Market Entry and Exit in Long-Term Care: 1985-2000

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Market entry and exit of skilled nursing providers is analyzed to observe initial industry responses to Medicare prospective payment. Supply adjustments were immediate, and were stronger in urban than in rural areas. After12 years of steady growth, widespread market expansion ceased in 1998, but net reductions in the number of facilities occurred primarily in the hospital-based sector. In county-level modeling with controls for State policy effects, post-prospective payment system (PPS) reductions in the number of skilled nursing facilities (SNFs) were associated with supply considerations; reductions were more likely to occur in areas with higher bed-to-population ratios prior to PPS implementation, and in areas that had recently seen expansion in capacity. County-level reduction in the number of SNFs was not associated with low income or other sociodemographic risk factors.

OBJECTIVES

In 1998 the Medicare Program began a 3-year transition in its form of payment for nursing home care, from a cost-based method to a system of prospectively set prices per severity-weighted day of care known as the SNF PPS. Following a decade of extraordinary growth in Medicare payments for skilled nursing and other post-acute care, the Balanced Budget Act (BBA) of 1997 mandated this transition as a strategy to encourage efficiency and discourage unnecessary services. The new rates had already been under development for several years by the Health Care Financing Administration, and the background and methods for their computation have been described in detail in the *Federal Register* (1997; 1998). Rates were derived from inflation-updated average allowable rural and urban per diem costs in an earlier base year, that had been standardized for regional input price differences using an area wage index, and for case-mix differences using a system of resource utilization groups (RUGs). During the 3-year transition facilities were paid based on a blend that incorporated decreasing proportions of their own historical cost per day; payments were not based on 100 percent of the Federal rate until 2001.

At the start of the PPS transition period there was widespread industry concern about the adequacy of the new system, and its impact both on facility profitability and on the quality of skilled nursing care. Nursing facilities that delivered substantial amounts of care to Medicare beneficiaries faced rapid changes in financing that were likely to affect their short-term profitability, as they made necessary clinical and managerial adjustments in response to the incentives posed by PPS. A few high-profile bankruptcies of major shareholder-owned nursing home chains drew public attention to the new payment system, prompting reviews from congressional and other Federal agencies (Office of the Inspector General, 1999; U.S. General Accounting Office, 1999a, b, c; Medicare Payment Advisory Commission, 1999). The U.S. General Accounting Office testified

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before Congress that the 1999 bankruptcy filings by major chains were the result of overinvestment in ancillary service delivery settings. In their opinion, the filings were indicative of a period of industry adjustment to PPS, but did not pose a threat to beneficiaries' access to care and did not constitute evidence that the rates were fundamentally inadequate (U.S. General Accounting Office, 2000). Provisions included in the BBA 1999 and again in the Benefits Improvement and Protection Act of 2000 modified several components to the new system, and provided some payment relief by temporarily raising rates for certain complex admission types. These legislative reforms, together with other rate changes implemented by CMS as part of its annual update process, addressed some of the industry's concerns about the fairness and adequacy of the system. The essential structure of a fixed, all-inclusive payment per case-mix adjusted day, however, remains unchanged.

This study's objective is to investigate the impact of SNF PPS on market expansion, and to identify differences in market responses to the new payment system by type of ownership, hospital affiliation and location. The nursing home industry is characterized by considerable entry as well as exit activity, and in gauging the impact of SNF PPS it is important to take a longer-range perspective by looking at patterns of market growth over several years. This article takes advantage of the historical information maintained in the certification files, by tracking openings and closings of SNFs for the 12 years before implementation (1985-1997) and the 3 years of PPS transition (1998-2000). Market entry and exit is only one of many possible markers for changes in long-term care (LTC) supply. Although this study examines only the number of operating facilities, changes in bed capacity, changes in the levels or intensity of treatment, and changes in facility ownership or consolidation are all potential indicators of changes in beneficiary access to extended care. Each of these should also be studied, as the national data become available on service use, cost, and profitability of Medicare SNF services during the PPS transition period.

SOURCES

Data are taken from the Online Survey and Certification (OSCAR) File, which is a CMS public use file that is updated regularly from State survey and licensure information on all nursing homes that accept Medicaid or Medicare patients. Our source file includes updates provided as late as March 2001. Within this file, information on bed capacity, staffing levels, and characteristics of the patient population may be updated at different times for different facilities, such that the accuracy of these data, as of a given file creation date, depends on the timing of the State surveys. The information extracted for our study, however, relates primarily to new or terminated provider numbers. These items are maintained by CMS as part of its provider participation and billing records, and may be considered current as of the release date of any given file.

For this study, new facilities are identified by new provider numbers and closed facilities are identified by provider number termination codes. We have aggregated the openings and closings and status changes of all nursing homes in the OSCAR file, by year, from 1985-2000. Data on the subgroup of Medicare-participating facilities are further examined by location, ownership, and facility type.

County-level files were constructed from the OSCAR data, which were then merged with sociodemographic information from the Area Resource File, as released in

2001. Summary variables were computed to capture changes in the number of SNFs by county, for the 3-year periods 1995-1997 and 1998-2000. These were used in multivariate models identifying local conditions that are associated with a post-PPS reduction in skilled nursing home supply.

Our data are organized by calendar year. The new Medicare payment system began in 1998 for facilities with fiscal years starting on or after July 1, 1998, and therefore, was effective for at most one-half of that year. For some analyses we needed to dichotomize the data into pre- and post-PPS periods, and this required a decision on whether to identify 1998 or 1999 as the first PPS year. We chose to treat 1998 as the first year of PPS, because the industry had knowledge of the BBA requirements and new rates by the beginning of that period.

INDUSTRY BACKGROUND

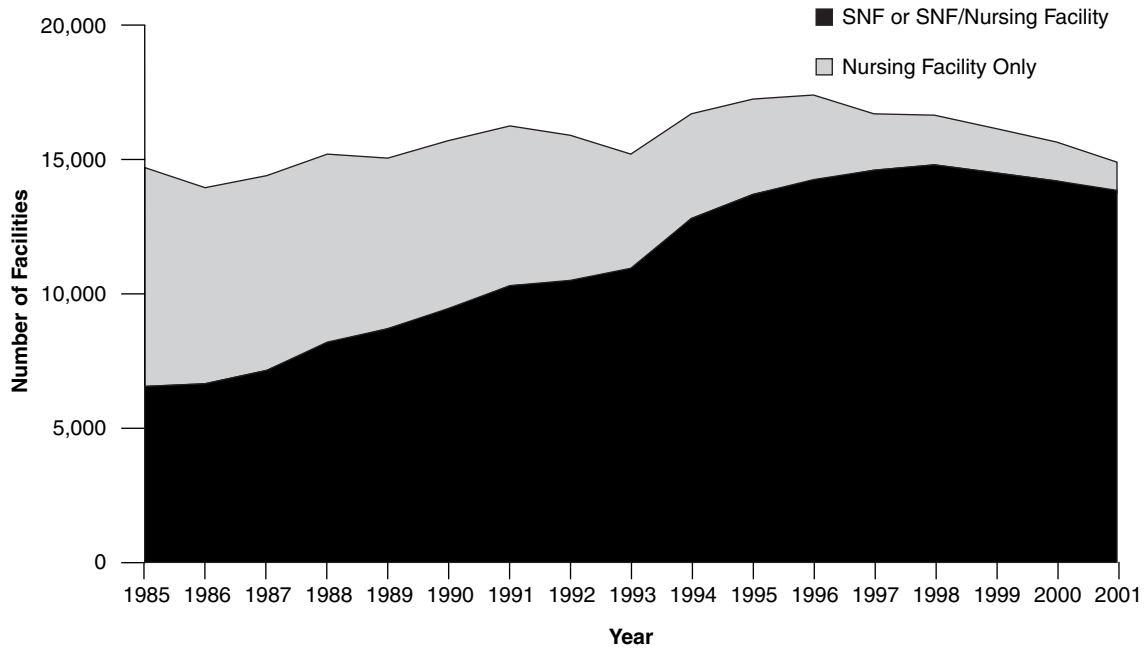
At the start of 2001 there were approximately 17,000 nursing homes in the United States that were certified to provide care to Medicaid and/or Medicare beneficiaries, and these operated 1.7 million extended care beds. Nearly two-thirds of nursing homes are proprietary, owned by corporations or — less commonly — by individuals or partnerships. Another 27 percent are organized as private non-profit entities and the remainder are public. Twelve percent of all nursing facilities are operated as subunits within hospitals; the rest are licensed as freestanding facilities. The number of beds operated by a single facility ranges from 4 to nearly 1,400, but the median size of freestanding facilities at the beginning of 2001 was 100 beds, and the median for hospital-based facilities was only 30 beds. For-profit facilities tend to be larger than not-for-profit ones, but this is because 97 percent of all proprietary nursing homes are licensed as freestanding.

Most admissions to nursing homes are not covered by Medicare. The Medicare skilled nursing service benefit is designed as a supplement to inpatient acute hospital services (Health Care Financing Administration, 1992; Office of the Inspector General, 1994). Medicare covers extended care for skilled nursing and rehabilitative services if they are provided in a certified facility or hospital swing bed, and only subsequent to an acute care admission. Coverage extends for up to 100 days, but beneficiaries pay substantial copayments after the 20th day. Medicare-sponsored patients typically account for less than 9 percent of all nursing home patients, and only 12 percent of total nursing home expenditures (American Health Care Association, 2001). Though small, Medicare's share has grown rapidly over the last two decades; according to the National Health Expenditures Survey, Medicare accounted for only 2 percent of expenditures in 1979 and 5 percent in 1989 (Centers for Medicare & Medicaid Services, 2001), and the growth can be attributed both to an increasing use rate per beneficiary, and more intensive and rehabilitation-oriented services.

The majority of nursing home patients are receiving chronic or custodial care, for which Medicaid is the main payer. Twelve percent of all nursing homes in the OSCAR File are certified for Medicaid and privately covered patients, but do not participate in the Medicare Program at all. These non-participating homes are referred to as nursing facilities. The care provided in these settings is generally longer in duration and less intense, and is not required to be carried out or directly supervised by licensed nursing and/or rehabilitation therapy personnel. Consistent with other literature in this field, we refer to nursing homes that are certified to provide at least some skilled level care as Medicare-participating

Figure 1

Number of Total Certified Nursing Homes, United States: 1985-2000



NOTE: SNF is skilled nursing facility.

SOURCE: Centers for Medicare & Medicaid Services: Data Analysis from the Online Survey and Certification Reporting System File, 2001.

nursing homes or SNFs. It is important to keep in mind that a SNF may certify only part of its bed capacity for Medicare patients, and skilled-level services can account for widely varying proportions of the total patient care provided in nursing homes that are identified as SNFs. Furthermore, a bed that is certified for skilled care is not necessarily staffed to accommodate that level of care, unless a skilled-level patient is actually in that bed. A Medicare-certified bed may be used for Medicare, Medicaid, or private patients.

NURSING HOME SUPPLY CHANGES

Market Expansion

The total number of certified nursing homes in the United States increased by only 15 percent over the 12 years from 1985 to 1997 (Figure 1). In this same period, the number of certified for skilled care grew by 136 percent, from 6,300 to nearly 14,900. SNF expansion occurred in both the for-profit and non-profit sectors. Until 1997, hospital-based facilities increased at a faster rate than freestanding ones, nearly tripling in number over these 12 years and increasing proportionally from 10 to 15 percent of total Medicare-participating facilities. Because not every bed in a new or converted SNF is required to be certified for skilled-level care, the increase in related Medicare-certified bed capacity may not have been as dramatic as the increase in Medicare-certified facilities, but it will still have been substantial.

The growth in SNFs was accompanied by reduction in the number of nursing facility-only facilities, and a large portion of the increase in SNFs was the result of status changes by existing facilities that

began to provide at least some skilled-level care to Medicare beneficiaries. Out of more than 7,000 terminations recorded for nursing facility provider numbers in the decade before PPS (1987-1997), nearly 8 in 10— or about 500 per year—were coded in the OSCAR File as status changes rather than closures. If these had all been changes from non-Medicare to Medicare-participating status, nursing facility conversions would have accounted for 54 percent of the new SNF provider numbers assigned during this period. Status changes among existing SNFs are less common, averaging only 26 per year in this same period. Immediately following PPS implementation there was some increase in this number (58 in 1998 and 62 in 1999), but they dropped back to earlier levels in 2000. While there may have been some fear that nursing homes would opt out of the Medicare Program after the implementation of PPS by abandoning skilled-level care and seeking recertification as nursing facility, there is no evidence of this during the PPS phase-in period.

Medicare-Certified Market

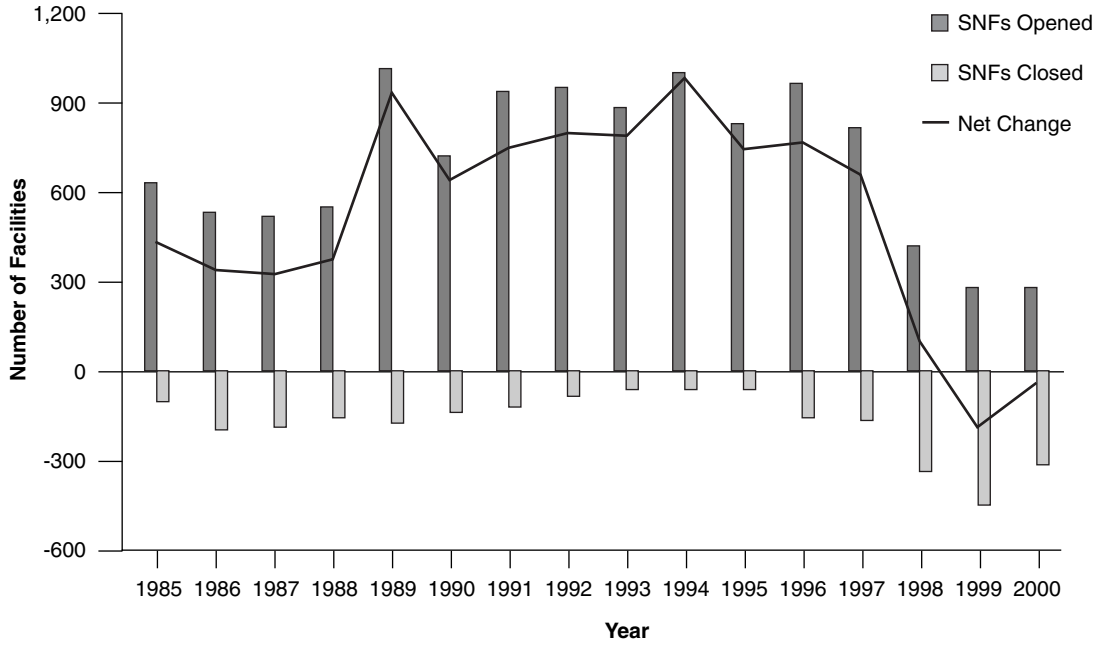
The remainder of this article follows activity among SNFs only, as indicative of entry and exit behavior in the market for Medicare-sponsored LTC. We track all terminated SNF provider numbers as facility closures, even though a small number of them represent status changes that may be closures only to beneficiaries of Medicare-covered services.

The rapid and widespread expansion of Medicare-certified facilities stopped after 1997. The number of certified freestanding SNFs increased very slightly from 1998 to 2000, and the number of hospital-based units actually declined. Figure 2 shows the number of SNFs opening and closing in each year since 1985. In the decade leading up to BBA, newly opened facilities outnumbered closed ones nearly seven to one, in both the for-profit and not-for-profit sectors. Beginning in 1998, entry activity declined, but did not stop altogether, while the annual number of closing facilities grew substantially. Even in these years, however, total market entries and exits were nearly balanced. Because the new entrants were nearly all freestanding while the closures tended to be in the smaller hospital-based facilities, the net effect of entry and exit on LTC beds over 1998-2000 is likely to have been an increase.

The nursing home industry appears to be highly responsive to the Medicare regulatory environment, despite the fact that Medicare-sponsored skilled care represents a minority of its business. The spike in the number of new facilities that can be seen in Figure 2 in 1989 occurred immediately after two regulatory events that broadened Medicare's extended care benefit. One was a set of clarifications issued by the Health Care Financing Administration in 1987 that were intended to reduce regional variation in the interpretation of the SNF benefit and to encourage facilities to set higher standards for functional recovery. These were, at least in part, a response to provisions in the Omnibus Budget Reconciliation Act of 1987 that focused on the need to set standards for functional recovery in skilled nursing settings (U.S. General Accounting Office, 1997). The other was a provision of the Medicare Catastrophic Coverage Act (MCCA) of 1988, which was effective throughout 1989, but was repealed in the subsequent year. The MCCA eliminated what is known as the 3-day rule, a Medicare requirement that inpatient skilled nursing services be covered subsequent to an acute hospitalization of at least 72 hours. The change would have extended coverage to many beneficiaries under a wider range of circumstances,

Figure 2

Market Entry and Exit of Skilled Nursing Facilities, United States: 1985–2000



NOTE: SNFs is skilled nursing facilities.

SOURCE: Centers for Medicare & Medicaid Services: Data analysis from the Online Survey and Certification Reporting System File, 2001.

and it resulted in an immediate though short-lived spike in service utilization (Health Care Financing Administration, 1992). The number of SNFs continued to grow even after the MCCA was repealed, but the pace was slower.

The increase in SNFs occurred across different types and sizes of community, and very similar cumulative trends can be seen if the data are subdivided by metropolitan status, or by level of rurality within non-metropolitan counties. (The codes are based on a combination of the Office of Management and Budget's metropolitan areas of 1993 and the population size of a country's largest city or urbanized area as estimated for 1997 (Ghelfi and Parker, 1997).[1] Although the absolute number of new facilities is consistently smaller in the non-metropolitan counties across the years, the trends over time are similar across county types.

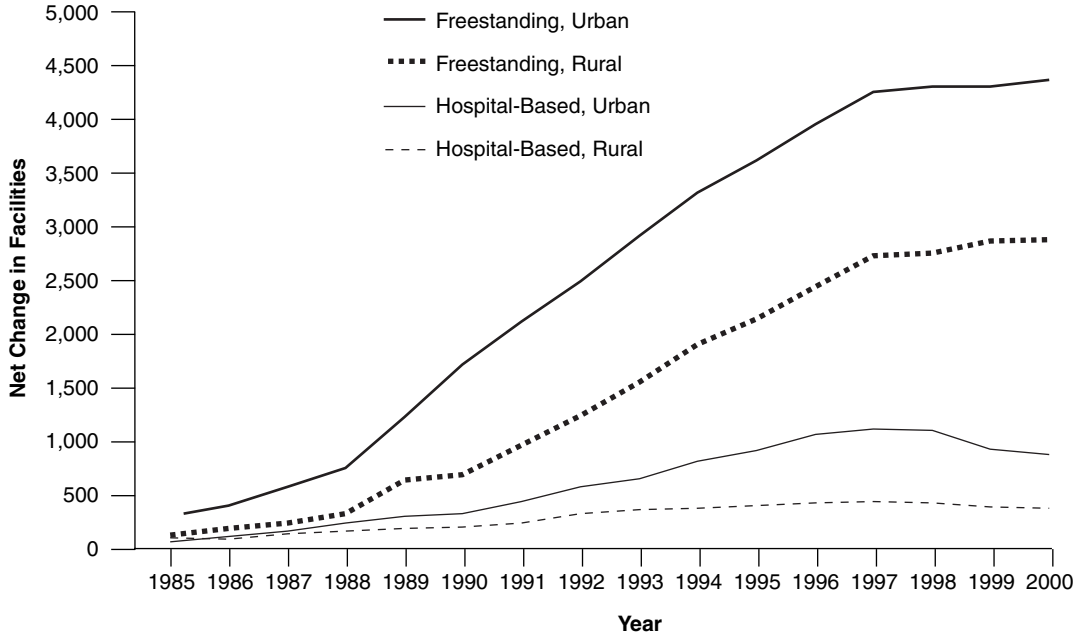
There are differences between urban and rural settings in the proportions and types of facilities that opened and closed during the post-PPS period (Figure 3). The net decline in the number of urban facilities between 1998 and 2000 is almost entirely from reductions in hospital-based units. The number of hospital-based facilities throughout the country declined by 342 — resulting in proportional reductions of nearly 20 percent in urban and 9 percent in rural settings, from their respective levels at the end of 1997.

After 1997, however, the entry and exit patterns are more complex than they appear from the graphs of cumulative change. Figures 4 and 5 show that virtually no new hospital-based facilities opened

[1] Data sorted by the U.S. Department of Agriculture's Urban Influence Codes are not shown, but are available on request from the author.

Figure 3

Cumulative Increases to Nursing Facilities and Related Bed Complements, by Hospital Affiliation and Location: United States, 1985-2000



NOTES: Lines are not stacked; y-axis measures the cumulative total since 1985, within each group. Urban and rural defined from Urban Influence Codes, which are based on 1993 county metropolitan statistical area assignment.

SOURCES: Centers for Medicare & Medicaid Services: Data analysis from the Online Survey and Certification Reporting System File, 2001; and (Ghelfi, L.M. and Parker, T.S., 1997).

after 1997 in urban or in rural counties, and so many existing units closed that by the end of 2000, the total number of hospital-based facilities had declined to the level that had prevailed in 1994. Among freestanding units there was also a substantial increase in the number of closures beginning in 1998, but the key difference is that the market still supported new entrants; the number of new freestanding providers still equaled or exceeded the number of terminated ones in each of the post-PPS years. Overall, there was a net loss of facilities in metropolitan areas, but a net gain in non-metropolitan ones, during the three PPS transition years.

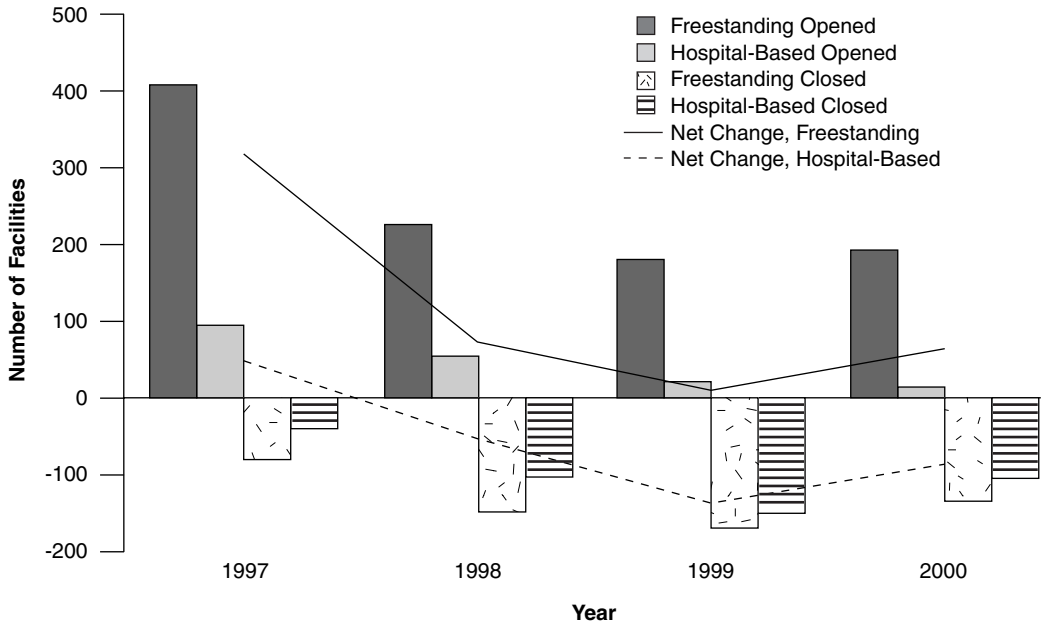
If we were to aggregate this activity by ownership status, the analysis would show not-for-profit facilities closing in greater proportions than for-profit facilities. The apparent differences by ownership are attributable, however, to the fact that so few for-profit facilities are hospital-based. We found little difference between for-profit and not-for-profit freestanding facilities in their patterns of cumulative change, either before or after the introduction of PPS.

County-Level Supply Changes

Our data on firm entry and exit does not track the new providers identified in the OSCAR File to determine if the physical facility was operating previously under different ownership. Some of the facility openings and closings that have been identified, therefore, will have been the result of changes in ownership, but not an actual gain or loss of a facility in the community. To the extent that this activity represents the effects of acquisition and consolidation, the OSCAR data may overstate entry and

Figure 4

Entry and Exit of Nursing Homes in Urban Areas, by Affiliation: United States, 1997-2000



NOTES: Urban identified according to 1997 Urban Influence Codes (Ghelfi, L.M. and Parker, T.S., 1997).

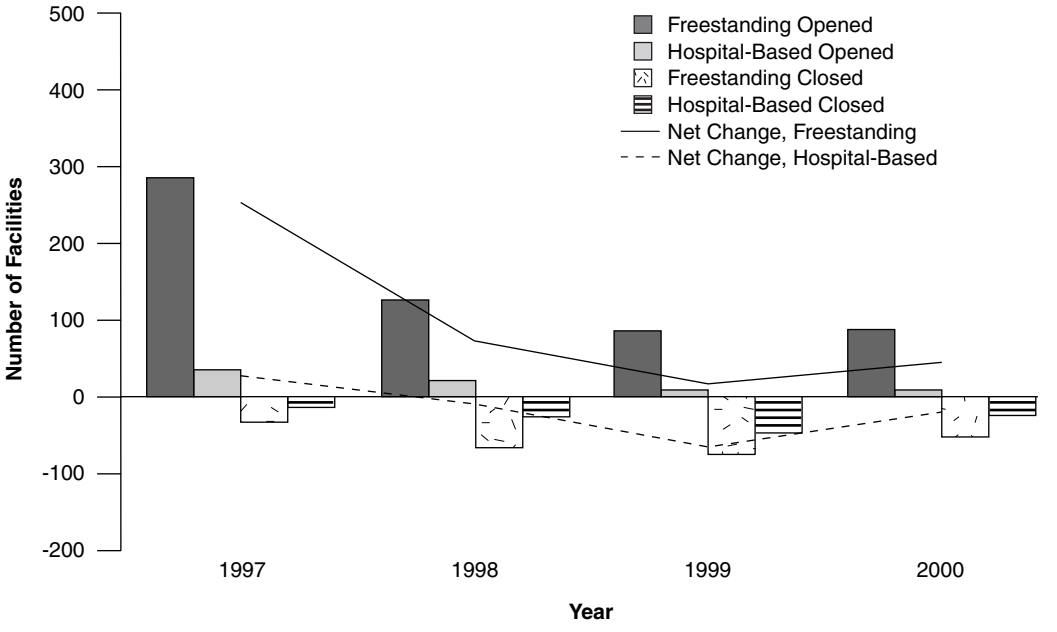
SOURCE: Centers for Medicare & Medicaid Services: Data analysis from the Online Survey and Certification Reporting System File, 2001.

exit behavior. The net change in facilities is an estimate of change in supply, but it may still overstate any reductions if there have been consolidations of smaller homes under one owner. Increasing ownership turnover or consolidation following PPS implementation is an important measure of industry response in its own right, one that should be studied in combination with other certification and cost report utilization data as it becomes available. To get a better approximation of real entry and exit patterns and assess the local effects of net changes in nursing home supply, we aggregated the OSCAR data on new and terminated providers at the individual county- level. We computed the net change in nursing homes, by county and year, and then aggregated these numbers for the 3-year period before PPS (1995-1997), and during the transition (1998-2000).

U.S. counties vary widely in population base and land area as well as in LTC supply. At one extreme, the OSCAR File listed 425 certified nursing homes in Los Angeles County alone. Three-fourths of all metropolitan counties, however, and all non-metropolitan counties, had fewer than 15 homes. Seven percent of rural counties had no nursing homes at all at the beginning of 2001, and 16 percent had no Medicare-participating homes. During the period of expansion from 1985-1997, three-fourths of all counties experienced some growth in the number of facilities and less than 1 percent showed a net reduction (Table 1). Even in the last 3 years prior to PPS implementation (1995-1997), 36 percent of counties had a net increase and only 2 percent had a net reduction. However, summarized OSCAR data show that for the majority of counties in the United States, regardless of

Figure 5

Entry and Exit of Nursing Homes in Rural Areas, by Affiliation: United States, 1997-2000



NOTES: Rural identified according to 1997 Urban Influence Codes (Ghelfi, L.M. and Parker, T.S., 1997).

SOURCE: Centers for Medicare & Medicaid Services: Data analysis from the Online Survey and Certification Reporting System File, 2001.

size or urban influence status, expansion in the LTC industry stopped after 1997. During the 3 years from 1998 to 2000, 75 percent of all counties in the United States had no net change—71 percent had no entry or exit activity at all, and in 4 percent of counties an equal number of SNF providers opened as closed (quite possibly from changes of ownership). Surprisingly, for the remaining 25 percent of counties that experienced some change in their supply of SNFs, increases were slightly more common than decreases; nearly twice as many counties had a net gain in freestanding facilities as had a net loss, but the large number of closures among hospital-based facilities offset these.

There are pronounced regional differences in market activity after 1998 that relate to the difference in mix of freestanding versus hospital-based facilities, but may also reflect differences in the State regulatory environment. Most of the Nation's counties that lost facilities between 1998 and 2000 are in the Southwest, Mountain, and Pacific coast areas (particularly Texas and California), and most of the reductions are in hospital-based units. Sixty percent of counties on the Pacific coast and nearly 40 percent of urban counties in the southwestern States (Arkansas, Louisiana, Oklahoma, and Texas) lost SNFs. Several major urban counties in the New England area, however, also saw a reduction of facilities after 1998.

We examined characteristics of the counties that experienced post-PPS contraction in their number of SNFs, to determine if they were significantly different from counties with expansion or with no net change, with respect to sociodemographics or underlying supply-related characteristics (Table 2). Looking only at bivariate comparisons of group means, counties that lost nursing

Table 1

County-Level Summary of Nursing Home Openings and Closings: United States, 1998-2000

County and Affiliation	Number as of January 1998		Distribution of Counties by Market Activity Between 1998 and 2000			
				Counties Where the Number Closed Is		
	Counties	Skilled Nursing Facilties	Counties with No Activity	Equal to the Number Opened	Greater than the Number Opened	Less than the Number Opened
County Group			Percent			
Rural	2,299	4,805	80.5	2.4	7.6	9.5
Urban	833	9,982	0.5	7.9	24.0	22.2
All[1]	3,132	14,787	0.7	3.9	12.0	12.9
Hospital-Based Activity Only						
Rural	—	708	1.0	0.3	3.6	0.9
Urban	—	1,112	0.7	1.2	20.2	4.1
All	—	1,820	0.9	0.5	8.0	1.7
Freestanding Activity Only						
Rural	—	4,097	0.8	2.3	4.7	9.0
Urban	—	8,870	0.5	6.4	14.8	26.5
All	—	12,967	0.8	3.4	7.4	13.7

[1] Modified Federal Information Processing Standards (M-FIPS) Codes are used to conform to prior period data appearing in Area Resource File.

NOTE: Rural and urban identified according to 1997 Urban Influence Codes (Ghelfi, L.M. and Parker, T.S., 1997).

SOURCE: Centers for Medicare & Medicaid Services; Data analysis from the Online Survey and Certification Reporting System File, 2001.

Table 2

Characteristics of Counties, by Direction of Post-Prospective Payment System Change in SNFs: United States, 1997

		Sociodemographics				Supply Characteristics	
County Group	Number of Counties	Median Household Income	Percent Population Age 65 or Over	Percent Population Non-White, Including Hispanic	Total County Population	Certified Long-Term Care Beds per Thousand Elderly	Percent with Gain in Number of SNFs from 1995 to 1997
With No Change	2,328	$29,521	14.9	16.2	45,029	65.1	28
With Net Reduction	375	*32,570	*13.8	*26.1	*264,132	65.6	*71
With Net Increase	404	*32,960	14.6	17.2	*166,294	64.7	*50
All Counties[1]	3,107	30,336	14.7	16.9	87,241	65.1	36

* $p \leq 0.01$ in *t*-tests compared with the mean of the group with no change, from one-way analysis of variance.

[1] Excludes Alaska.

NOTES: SNFs is skilled nursing facilities. Median household income is measured as of 1995; the other three sociodemographic variables are measured as of 1997.

SOURCES: Health Resources Services Administration: Data analysis from Area Resource File, 2000; and Centers for Medicare & Medicaid Services Online Survey and Certification Reporting System File, 1998 and 2001.

homes post-PPS tended to have a somewhat smaller share of elderly population and a higher proportion of non-white residents, as compared both with counties that gained facilities and with counties with no change. Counties with supply changes in either direction during the post-PPS period tended to be larger, and were more likely to have already expanded their SNF supply in the previous 3 years, than those with no change. These are counties where the market is generally more active, which may be a characteristic associated simply with population size. There were no significant differences between county groups in their population-based LTC supply measures, which we defined as the ratio of certified LTC beds to residents age 65 and over.

A major limitation of these bivariate comparisons is that they fail to account for differences in State regulatory environments. Licensure and oversight vary widely in their intensity, and State-run Medicaid Programs vary in the generosity of their payments and their LTC care eligibility criteria. Certificate of Need laws heavily restrict market entry in some States, have a modest impact in others, and are non-existent in still others. States with less regulatory interference may be more likely to see activity of any kind (openings or closings) than those with tougher laws. Any assessment of county-level differences in market response to PPS needs to account in some way for these State policy effects.

To identify the independent effects of sociodemographic characteristics and supply variables on the post-PPS activity, we constructed multivariate models for the probability of a county's experiencing a net decline in SNFs between 1998 and 2000, in which we controlled for fixed policy effects using dummy variables by State location. The model's explanatory variables included the characteristics listed in Table 2, plus dichotomous variables set equal to one if the county had experienced a net increase in SNFs between 1995 and 1997. After controlling for county population and State location, the strongest predictor for a county-level reduction during the PPS transition period is the indicator for having had an expansion in facilities during the three pre-PPS years. Apart from the size of the county population, none of the sociodemographic characteristics are significantly associated with the likelihood of a post-PPS reduction. In contrast to the findings from bivariate comparisons shown in Table 2, the multivariate model indicates that counties with higher bed-to-population ratios in 1997 are also more likely to have experienced SNF reductions. Thus, post-PPS losses in nursing homes at the county level are associated with market/supply related factors, but not with sociodemographics. Because most of the post-PPS decline in facilities happened in metropolitan areas, we also tested to see if the marginal effect of prior-period increases is different in rural than in urban settings, but we found no evidence of this. (Regression results are not included in this article, but they are available on request from the author.)

All of our findings are similar in significance and direction when we model county-level losses of hospital-based units separately from losses of freestanding units. The separate models by facility type add the interesting finding that the likelihood of a post-PPS reduction in hospital-based units is associated with recent expansion in hospital-based units, but not with recent expansion in freestanding units (and vice-versa). This finding suggests that the two types of providers may serve distinct markets, and lends support to the position that hospital-based settings provide care for a systematically different type of patient.

In Table 3 we summarize the effects of the two main supply-related covariates using probabilities simulated from the

Table 3

Independent Effects of Supply-Related Covariates on the Predicted Probability of a Reduction in Facilities: United States, 1998–2000

Type of Skilled Nursing Facility	Proportion of Counties with Net Decrease, 1998-2000[1]	Predicted Probability of Decrease, Given			
		County Did Not Have an Increase in Previous 3 Years	County Did Have an Increase in Previous 3 Years	25th Percentile of County Bed/Population Ratio[2]	75th Percentile of County Bed/Population Ratio[2]
All	0.13	0.08	0.18	0.11	0.16
Freestanding	0.09	0.06	0.13	0.08	0.12
Hospital-based	0.24	0.17	0.37	0.22	0.28
Urban Counties Only					
Freestanding	0.15	0.10	0.19	0.14	0.20
Hospital-Based	0.36	0.25	0.50	0.35	0.43
Rural Counties Only					
Freestanding	0.07	0.05	0.10	0.05	0.08
Hospital-Based	0.14	0.10	0.28	0.12	0.17

[1] Conditional on having at least one skilled nursing facility in 1997.

[2] Interquartile range for beds per 1,000 residents age 65 or over was 44 to 84.

NOTES: Table presents probability simulations on correlates of interest of a county-level reduction in the number of nursing homes during the prospective payment system phase-in period, after controlling for State policy effects. Results are from logistic regressions where the outcome equals one if the number of skilled nursing facilities in the county decreased between 1998 and 2000 by one or more, and zero otherwise. Three separate models were estimated based on outcomes identified by a decrease in number of total, of hospital-based, or of freestanding facilities. Other independent variables include: total population; median household income; percent age 65 or over; percent non-white; 0/1 indicators for the county presence of a hospital with swing beds; and individual State dummy variables. Population and bed supply variables were entered in natural log form. Predicted probabilities were computed by holding all other covariates at observed values while altering the values for the simulated variables as indicated in column headings. Coefficients on simulated variables were all significant at the $p<.001$ level.

SOURCE: Dalton, K., University of North Carolina at Chapel Hill, Chapel Hill, NC., 2002. (Regression output available on request from the authors.)

models. The probabilities in this table are derived by holding values for the county-level measures to their observed values, for all variables other than the one being simulated (effectively averaging the other variables across the values contained within the analytic sample). Counties with an increase in facilities immediately pre-PPS were roughly twice as likely to have a post-PPS decrease, than those that did not. The underlying sample proportions of a post-PPS decrease differ by location and type of facility, but the marginal effect of prior-period expansion on the probability of a post-PPS decrease is similar across groups. Rural location was eliminated as an independent variable in the models (since it is captured indirectly though the county population); because of the substantial differences in the sample's probability of the outcome between rural and urban counties, however, Table 3 summarizes simulated probabilities separately for these two groups. For all three outcomes modeled, the simulated effects of the bed-to-population ratio are proportionally smaller than those of prior-period expansion, but they are still substantial. A bed supply of 84 per 1,000 elderly residents (the 75th percentile of the sample distribution) yielded probabilities of a post-PPS reduction in facilities that were one-third to one-half again as large as the probabilities when the supply was only 44 per 1,000 (the 25th percentile).

In theory, the association between post-PPS facility reduction and prior-period facility expansion could be an artifact of negative autocorrelation. This occurs where activity in either direction in one time period tends to be followed by activity in the opposite direction in the next period. We do not think this is a likely explanation, in large part because of the small number of counties where there was any net reduction to capacity in the years immediately leading up to PPS.

DISCUSSION

The time series presented in this article indicate that the introduction of Medicare SNF PPS coincided with an abrupt halt in the expansion of the skilled LTC markets. Yet it is worth stressing that the payment rules and rates are still evolving, and that what is pictured here may be a short-term industry response only.

Although Medicare pays for fewer than 1 in 10 admissions, short-term or long-term sensitivity of nursing homes to the Medicare regulatory environment should not be surprising, because Medicare post-acute services have been the main source of expansion in demand in nursing home care since the 1980s. While SNF PPS was not necessarily intended to reduce Medicare beneficiaries' skilled nursing admission rates, one of its objectives was to reduce the use of unnecessary care during SNF stays and, by definition, this should have the effect of lowering demand for some SNF services. From these data we find that the industry expansion was at least temporarily halted, yet there has been no overall reduction in the number of Medicare-participating facilities during the transition period. Any change in price causes some market adjustment and our data indicate that there have been localized reductions in capacity. Had these reductions occurred in particularly poor, isolated, underserved or otherwise vulnerable communities there would be reason for concern, but we have found no evidence of this. Our findings may reflect only a temporary response, but there is nothing to indicate that widespread reductions may begin after 2000 in the absence of significant new rate-reducing regulation.

PPS based on all-inclusive rates per covered day does not provide any theoretical incentive to reduce SNF admissions or length of stay, and therefore should not

necessarily affect demand as measured by occupied beds. It should, however, motivate nursing homes to reduce costs by reducing the intensity of services delivered per day. It may (depending on the accuracy of its case-mix adjusters) create disincentives to admit the more medically intensive patients. This distinction is relevant to our findings with respect to hospital-based settings, where the 1998 Medicare stays were one-half as long, but 50 percent more costly per day, than those of freestanding facilities (Health Care Financing Administration, 2001). There are several plausible explanations for the differential decline in hospital-based units after PPS. Closing a single unit within an organization should be less costly than closing an entire facility. As a result, the decision to close might be undertaken more readily in hospital settings, particularly in urban areas where the SNF is less likely to be part of the hospital's core mission and clinical staff are more easily absorbed into other units. This would be true even if there were no systematic differences in operating cost structure or average profitability between hospital-based and freestanding settings. A more plausible, and not mutually exclusive, explanation is that there are systematic differences between the two settings in cost and profitability. If hospital-based units have historically had higher per-diem costs, they are likely to be facing lower payment margins under PPS, at least in the initial years. The standardized per-day amounts in the PPS rates were derived from base year costs in a way that gave lower weights to costs in hospital-based than freestanding settings, and as a consequence the rates may understate expected costs allocated as a result of standard Medicare cost accounting rules. In addition, the RUG-based patient classification system is not a very precise tool for acuity measurement for skilled-level care (Medicare Payment Advisory Commission, 1999). If hospital-based units serve a more complex patient group whose severity is not captured by the RUG weights, this will have the effect of reducing their PPS margins relative to those in freestanding units, for reasons not related to differences in efficiency.

Finally, the BBA also contained provisions that required CMS to make it more difficult for hospitals to improve their acute-care profitability under the inpatient PPS by shortening their lengths of stay through earlier discharges to post-acute care. These were changes to the inpatient hospital payment rules (rather the SNF rules), which reduced payment for certain diagnosis-related groups if the patient was transferred to a SNF or acute rehabilitation unit within a certain number of days after admission. Such changes may well have altered the hospitals' assessment of the usefulness of operating a SNF unit. An inability to fully recover either fixed costs allocated to the SNF unit or the variable costs associated with complex SNF patients, occurring simultaneously with reduced opportunities to use SNF care to improve their acute care margins, could certainly have caused hospitals to reconsider the role of a SNF unit in their overall business plan.

The data on nursing home closures during the initial post-PPS years points to a possible problem in the rate structure for urban hospital-based units. To the extent that former hospital-based patients can be adequately cared for in existing freestanding capacity (or by remaining in an acute-care bed), the reduction of hospital-based units is not necessarily a policy problem for the Medicare Program. If, however, there continues to be a distinct group of more severely disabled patients that are appropriate for SNF-level care, but are not adequately covered by the new rates, then the

reduction in hospital-based capacity merely transfers the profitability problems from the hospital to the freestanding setting. This could translate into reduced beneficiary access or quality-of-care problems for the more complex patients. Pre- and post-PPS patterns in unit costs, service intensity and profitability need to be examined at the claims level in order to disentangle the financial and policy issues of rate adequacy. This task will be particularly important to undertake over the next few years, as it becomes possible to merge cost report, individual claims, and clinical data, in order to inform the continuing debate on PPS in LTC.

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