term care. These high use rates lead to waiting lists in many facilities and consequently to "administrative days" in hospitals for patients waiting to be transferred to nursing homes. Nevertheless, occupancy rates were found to be significantly related to unit costs in nursing homes.

Location of the facility also influences per diem costs. Both national (Bureau of Labor Statistics) and regional indices, like the Florida Price Level Index (FPLI) measure cost and price differences between and within States. Also, urban locations often have higher costs than rural locations. Other factors investigated in my study are the proportions of administrative costs and of title XIX (Medicaid) patients and some demographic variables. These variables are, for each Florida county, the percentage of elderly, the percentage change in the elderly population (1970 to 1976), and the proportion of the elderly in poverty in 1975 (*11*). Finally, the degree of unionization of health care sector workers is incorporated as a dummy variable on a county basis as an indication of supply-side cost factors that may strongly impact the labor-intensive nursing home industry.

Not investigated are factors related to quality of care, primarily because of the lack of reliable and specific data. It is assumed, however, that most of the unexplained variation in cost per day among facilities may be attributed to differences related to quality of care.

Descriptive Summary of Trends, 1971 to 1976

Data from Medicaid Cost Reports (MCRs) from 1971 through 1976 of about three-fourths of all Florida nursing homes and beds in service were used in the analysis. Florida started participating in the Medicaid program on January 1, 1970. As more nursing homes entered the program, a larger portion of all Florida facilities' MCRs were available for the study; the 1976 data base covers nearly 9 out of 10 licensed beds.

The per diem rates rose steadily from a statewide mean of $15.84 in 1972 to $21.51 in 1976; that is, by more than one-third. This increase is about equivalent to the concurrent rise in the Consumer Price Index (CPI) from 125.5 to 171.1. Calculating the mean rate by health systems agency (HSA) clearly shows three regional groupings: HSAs 1, 2, 3 (North Florida), HSAs 4, 5, 6 (Central and Southwest Florida), and the Southeast, Atlantic coast HSAs 7, 8, and 9. The last group, which covers Miami, Fort Lauderdale, and West Palm Beach, had the highest mean per diem costs throughout the 6-year period.

Florida is a highly urbanized State. Nearly nine-tenths of its population live in standard metropolitan statistical areas (SMSAs), compared with two-thirds of the population nationwide (*12*). More than twice as many MCRs analyzed were from SMSAs (901) than from rural nursing homes (409). Consistent with the hypothesis and findings of this study, the 6-year mean per diem for urban facilities, $18.84, was higher than the rural per diem of $17.84. This $1 difference hypothetically could have added to a $36 million savings, had the urban homes been paid at the rural mean rate over the 6 years. This urban-rural differential persists through all 6 years, and it is also reflected in the Florida Price Level Index. The FPLI is the result of strong concerns expressed by State employees, legislators, and private parties alike over the large differences in the cost of living and of operation within Florida. Since 1972, the FPLI has been established annually. It is based on a legislatively mandated "study of price level differentials among the counties of the State of Florida conducted by the Department of Administration" (*13*).

The FPLI confirms the pattern set by the per diem costs. It is consistently above the statewide mean level of 100.00 for the "Gold Coast" HSAs 7, 8, and 9, and below 100 for the North Florida HSAs 1 and 2.

The mean size of nursing homes increased from 102 beds in 1972 to nearly 108 in 1976. It varied greatly by region and county, and the urban homes were one-third larger than the rural group. The 6-year mean of 86.7 beds for facilities in the more rural North; 102.7 for HSAs 4, 5, 6; and 118 for the urban Southeast HSAs 7, 8 and 9 reflects the predominance of rural or urban characteristics in these three regional groupings.

Florida's nursing homes evidenced relatively high occupancy rates throughout the 1970s. In 1975 and 1976, the rate was increasing to a mean of 92.7 percent. An interesting inverse relationship between size and occupancy rate is evident in the data. Partial differentiation results in negative sign-coefficients for per diem cost-size, per diem cost-occupancy rate, and also for size-utilization relationships. This effect means that both are inversely related with per diem costs and with each other.

Finally, a unionization dummy variable for Miami (Dade County) and Jacksonville (Duval County), the only two areas experiencing any sizable degree of unionization of health sector workers, was overshadowed by regional price differentials expressed in the FPLI or, even stronger, in the three regional dummy variables. The proxies explaining the demand for health care by the elderly show some urban-rural differences. Relatively more elderly persons reside in Florida's rural counties, and a higher proportion of these are in poverty (21.54 percent versus 15.1 percent in the SMSAs in 1975).

Model Specification and Framework

At the time of the study, I was not aware of other econometric analyses of nursing home costs at either the State or national level. Since that time, I have come across an analysis by Meiners, performed concurrently and independently, which supported the findings of my Florida study (*14,15*). He used national survey data. Furthermore, an excellent review of recent studies on nursing home costs was published in the spring of 1980. In her review, Bishop surveys the cost function in economic theory, major nursing home cost function studies, the choice of independent variables, and the status of research of nursing home costs (*16*). She concluded that:

> nursing home cost function research has succeeded in confirming that certain variables are associated with nursing home costs in a systematic fashion. These include occupancy rate, ownership and provider type, location, and level of care. Costs also vary with patient mix and services offered, but these relationships are not as consistent; this is to be expected, given the theoretical and measurement problems of these product descriptors.

As mentioned earlier, I included all of Bishop's variables, except for "patient mix and services," which are related to quality of care, since I, too, encountered the theoretical and measurement problems of these product descriptors that Bishop mentions. Only the proportion of Medicaid residents was incorporated into my model as an indicator of patient mix, but it was of minor importance in explaining variations in per diem costs.

Based upon literature research, and 6 years' work experience in the Florida Department of Health and Rehabilitative Services, I formulated the major hypothesis: there is a quantifiable relationship between nursing home costs and occupancy (utilization) rate, location, urbanization, the share of Medicaid (title XIX) residents, unionization, some demographic variables and, finally, the size of the facility. Among the specific hypotheses tested were that size is inversely related to per diem costs over the existing range, in a U-shaped functional form. Furthermore, that geographic location, more specifically location in urban SMSAs and higher cost areas, as measured by the FPLI, is in direct and significant relationship to unit costs. Use, on the other hand, is in a significantly inverse relationship. These and other hypothesized relationships among major variables (path model) are illustrated in figure 1. The model employed is:

$Y_i = a_i + B_1X_{1i} + B_2(X_{1i})^2 + B_3X_{2i} + B_4X_{3i} + \ldots\ldots B_nX_{mi} + e$, with m independent variables and

i facilities observed over the 6-year period. The data sources for each variable of the model are explained in table 1.

Econometric Analysis of Nursing Home Costs

The original model incorporated the variables delineated in figure 1 and table 1. The final version uses the log 10 of the occupancy rate (variable X_2), which reflects the nonlinear relationship of this variable to unit costs. The regression reads ($R^2 = .448$):

$$Y = -11.691 - 34.146X_2 + .150X_{14} - .031X_1 + .126X_4 + 4.267X_8 + .000044X_1^2 - .084X_{11} - .107X_{12} + 1.546X_{10} - 1.236X_5 + .976X_7. \quad [R\ 1]$$

Table 2 summarizes the regression results for this econometric cost model, including the overall F statistic. All variables included are significant at the .05 level.

The regression presented previously and in table 2 shows that occupancy rate, the CPI (which measures the impact of inflation over the period investigated), government control, and nursing home size and location—as measured by the FPLI—explain more than two-fifths of the total variation in unit costs. The remaining variables add little explanatory power to those five top variables. Streamlining the model gives the following regression equation ($R^2 = .425$, $F = 180.45$; beta coefficients are in parentheses under each variable):

$$Y = -21.427 - 32.929X_2 + .149X_{14} - .015X_1 + .180X_4 + 4.597X_8. \quad [R\ 2]$$
$$\qquad\qquad (-.547) \quad (.444) \quad (-.146) \qquad (.153) \quad (.110)$$

Occupancy rate, the CPI, size, and the FPLI come in with the expected signs. The only possible surprise might be the positive sign of the government control variable X_8. However (*16a*):

Cost studies have consistently found that facilities owned and operated by nonprofit voluntary and government organizations have higher costs than for-profit nursing homes by at least several dollars per day.

The strong regional and urban-rural diversity was expected to be more strongly reflected in unit cost differences than is evidenced by the explanatory power of the FPLI in the previous regression equations. The model was therefore structured to incorporate three regional dummy variables, one each for the lower cost HSAs 1, 2, 3 (North X_{15}); HSAs 4, 5, 6 (Central X_{16}); and the high-cost HSAs 7, 8, and 9 (Southeast X_{17}). Inclusion of these variables leads to the regression results in which the Southeast dummy variable (X_{17}) completely overshadows the impact of the FPLI (X_4) and of the SMSA dummy variable (X_3); neither variable consequently enters as a predictor. Reduction to a highly efficient and manageable five-variable model is as follows ($R^2 = .476$; beta coefficients in parentheses below):

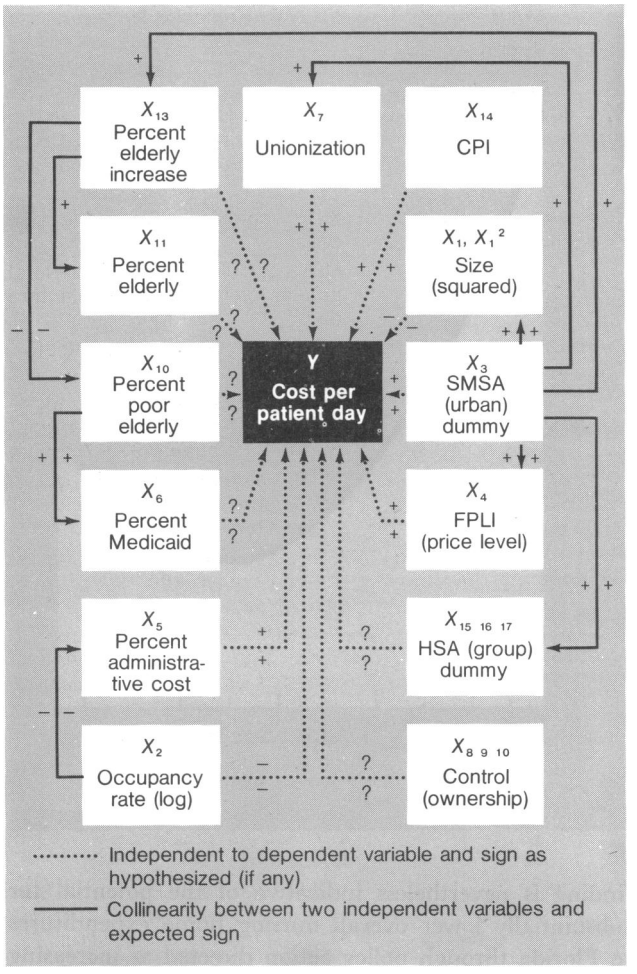
$$Y = -4.9 + .15X_{14} - 25.83X_2 + 2.28X_{17} - .01X_1 + 2.74X_8. \quad [R\ 3]$$
$$\qquad\quad (.585) \quad (-.456) \quad (.220) \quad (-.27) \qquad (.094)$$

Figure 2 illustrates the relationships and relative

Table 1. Variables employed and data sources

Variables	Data source and location
Dependent	
Y = cost per patient day	Medicaid Cost Reports (MCR), Department of Health and Rehabilitative Services, Jacksonville
Independent	
X_1 = size of facility (licensed beds)	MCR, calculated available bed days.
X_2 = occupancy or utilization rate	MCR, calculated by dividing total patient days into available bed days.
X_3 = urban-rural (SMSA–non-SMSA)	MCR and "Florida Statistical Abstract."
X_4 = location-related cost input factors	FPLI—Annual report to the legislature by the Florida Department of Administration (1972–76 only).
X_5 = percent administrative costs	MCR, calculated by dividing administrative into total expenditures.
X_6 = percent Medicaid patient days	MCR, calculated by dividing Medicaid days into total patient days.
X_7 = degree of unionization	Florida nurses' associations, Public Employees Relations Commission, AFL-CIO Office in Florida.
$X_{8\text{-}10}$ = control	MCR; X_8 = government; X_9 = private nonprofit; X_{10} = private for profit.
X_{11} = percent elderly, 1976	"Florida Statistical Abstract 1977," estimates for July 1, 1976 (calculated).
X_{12} = percent elderly in poverty, 1975	"Older People in Florida: A Statistical Abstract: 1976" (University of Florida, Gainesville).
X_{13} = change in the percent elderly, 1970 to 1976	"Florida Statistical Abstract" 1972 and 1977 (calculated).
X_{14} = annual Consumer Price Index, 1971 to 1976	U.S. Bureau of Labor Statistics
$X_{15\text{-}17}$ = regional (HSA) grouping	X_{15} HSAs 1,2,3; North Florida X_{16} HSAs 4,5,6; Central Florida X_{17} HSAs 7,8,9; Southeast Florida

Figure 1. Hypothesized model of the relationships among variables



strength of independent variables in the final model R 3 and compares it to the previous 5-variable model R 2. The cost per patient-day is found to be highly and positively correlated with the CPI (X_{14}), negatively with the log 10 of the occupancy rate (X_2) and with size (X_1), and positively with location in the high-cost southeast Florida coastal area (X_{17}) and with government control (X_8). The comparison with the earlier discussed 5-variable regression R 2 presented in figure 2 shows replacement of the FPLI by the stronger Southeast HSAs' regional predictor, as well as the reversal of X_2, occupancy rate, and X_{14}, CPI.

Analysis of regressions run separately for the 6-year urban (SMSA) and rural data set shows an urban outcome similar to that of the combined regression ($R^2 = .4227$, $F = 122.12$ at the .05 level of significance, and beta coefficients are indicated in parentheses):

$$Y = -25.74 - \underset{(-.527)}{34.36X_2} + \underset{(.429)}{.15X_{14}} + \underset{(.168)}{7.90X_8} + \underset{(.163)}{.22X_4} - \underset{(-.150)}{.014X_1}. \quad \text{[R 4]}$$

Regression of the 409 Medicaid Cost Reports' data submitted by non-SMSA nursing homes over the 6-year period shows only the log 10 of occupancy rate, CPI, and size entering the model at the .05 level of significance ($R^2 = .5$, $F = 128.12$, beta in parentheses):

$$Y = -3.69 - \underset{(.5204)}{31.968X_{14}} + \underset{(-.6546)}{.150X_2} - \underset{(-.1716)}{.025X_1}. \quad \text{[R 5]}$$

The hypothetical "optimal size" was calculated for the U-shaped cost-size relationship by partial differentiation. Taking the first derivative of the final five-variable regression, R 3, and setting it equal to zero results in a minimum-cost size of 356 beds. Figure 3 illustrates this size-cost relationship. Interestingly enough, an identical optimal, that is, lowest cost-size range, was suggested in Meiners' analysis of national survey data (*14a*).

Entering the calculated optimal values for size and

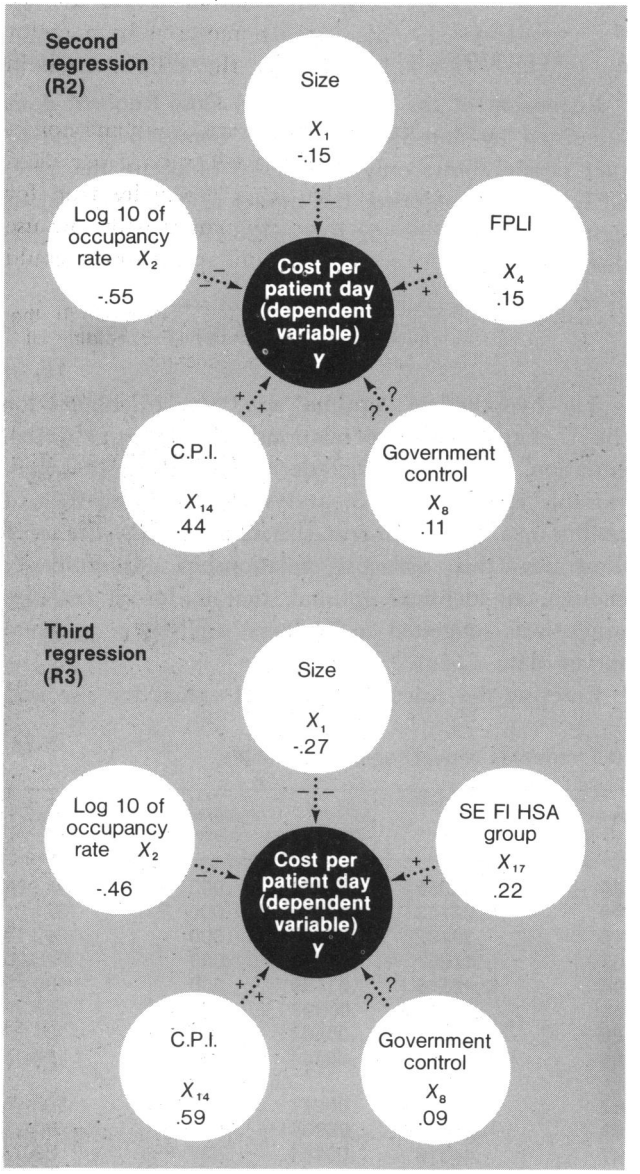
Table 2. Summary tables of regression R 1 (all variables except regional variables)

Variable number and name	Beta coefficient	R^2	R^2 change	Significance level	Overall F value
X_2 Log 10 of occupancy rate	−.568	.20369	.20369	.000	313.86
X_{14} Consumer Price Index	.446	.37723	.17354	.000	371.31
X_1 Size (capacity)	−.315	.39192	.01469	.000	263.18
X_4 FPLI (regional cost differential)	.107	.41267	.02075	.000	215.00
X_8 Government control	.104	.42543	.01186	.000	180.45
X_1^2 Size (capacity) squared	.181	.43116	.00662	.000	154.37
X_{11} Percent elderly in 1976	−.120	.43677	.00562	.001	135.27
X_{12} Percent poor elderly in 1975	−.109	.44122	.00444	.002	120.41
X_9 Noncorporate private control (individual, partnership, or other)	.052	.44398	.00277	.014	108.15
X_5 Percent administrative costs	−.049	.44637	.00234	.023	98.18
X_7 Degree of unionization	.047	.44816	.00184	.047	89.85

NOTE: FPLI Florida Price Level Index.

size squared (X_1 and X_1^2) and the means for all the other variables into the regression equation and solving for Y, for the total Florida data set, we obtain \$15.84 as the hypothetical 6-year average minimum per diem cost at the optimum size. If all Florida homes had averaged this cost instead of the actual \$18.53 mean for the 6-year period, the hypothetical savings would have amounted to \$136.3 million. The urban areas, that is, the SMSAs, would have accounted for \$103.5 million, or three-fourths of the calculated total "savings." Despite the hypothetical nature of the optimal size (range) and the associated minimum cost, this finding is nevertheless indicative of the potential for substantially lower overall nursing home expenditures in Florida through policy action directed at increasing the average size of nursing homes.

Figure 2. Comparison of five-variable models, using the Florida Price Level Index (FPLI) and the Health Systems Agency (HSA) group, respectively, as indicator of regional cost differentials in terms of their standardized beta coefficients



NOTE: Expected signs are indicated per figure 1 and substantiated by regression results.

Figure 3. Size-cost relationship for the 6-year data set as calculated from regression R 3, holding all other variables entered constant

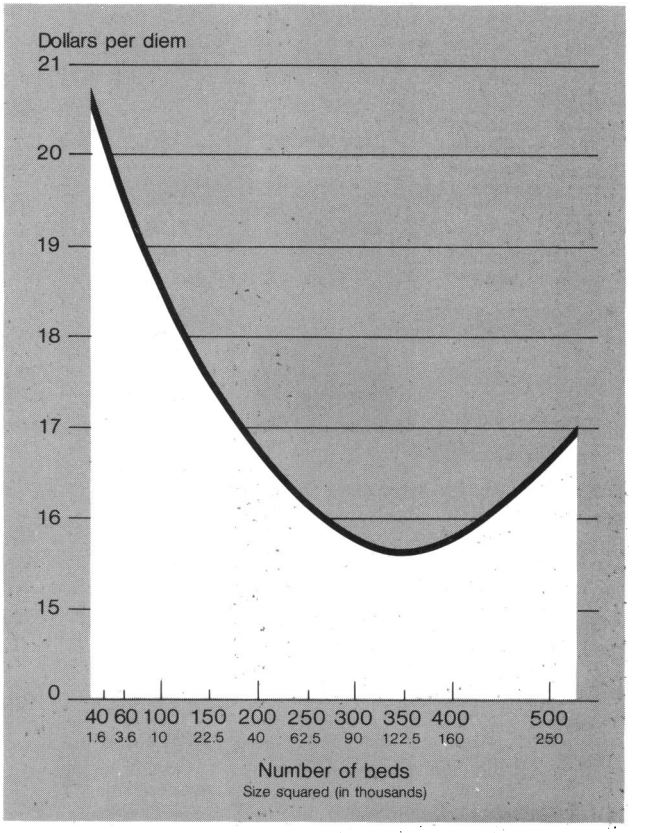
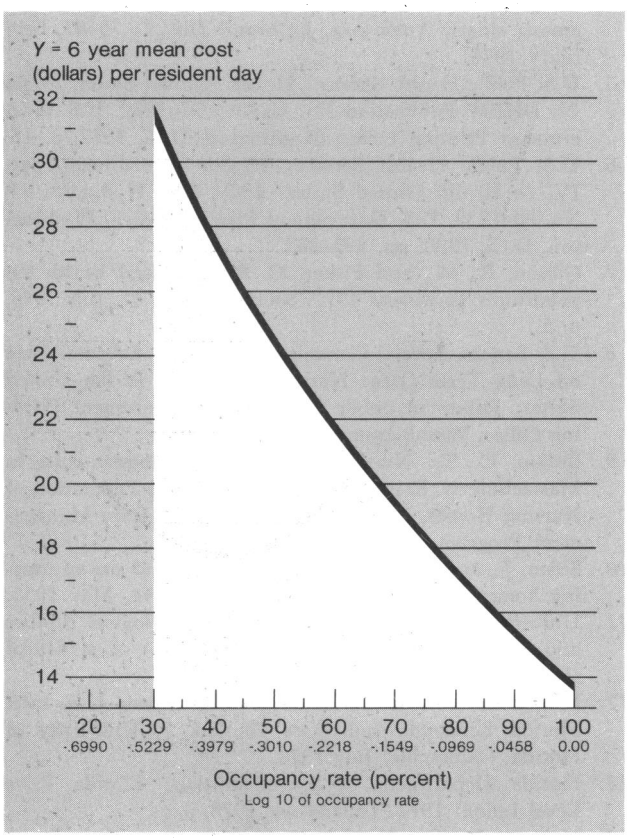


Table 3. Hypothetical mean per diem rates related to changes in the occupancy rate (OR)

Mean per diem rate	*OR in percentages*	*Marginal cost reductions with each 10 percent improvement in OR*
\$37.72	20	
\$34.41	25	\$6.02
\$37.70	30	
\$27.43	40	4.27
\$24.12	50	3.31
\$21.39	60	2.73
\$19.14	70	2.25
\$18.11	75	1.98
\$17.16	80	
\$15.82	87.5	1.75
\$15.41	90	
\$14.61	95	
\$14.15	98	1.56
\$14.00	99	
\$13.92	99.5	
\$13.85	100.0	

Figure 4. Occupancy rate-cost relationship for the 6-year data set as calculated from regression R 3, holding all other variables entered constant



The cost-occupancy relationship is also of great interest. Holding all other values constant, the cost-occupancy relationship is depicted in table 3 and figure 4 which show the strong reduction of per diem costs with improving utilization. This trend is especially evident at the lower occupancy ranges. In terms of a cost-containment strategy, concentration on the improvement of low occupancy rates is preferable to attempts to raise high utilization levels even higher. It may mean the closure or consolidation of underused small facilities or of wings of larger homes.

The rate of inflation, as expressed by the CPI, impacts upon the nursing home industry's costs beyond the relative increase in the CPI itself. This effect is the result of partial differentiation of the 6-year Florida data set, and it is presented in figure 5. The often-expressed concern over the cost-escalating impact of inflation on nursing homes, and thus indirectly on a large portion of the States' Medicaid budgets, seem well substantiated by this analysis.

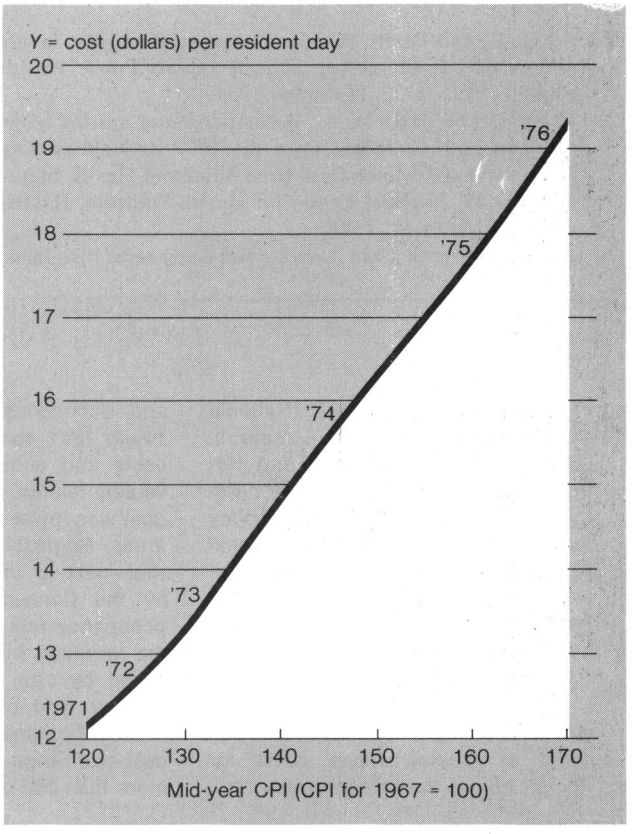
Policy Implications of Study Findings

Regression analysis of an extensive data set from 6 years of Medicaid Cost Reports explains about one-half of the variation in the per diem cost of nursing home care in Florida. This finding means, of course, that one-half of the variation in unit cost remains unexplained by this study. Most of this unexplained variation probably relates to "quality of care," which needs to be studied in its cost impact by measuring its structure, process, (subjective) patient satisfaction, and (objective) health status outcome. In addition, organizational structure, managerial skills, patient mix and characteristics, and staff "quality," morale, and turnover need also to be studied to enlarge our knowledge of nursing home operations and their functional cost components.

Nevertheless, the following policy implications can be drawn from this analysis:

- Reduction in the rate of inflation would reduce the rate of increase in nursing home costs by a factor of one-third to one-half greater than the change in the CPI itself.
- Improvement in the occupancy rate of nursing homes with persistently low rates of use will reduce per diem costs significantly. This change is especially true for larger homes. Closing or merging homes with low use rates through de-licensing or similar measures could

Figure 5. Consumer price index (CPI)-cost relationship for the 6-year data set, calculated from regression R 3, holding all other variables entered constant



lead to a substantial reduction in unit cost, thus alleviating the upward pressure on States' Medicaid budgets.

• Larger, more cost-efficient facilities through consolidation of homes, for instance, or the sharing of services such as medical direction, dietary planning, or various types of activity programs and therapy services would lead to a further reduction in cost.

• The factors behind the high unit costs of government-controlled nursing homes (usually county facilities) need to be further investigated. High costs may be attributable to their high administrative or payroll cost per patient-day, which do not necessarily contribute to better patient care.

• Placement of public-pay residents into nursing homes located in lower cost areas to the extent it is humanely possible without disrupting their family ties or other human or locational attachments should be considered. The calculations performed in this analysis show that many millions of dollars could be saved each year by such a policy in one State alone.

• Publication of nursing home costs and charges to enable both policymaker and consumer to make informed decisions and judgments might positively affect public policy through incentive-disincentive structuring as well as individual consumers' choice of less expensive nursing homes.

References

1. Solon, J., and Baney, A. M.: Inventory of nursing homes and related facilities—an advance report. Public Health Rep 69: 1121–1132, December 1954.
2. Hing, E., and Zappolo, A.: A comparison of nursing home residents and discharges from the 1977 national nursing home survey. Advance Data from Vital and Health Statistics, No. 29, National Center for Health Statistics, Hyattsville, Md., May 17, 1978.
3. American Health Care Association: Long term care facts. Publication No. 75 M–7503–1. Washington, D.C. Undated.
4. Dunlop, B. D.: Need for and utilization of long-term care among elderly Americans. J Chronic Dis 29: 75–87, February 1976.
5. U.S. Public Health Service: Health, United States, 1976–77. DHEW Publication No. (HRA) 77–1232. U.S. Government Printing Office, Washington, D.C., 1977, p. 16.
6. U.S. Public Health Service: Health expenditures, Sec. IV, *In* Health United States: 1979. DHEW Publication No. 80–1232. U.S. Government Printing Office, Washington, D.C., 1980, pp. 235–263.
7. Gibson, R. M., and Fisher, C. R.: National health expenditures, fiscal year 1977. Social Sec Bull 41, July 1978, p. 5.
8. U.S. Senate, Special Committee on Aging, Subcommittee on Long Term Care: Nursing home care in the United States: failure in public policy. U.S. Government Printing Office, Washington, D.C., 1974, p. 11.
9. Bishop, C. E.: Nursing home and rest home costs in Massachusetts. Report to the Massachusetts Federation of Nursing Homes. Boston University Health Care Management Program. Boston, October 1976.
10. Solon, J., and Baney, A. M.: Ownership and size of nursing homes. Public Health Rep 70: 437–444, May 1955.
11. University of Florida, Center for Gerontological Studies and Programs: Older people in Florida: a statistical abstract. Gainesville, 1976.
12. Forde, R.: Florida suburban growth exceeds U.S. rate. Florida Economic Indicators 10, No. 7, University of Florida, Gainesville, July 1978.
13. Florida Department of Administration: Florida Price Level Index: 1977. Tallahassee, 1978, p. i.
14. Meiners, M. R.: Nursing home costs: a statistical cost function analysis using national survey data. Doctoral thesis. Georgetown University, Washington, D.C., December 1978; (*a*) pp. 108, 118, 136.
15. Meiners, M. R.: An econometric analysis of the major determinants of nursing home costs in the United States. Soc Sci Med 16: 887–898 (1982).
16. Bishop, C. E.: Nursing home cost and reimbursement issues. Health Care Financing Rev 1:60, spring 1980, (*a*) p. 50.

SYNOPSIS

TRAXLER, HERBERT G. (National Center for Health Services Research, U.S. Department of Health and Human Services): *Determinants of nursing home costs in Florida: policy implications and support in national research findings. Public Health Reports, Vol. 97, November–December 1982, pp. 537–544.*

Descriptive and econometric analysis of the major nonquality determinants of nursing home costs for Florida shows that mean costs, size, and occupancy rate increased between 1971 and 1976, that per diem costs and occupancy rate were inversely related, and that the per diem cost was lower in rural than in urban areas. Regression of the data shows that—next to inflation, as expressed by the Consumer Price Index—the occupancy rate accounts for most of the variation in per diem costs, followed by size, urban-rural location, and by type of control. The hypothetical "optimal," defined as lowest cost-size range, was calculated to be more than 350 beds. Recent research substantiates most of these findings.

Medicaid Cost Reports from Florida's nursing homes were the source of the information analyzed; by 1976, the sixth year of the study, the data base covered nearly 9 of 10 licensed beds in the State.

Some policy implications can be drawn from the analysis. Reductions in per diem costs could be achieved by higher occupancy rates, especially in the larger nursing homes, and a reduction in the rate of inflation would reduce the rate of increase in nursing home costs.