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Oversight of Nursing Homes: Pruning the Tree or Just Spotting Bad Apples?

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Purpose: This study investigated whether higher rates of nursing home quality citations are associated with increased risk of voluntary and involuntary facility terminations from the Medicare/Medicaid certification process. ***Design and Methods:*** We examined nationwide Online Survey Certification and Reporting (OSCAR) data from 1992 through 2000 and used a multinomial logistic regression model with time-varying covariates to estimate the relationship between nursing home deficiencies and terminations. ***Results:*** In the study period, 8.7% of nursing homes voluntarily terminated and 2.4% of facilities were involuntarily terminated. Deficiencies significantly predicted both types of termination, controlling for state and market characteristics. Low occupancy and very high Medicaid mix were strongly related to voluntary and involuntary terminations ($p < .05$). ***Implications:*** Nursing homes that receive a high number of deficiencies exit the Medicare/Medicaid market and have lower occupancy rates before termination, although the relationship varies considerably across states. If competition on the basis of quality is increased because of public reporting efforts, our analyses suggest that terminations, both voluntary and involuntary, will likely increase.

Key Words: Deficiencies, Termination, Quality, Regulation, Nursing home

The complex issue of how best to regulate nursing homes has been with us for several decades. Despite some important gains in the last ten years (e.g., reduced rates of physical restraints, urinary incontinence, and catheterization), the overall quality of nursing homes remains poor (Harrington, 2001). Serious, ongoing nursing home quality problems exist in the presence of a *deterrence* regulatory framework codified by the Nursing Home Reform Act, part of Omnibus Budget Reconciliation ACT (OBRA) 1987 (Walshe, 2001). Under the deterrence approach, nursing home operators are seen as "amoral calculators" who must be overseen with strict application of formal enforcement mechanisms (e.g., recording and posting deficiency information, issuing citations, and imposing sanctions). In contrast to the deterrence framework, a less formal *compliance* approach involves arrangements whereby government agents are supposed to work cooperatively with providers to improve care. An ad hoc compliance model was practiced in many states before the OBRA, and its perceived inadequacy in those states was an impetus for regulatory reforms (Spector & Drugovich, 1989) and federal legislative reforms (Hawes, 1996; Institute of Medicine, 2001) designed to strengthen oversight authority.

The existing survey and certification process and the complaint and ombudsman programs reinforce the adversarial approach. OBRA established mechanisms by which nursing homes may be fined, denied payment for newly admitted residents, or even have key leadership replaced by outside managers. Significant quality problems persist despite these reforms. The problems are related to a host of organizational characteristics, such as proprietary status and staffing consistency. For-profit nursing homes have 30% more violations in standard care practices than do nonprofit facilities (Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000). Research has also identified a relationship between high rates of employee turnover and poor quality (Angelelli, Gifford, Shah, & Mor, 2001; Cohen-Mansfield, 1997).

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The apparent lack of substantial progress over the last decade under the deterrence model casts an increasingly large shadow over discussions on the future of long-term care among elite stakeholders (providers, federal and state officials, advocacy groups and researchers). Some argue that polarization and politicization of the ongoing debate are a result of the deterrence framework, in which regulators are pitted against providers in an adversarial relationship (Walshe, 2001). Defenders of a strong deterrence model are increasingly hard-pressed to justify the costs of expanding the punitive regulatory burden in the absence of more convincing evidence of success under the deterrence approach. At the same time, many detractors of the deterrence framework have lost confidence in the ability of government regulators to improve the treatment of the 1.6 million Americans receiving postacute and long-term care in nursing homes, with some in the mid-1990s going so far as to unsuccessfully lobby for a partial privatization of the oversight process (Health Care Financing Administration, 1998).

Since then, the debate has shifted to the advantages and disadvantages of public reporting of quality measures on the web and how such efforts fit into existing regulatory efforts. Those in favor of the compliance approach argue that government-sponsored public reporting of quality measures will reduce the information asymmetry inherent in the nursing home placement decision, thereby motivating nursing homes to improve performance without an expansion of punitive enforcement efforts (Chou, 2002). Skeptics of current public reporting efforts are most troubled by the paucity of public knowledge concerning long-term care issues. They argue that quality measures may be of limited value in the hands of consumers who lack a basic understanding of the current long-term care landscape. Two recent surveys by AARP (2001) and The NewsHour with Jim Lehrer/Kaiser Family Foundation (2001) support the notion that many Americans know little of long-term care issues and therefore are not in a position to judge properly the adequacy of publicly reported information about nursing home quality.

By law, quality of care deficiency information is publicly available and must be clearly posted within nursing homes. Many nursing homes pride themselves on being "deficiency free," using the phrase in marketing and philanthropic development efforts. Deficiency data have been commonly used as a measure of nursing home quality (Castle, 2000a, 2000b; Castle & Mor, 1998; Harrington, Zimmerman, Karon, et al., 2000). Since 2000, the Center for Medicare and Medicaid Services has been posting information about reported deficiencies and resident characteristics on their web site, and it is purportedly one of the most popular government-sponsored sites.

Although public reporting of the results of the survey process can be useful for residents, family advocates, and hospital discharge planners, the utility of the information is compromised by inconsistent interpretation of the regulations and differential willingness to sanction a facility with a deficiency. The General Accounting Office has been critical of deficiency citations, arguing that, in practice, surveyors often fail to detect many problems, such as falls that led to fractures, inappropriate use of restraints, and malnutrition (General Accounting Office, 1998, 1999). Substantial inter- and intrastate variations in both the number and type of deficiencies identified during inspections have been documented in the literature (Rudder & Phillips, 1998). Furthermore, many have noted that there is little apparent effect of levying deficiencies against facilities, because care problems continue to be present in subsequent inspections. In 1999, 77% of nursing homes judged to be performing poorly continued to have problems in follow-up surveys by state licensing and certification agencies (Harrington, Carrillo, Thollaug, & Summers, 2000).

Despite the considerable and growing literature on the factors associated with quality, no one has systematically examined the determinants of terminations from the Medicare/Medicaid program. Terminations can be either voluntary or involuntary, the latter precipitated either by residents being in immediate jeopardy or by the facility's failure to achieve substantial compliance within 6 months of being found to be out of compliance. If deterrent regulation is effective, facilities with more deficiencies presumably would be more likely to terminate. On the other hand, the economics of nursing facility performance are also greatly influenced by demand and bed supply. The supply of beds has been artificially capped in most states for years. State reimbursement rates are also a factor, because nearly two thirds of nursing home residents are on Medicaid. Many have argued that high demand and low supply (very high occupancy rates) mitigate against facility terminations and provide no incentive to nursing homes to provide quality care, even in response to increased Medicaid payments (Gertler, 1989; Nyman, 1988).

However, as demand for nursing home care has eased and occupancy rates have declined in most markets over the past several years because of alternative long-term care options, the discretion regulators have to terminate facility increases as does the influence of market forces emphasizing quality (Grabowski, 2001). Thus, declining occupancy rates throughout the 1990s suggest superior quality may play a more central role in facility survival.

If nursing homes are now being forced to compete more on quality, it follows that public information concerning quality of care (in the form of deficiencies) may also be related to nursing home terminations. The effectiveness of using deficiencies to "prune the tree" and force bad apples from the federal nursing home market during the 1990s has never been analyzed, although several case-study

approaches to the issue have highlighted the potential for transfer trauma resulting from facility closures (Castle, 1997; Wood, 2002).

To begin exploring these relationships, we organized this article around the following research questions:

1. How frequent are facility terminations, both voluntary and involuntary, and has this changed over the last decade?
2. What organizational characteristics are associated with terminations?
3. Controlling for organizational and market characteristics, are facilities with more deficiencies more likely to terminate?
4. Are states that levy more deficiencies in their inspection process more likely to close poor performing facilities than states that levy fewer deficiencies?

Methods

Data Sources

The Online Survey Certification and Reporting (OSCAR) file was the primary data source used in this analysis. By law, nursing homes certified to receive Medicare and/or Medicaid funding must be surveyed by state agencies every 9 to 15 months. Surveyors examine processes and outcomes of care to establish whether minimum standards are met. Observations relating to 185 quality requirements in 17 different categories must be performed. Actual survey practices vary from state to state, but the data elements collected during these surveys are uniform. They include a host of organizational characteristics, such as staffing levels and aggregate resident characteristics. The number of health deficiencies given to each nursing home is a key feature of the OSCAR data. The Area Resource File (ARF) was also used to characterize the counties in which nursing homes operate.

Defining Facility Termination

Survey results containing health deficiency information and other facility characteristics from 1992 to 2000 were merged together in a longitudinal file with separate indicators for dates of termination from the Medicare/Medicaid certification process. Facilities that simply changed status (either dropping or adding Medicare or Medicaid certification, but not dropping both) were considered ''active'' facilities. Termination from the Medicare/Medicaid certification process does not necessarily reflect closure. Nursing homes could opt out of the government programs and admit only private pay residents. However, this practice is not presumed to be prevalent.

Independent Variables

Comparisons of termination rates over time are presented separately for hospital-based and freestanding nursing homes. Subsequent analyses are limited to freestanding nursing homes because of observed differences in termination rates presumably related to the predominance of short-stay Medicare patients in hospital-based facilities. Freestanding homes that terminated either voluntarily or involuntarily are compared with active facilities on a range of organizational characteristics, including size, proprietary status, occupancy rate, chain membership, rural location, and a measure of each facility's mix of payer sources. We characterize facilities as ''high Medicaid'' if 85% or more of their residents are Medicaid, less than 10% are Medicare, and less than 10% are private pay. The frequency of these ''high Medicaid'' facilities varies across states, ranging from less than 10% in Iowa, Montana, Nebraska, and Idaho to a third of all facilities in Louisiana, Mississippi, and Georgia. We chose the 85% cutpoint because it represents a high level of dependence on a payment source that has a payment-to-costs ratio of 0.93 (The Lewin Group, 2002). Hence, facilities with very high proportions of Medicaid residents are often ''resource poor,'' although the extent to which Medicaid rates fall short of costs varies across states.

A key independent variable in our analyses is the number of health deficiencies received by facilities. Deficiencies are violations in care standards. Only health-related deficiencies are included in this study (e.g., nursing home failure to ''Have a program to keep infection from spreading,'' or ''Keep the rate of medication errors—wrong drug, wrong dose, wrong time—to less than 5%'').

Observed and well-documented variations in state survey practices from state to state and over time required a state standardization of the health deficiency information to reflect annual, within-state rankings for use in the multivariate models. Each facility's absolute number of health deficiencies in a given year was ranked on 20-point scale (0 to 19) relative to its position in a distribution of every other facility in the state for that year.

As part of our descriptive analysis, we summarize the number of deficiencies cited on both the first-appearing (since 1992) and last-appearing survey (before termination for those that terminated or closest to the end of 2000 for those remaining active). Reporting the average number of deficiencies noted on both the first-appearing and most recent surveys was done to acknowledge the downward national trend in the citing of deficiencies over time (i.e., deficiencies on the most recent survey for facilities remaining open are acknowledged to be somewhat lower in part because of the effect of time). We also present a state-by-state analysis of the average number of deficiencies for facilities remaining

Table 1. Trends in Nursing Home Terminations, 1992–2000[a]

	Freestanding					Hospital-Based				
		Voluntary Terminations		Involuntary Terminations			Voluntary Terminations		Involuntary Terminations	
Year	Total *N*	*N*	% of Total	*N*	% of Total	Total *N*	*N*	% of Total	*N*	% of Total
1992	13,562	54	0.4	27	0.2	1,493	6	0.4	0	0.0
1993	14,407	103	0.7	29	0.2	1,754	18	1.0	0	0.0
1994	14,532	97	0.7	37	0.3	1,966	21	1.1	0	0.0
1995	14,626	92	0.6	19	0.1	2,120	29	1.4	0	0.0
1996	14,726	126	0.9	44	0.3	2,330	39	1.7	1	0.1
1997	14,765	116	0.8	35	0.2	2,386	37	1.6	1	0.1
1998	14,791	135	0.9	51	0.3	2,425	107	4.4	2	0.1
1999	14,830	208	1.4	43	0.3	2,339	185	7.9	1	0.0
2000	14,661	181	1.2	50	0.3	2,124	139	6.5	3	0.1

[a]Reported terminations are limited to only one per facility per year to make the percentages interpretable in the context of the sum total of operating facilities in a given year.

active, voluntarily terminating, and involuntarily terminating.

We consider several facility- and county-level factors as independent or control variables in the multivariate model predicting termination. County-level variables (derived from the ARF) include rural status, per capita income (ranked from 0 to 19), and a Herfindahl Index of nursing home competitiveness (ranked from 0 to 19). The Herfindahl index is a measure of industry concentration. (It is the sum of the squares of the market shares of all firms in the market.)

Analytic Approach

We use a longitudinal multinomial logistic regression model to predict the probability of the voluntary and involuntary terminations among freestanding nursing homes, with "active" as the reference category. The model is based on information from 15,468 freestanding nursing homes that together had 110,028 surveys between 1992 and 2000. The model equation specifies the response variable as a function of a vector of facility- and county-level covariates, most of which are time-varying. Each variable's lagged (or prior) values were used to predict the likelihood of termination occurring in the ensuing period up to the current survey. Among our control variables, we include the total number of beds (ranked from 0 to 19), facility occupancy rate, and the Herfindahl Index.

Because we are modeling multiple transitions for the same facility over the survey years, the conventional assumption of independence between observations does not necessarily hold. If the correlation between observations within facility is not adjusted for properly, the standard errors for parameter estimates tend to be downward biased. To correct for this, we apply the Huber/White robust variance estimates procedure available in Stata (StataCorp, 1997), which estimates standard errors adjusted for clustering on facility.

Results

The frequency of termination in each year is presented in Table 1. The percentage of facilities terminating voluntarily was relatively stable for both freestanding and hospital-based facilities from 1992 through 1997. In 1998, the percentage of hospital-based terminations increased substantially, increasing from 1.6% in 1997 to 4.4% in 1998 and peaking at 7.9% in 1999. The increase in the rate of voluntary terminations among freestanding nursing homes between 1997 and 2000 was less dramatic, although it did increase from 0.9 in 1998 to 1.4 in 1999. The percentage of involuntary terminations did not vary over time, remaining quite low, between 0.1% and 0.3% of freestanding facilities each year. Only eight hospital-based facilities were involuntarily terminated over the 8-year study period.

Summaries for each state are presented in Table 2. The average deficiencies for each state are shown along with the numbers and within-state percentages of facilities classified according to termination status. The frequency of voluntary termination ranged from rates at or near zero in states such as Alabama, North Dakota, South Dakota, New Hampshire, and New York to proportions near 20% in states such as Nevada, Oregon, Massachusetts, Hawaii, and Texas. Rates of involuntary terminations ranged from less than 2% in nearly three-dozen states to more than 12% in Nevada.

The interstate variation in the average number of deficiencies is documented in Table 2. Facilities remaining active in Arizona between 1992 and 2000 had on average eleven deficiencies, compared with Rhode Island with only three deficiencies on average. Variation in the citing of deficiencies is apparent also in cross-state comparisons of facilities that

Table 2. State-Level Analysis of Terminations and Average Health Deficiencies (Freestanding Nursing Homes, 1992–2000)[a]

	No Termination (Active)				Voluntary Termination				Involuntary Termination				
	N	%	Avg.	*SD*	*N*	%	Avg.	*SD*	*N*	%	Avg.	*SD*	Total
AK	5	83.3	7	8	1	16.7	0						6
AL	193	94.6	7	5	4	2.0	5	3	7	3.4	23	13	204
AR	213	86.2	8	7	15	6.1	10	9	19	7.7	18	8	247
AZ	118	89.4	11	9	12	9.1	8	8	2	1.5	21	24	132
CA	1,085	89.5	12	8	77	6.4	12	11	50	4.1	36	19	1,212
CO	186	93.9	5	4	11	5.6	11	16	1	0.5	15		198
CT	235	87.4	6	4	33	12.3	4	4	1	0.4	22		269
DC	16	100.0	7	7									16
DE	39	90.7	6	4	3	7.0	3	3	1	2.3	15		43
FL	654	94.2	7	5	27	3.9	5	6	13	1.9	16	8	694
GA	292	96.7	6	5	7	2.3	6	5	3	1.0	17	11	302
HI	21	77.8	8	7	6	22.2	6	2					27
IA	408	95.6	4	4	14	3.3	11	12	5	1.2	9	5	427
ID	58	95.1	6	5	3	4.9	16	20		0.0			61
IL	731	93.0	6	5	34	4.3	7	7	21	2.7	28	17	786
IN	487	87.3	7	6	46	8.2	10	11	25	4.5	24	11	558
KS	315	83.8	7	7	47	12.5	8	7	14	3.7	21	15	376
KY	246	95.7	9	7	8	3.1	14	14	3	1.2	51	19	257
LA	275	91.4	7	6	22	7.3	7	6	4	1.3	20	10	301
MA	477	81.0	5	5	103	17.5	6	7	9	1.5	17	11	589
MD	222	90.6	3	3	13	5.3	6	7	10	4.1	11	8	245
ME	115	86.5	4	3	17	12.8	8	11	1	0.8	14		133
MI	392	91.8	9	6	16	3.7	16	13	19	4.4	29	16	427
MN	353	94.1	5	4	20	5.3	7	6	2	0.5	18	23	375
MO	472	92.4	6	6	34	6.7	7	7	5	1.0	13	9	511
MS	144	90.6	7	5	15	9.4	5	5					159
MT	58	96.7	6	7	2	3.3	5	1					60
NC	351	96.2	6	5	10	2.7	10	15	4	1.1	39	7	365
ND	64	100.0	3	3									64
NE	192	94.6	4	4	10	4.9	10	10	1	0.5	16		203
NH	80	100.0	5	5									80
NJ	320	90.7	5	5	31	8.8	5	6	2	0.6	13	11	353
NM	58	82.9	5	5	12	17.1	7	6					70
NV	27	67.5	12	11	8	20.0	23	18	5	12.5	39	13	40
NY	588	97.7	5	5	10	1.7	6	9	4	0.7	4	5	602
OH	914	90.2	6	5	93	9.2	8	7	6	0.6	35	13	1,013
OK	329	81.8	7	6	69	17.2	7	7	4	1.0	7	6	402
OR	126	79.2	6	5	29	18.2	7	6	4	2.5	18	12	159
PA	656	95.2	5	4	25	3.6	5	7	8	1.2	7	6	689
PR	2	100.0	14	4									2
RI	92	86.8	3	3	12	11.3	4	4	2	1.9	10	11	106
SC	146	91.3	8	6	11	6.9	6	5	3	1.9	35	35	160
SD	88	98.9	5	4	1	1.1	0	.					89
TN	289	95.1	7	5	15	4.9	10	8					304
TX	943	76.2	7	6	220	17.8	7	6	74	6.0	13	7	1,237
UT	76	93.8	4	4	3	3.7	14	8	2	2.5	3	2	81
VA	236	92.5	4	4	13	5.1	6	8	6	2.4	12	7	255
VT	39	83.0	4	3	8	17.0	3	2					47
WA	240	83.0	9	6	43	14.9	11	9	6	2.1	19	8	289
WI	373	94.9	4	4	18	4.6	5	7	2	0.5	25	23	393
WV	102	91.9	8	6	5	4.5	9	6	4	3.6	22	14	111
WY	25	100.0	11	6									25

Note: Avg. = average; OSCAR = Online Survey Certification and Reporting.
[a]Deficiency data taken from the most recent OSCAR before termination of facilities that terminated; otherwise, the deficiency data were drawn from the most recent available survey.

voluntarily or involuntarily terminated. The 12.5% of all Kansas facilities terminating voluntarily averaged eight deficiencies, whereas the 6.4% of California voluntary terminations averaged twelve deficiencies.

Table 3 compares the characteristics of freestanding nursing homes that did not terminate between 1992 and 2000 to those that terminated voluntarily or involuntarily. There were 1,236 voluntary

Table 3. Facility Characteristics Associated With Termination (Freestanding Nursing Homes, 1992–2000)[a]

Characteristic	Zero Terminations (n = 14,166)		Voluntary Terminations (n = 1,236)		Involuntary Terminations (n = 352)	
	Mean (*SD*)	%	Mean (*SD*)	%	Mean (*SD*)	%
No. of beds	110 (63)		78 (53)		116 (63)	
Rural		39		30		19
For-profit		72		81		88
Occupancy rate		85		75		79
Chain membership		59		53		56
Over 85% Medicaid		13		32		34
No. of health deficiencies						
Earliest survey	7.5 (8.8)		9.1 (8.5)		16.9 (15.7)	
Most recent survey	6.5 (5.9)		7.8 (8.2)		21.3 (15.7)	

[a]Multiple terminations per facility per year are possibly included in the total *N* for each termination subgroup.

terminations and 352 involuntary terminations nationwide during that timeframe. Facilities that voluntarily terminated tended to be smaller (78 beds on average) than those remaining active (110 beds) or involuntarily terminating (116 beds), with lower average occupancy rates (75% compared with 85% for actives and 79% for involuntary terminations). Those that voluntarily terminated were slightly less likely to be part of a nursing home chain when compared with those remaining active and those terminated involuntarily. On the other hand, all terminating facilities were more likely to be urban, more likely to have a high proportion of Medicaid residents, more likely to be for-profit, and more likely to have a higher number of deficiencies on average when compared with facilities remaining active.

Furthermore, nursing homes that were involuntarily terminated had considerably more deficiencies on both their earliest survey (16.9) and on the survey closest to the year when they were terminated (21.3), compared with voluntary terminations (9.1 and 7.8, respectively) and active nursing homes (7.5 and 6.5, respectively).

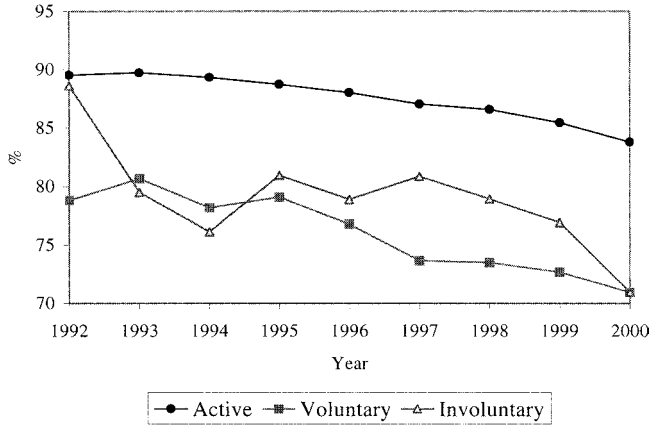

Figure 1. Facility average occupancy rate (1992–2000) among freestanding nursing homes, by termination status.

Figure 1 illustrates the average rates of occupancy per year among facilities that were terminated versus those that did not terminate. Occupancy rates are drawn from the survey preceding termination for those facilities that terminated. The figure reveals that nursing homes remaining active from 1992 through 2000 had higher occupancy rates on average across the study period. It also illustrates how the pool of facilities that terminated in each year had progressively lower average occupancy rates when compared with those remaining active.

Finally, we present the results of a multinomial logistic regression model to characterize the relationship of deficiencies to increased risk of termination among nonhospital-based facilities. The effects of various facility characteristics on the odds of voluntarily or involuntarily terminating are presented in Table 4. For-profit status is associated with a 25% increase in the odds of voluntary termination and a 49% increase in the odds of involuntary termination. Resource-poor facilities were 2½ more likely to either voluntarily or involuntarily terminate. Nursing homes with fewer beds, lower occupancy rates, and those situated in urban areas were significantly more likely to voluntarily terminate. In terms of the effect of time, the odds of both voluntary and involuntary terminations among freestanding facilities in 1998, 1999, and 2000 were considerably higher when referenced to 1992, whereas there were no effects for earlier (pre-prospective payment system [PPS]) years.

An intrastate ranking of deficiencies was used as an independent variable in the model to predict facility termination. Based on rankings of facilities within states from 0 to 19, a one-unit increase in ranking is associated with a 30% increase in the odds of involuntarily terminating. The effect of intrastate deficiency ranking on the odds of voluntary termination is less dramatic, but it persists even after controlling for payer mix, occupancy, and ownership status. A unit increase in ranking on the 0 to 19 scale is associated with a 5% increase in odds of voluntary

Table 4. The Likelihood of Terminations: Longitudinal Multinomial Logistic Regression (1992–2000)[a,b]

Variable	Voluntary Termination (vs. Active)				Involuntary Termination (vs. Active)			
	β	Robust *SE*	*p*	Odds Ratio	β	Robust *SE*	*p*	Odds Ratio
Facility is for profit	0.227**	0.083	0.006	1.255	0.395*	0.177	0.024	1.484
Facility is part of a chain	−0.060	0.064	0.349	0.940	−0.199	0.115	0.085	0.819
Total no. of beds (ranked, 0–19)	−0.122***	0.006	0.000	0.885	−0.019	0.010	0.058	0.981
Occupancy rate	−0.031***	0.001	0.000	0.969	−0.032***	0.003	0.000	0.969
Facility is resource-poor	0.986***	0.067	0.000	2.682	0.856***	0.120	0.000	2.353
Intrastate ranking of deficiencies (0–19)	0.052***	0.006	0.000	1.054	0.274***	0.022	0.000	1.315
State average no. of deficiencies	−0.013	0.010	0.190	0.987	0.095***	0.015	0.000	1.100
Herfindahl Index for NH beds (ranked, 0–19)	−0.030**	0.010	0.003	0.971	−0.006	0.020	0.728	0.994
Per capita income in county (ranked, 0–19)	0.005	0.008	0.565	1.005	0.010	0.015	0.526	1.010
Facility is rural	−0.194*	0.097	0.045	0.826	−0.509**	0.178	0.004	0.601
Calendar year (reference: 1992)								
1993	−0.103	0.136	0.450	0.902	−0.127	0.238	0.593	0.880
1994	−0.232	0.142	0.102	0.793	−0.204	0.245	0.405	0.815
1995	−0.112	0.138	0.415	0.894	0.248	0.238	0.298	1.281
1996	−0.102	0.135	0.456	0.903	0.314	0.242	0.194	1.369
1997	−0.072	0.136	0.592	0.930	0.275	0.235	0.241	1.317
1998	0.597***	0.119	0.000	1.816	0.774***	0.219	0.000	2.169
1999	0.505***	0.122	0.000	1.656	0.545*	0.229	0.018	1.724
2000	3.247***	0.138	0.000	25.714	3.133***	0.250	0.000	22.942
Intercept	−1.909***	0.223	0.000		−7.988***	0.567	0.000	
Model LR χ^2/df/*N*	2962.354/36/109,990							

Notes: NH = nursing home; OSCAR = Online Survey Certification and Reporting.

[a]All covariates are lagged, based on the closest previous OSCAR survey. They predict the log odds of a termination that occurred between the *previous* and *current* surveys.

[b]Facilities in Alaska, Washington, DC, and Puerto Rico excluded from analysis because of an insufficient number of cases to perform intrastate ranking standardization.

*$p < .05$; **$p < .01$; ***$p < .001$.

termination. The state average number of deficiencies was positively associated with increased risk of involuntary termination, but not voluntary termination.

Discussion

Over the course of the decade, nearly 10% of the total stock of approximately 14,500 freestanding nursing homes experienced termination from the Medicare/Medicaid program at some point—a small but not insignificant number. Our analyses demonstrate that those facilities that terminate have many more health deficiencies than nursing homes that did not. Admittedly, many facilities remain in the program with quality problems that do not rise to the point of voluntary or involuntary termination. We analyzed only the most extreme examples of failure—there are other paths to the quality tree worth exploring. Nonetheless, the findings shed light on several important issues related to efforts to understand the role of deficiencies in removing nursing homes from Medicare/Medicaid participation.

The first descriptive finding concerning the termination of hospital-based facilities confirmed existing reports (Medicare Payment Advisory Commission, 2002). The increase in the number of voluntary hospital-based terminations from 1998 through 2000 coincided with the introduction of the Medicare nursing home PPS. The policy altered the payment mechanism to make hospital-based nursing homes no longer lucrative cost centers for hospitals. Although other analyses of aggregate patterns of care have failed to detect significant access problems in terms of postacute care (Angelelli, Gifford, Intrator, Laliberte, & Mor, 2002), the quality implications of specific terminations have yet to be evaluated in isolation. The post-PPS hospital-based terminations (and to a lesser extent freestanding terminations that represented nearly a 50% increase from pre-PPS years) may have had significant spillover effects within local markets, perhaps exacerbating the problems facing freestanding nursing homes, even those with relatively low Medicare volume thought to be otherwise unaffected by distant policy perturbations along the continuum of care.

The freestanding nursing homes that voluntarily and involuntarily terminated throughout the 1990s were clearly at risk on multiple fronts. The most striking characteristic of the terminated facilities is their overall lack of resources. Facilities at greater risk of termination were more likely to be urban and more likely to be for-profit facilities lacking a philanthropic connection to the community and

the established financial reserves that many nonprofit nursing homes rely on. And perhaps most importantly, they manifested many documented quality problems before termination (i.e., these were decidedly *not* high-quality facilities opting out of the program to cater to solely private pay residents).

In most states, Medicaid generally pays considerably less than the private pay rate for nursing home care. Nursing homes with more than 85% of their residents on Medicaid and very few Medicare or private pay residents to offset low Medicaid payment rates are faced with a difficult challenge. It should not be surprising that such facilities—absent large philanthropic reserves—are more likely to fail (in most states in which Medicaid rates are low relative to private pay rates). Our analyses show that these facilities have a whole host of documented quality problems before termination—quality problems that make them less competitive for private pay residents.

The lower average occupancy rates among facilities voluntarily terminating suggest competitive pressures play an important role in voluntary exit from the market. This study provides evidence that deficiency information could be a key mechanism in facilitating competition. In addition, because proprietary facilities have higher rates of deficiencies than do nonprofits, the ultimate effect of deficiency information on the survival of profits may be even stronger. The causal line of reasoning is that for-profit homes get more deficiencies because their profit status extracts excess resources from critical care processes to compensate owner/investors, thus resulting in reduced quality. The poor quality is made known via public reporting, which then leads to lower occupancy; the facility then has to settle for more and more poor and "undesirable" Medicaid residents for whom revenues may be inadequate. Our data show that those homes destined to close have higher proportions of Medicaid residents than homes remaining active.

The result is a vicious cycle of poor quality leading to lowered occupancy and increased reliance on Medicaid as a payer source, which in turn results in lowered revenues and more deficiencies until the home is either terminated involuntarily or "sees the handwriting on the wall" and terminates voluntarily. The finding that voluntarily terminating facilities had a higher number of deficiencies just before termination when compared with those remaining active supports this "anticipatory" scenario. The fact that involuntarily terminated facilities had a higher number of deficiencies on their final survey whereas those remaining active and voluntarily terminating had lower average deficiencies on their most recent survey (relative to their earliest) is suggestive of a more direct relationship between deficiencies and forceful exit from the market.

Whereas the use of deficiencies appears to have a uniform effect across states in terms of directly forcing poor-performing facilities from the market, the indirect effect of deficiencies varies more from state to state. The overall state average number of deficiencies was not related to voluntary terminations, suggesting the meaning of deficiencies as a market "signal" may vary considerably from state to state. Because there is considerable variation from state to state in the likelihood of either voluntary or involuntary terminations, the overall "strength" and consistency of the regulatory signal is also considerably less than optimal.

A central empirical finding of this study is the fact that facilities with more deficiencies are at increased risk of termination, both voluntarily and involuntarily. Yet, in conceptualizing the operative role of quality-of-care information as a tool for improving quality, some caveats are in order. First, although it appears as though deficiencies have a role in precipitating terminations, we do not know what other regulatory mechanisms were used in concert with deficiencies to force exit from the market (e.g., sanctions, fines). Second, the actual signal of deficiencies may be quite weak. Public perceptions of facilities could just as easily be influenced by other, unmeasured facility characteristics. For example, there may exist a communally held belief that "nursing home X is terrible—it's where all the poor folks go."

Public reporting of quality measures will only increase the effect of having a poor reputation (the signal will be louder) and therefore hasten exit from the market of more resource-poor facilities. Apart from raising the stakes in terms of the need for proper risk-adjustment methods for the publicly reported quality measures now being championed by the current administration as a means of promoting choice and accountability, the question of how to deal with failed and failing facilities looms large.

Pruning the Tree

We return to the original question concerning the role of government in regulating the quality of long-term care settings. Somewhat paradoxically, public reporting represents a triumph of the strict enforcement position because it facilitates public disclosure with no recourse to corrective action. Indeed, although it was stated at the outset that those promoting less government involvement were most vigorous in advancing the cause of public reporting, in truth most parties to the debate were originally optimistic that public reporting could promote overall quality.

This study provides evidence that public reporting may indeed be a mechanism to promote overall quality in the sense of forcing some facilities from the market, but the plight of the most "at-risk"

facilities should not be ignored. Although many would no doubt prefer to help usher in the demise of chronically underperforming nursing homes, doing so without a clear plan concerning what long-term care options will take their place is not defensible. If we are to prune the tree of existing long-term care facilities, we must also make every effort to plant and nurture more humane alternatives.

References

AARP. (2001). The costs of long-term care: Public perceptions versus reality. Washington, DC: Health and LTC Research Center. Retrieved August 2, 2002, from http://research.aarp.org/health/ltc_costs_1.html

Angelelli, J., Gifford, D., Intrator, O., Laliberte, L., & Mor, V. (2002). Access to post-acute nursing home care before and after the BBA. *Health Affairs,* September/October, 254–264.

Angelelli, J., Gifford, D., Shah, A., & Mor, V. (2001). External threats and nursing home administrator turnover. *Health Care Management Review, 26,* 52–62.

Castle, N. (1997). Replaced by fish: When a nursing home closes what happens to the residents? *Journal of Long-Term Care Administration,* December, 10, 11, 24, 25.

Castle, N. (2000a). Deficiency citations for physical restraint use in nursing homes. *Journal of Gerontology: Social Sciences, 55B,* S33–S40.

Castle, N. (2000b). Nursing homes increasing and decreasing restraint use. *Medical Care, 38,* 1154–1163.

Castle, N., & Mor, V. (1998). The use of physical restraints in nursing homes: A review of the literature since the Nursing Home Reform Act. *Journal of Applied Gerontology, 18,* 77–98.

Chou, S. (2002). Asymmetric information, ownership and quality of care: An empirical analysis of nursing homes. *Journal of Health Economics, 21,* 293–311.

Cohen-Mansfield, J. (1997). Turnover among nursing home staff: A review. *Nursing Management, 28,* 59–62.

General Accounting Office. (1998). *California nursing homes: Care problems persist despite federal and state oversight* (Publication No. GAO/HEHS-98-202). Washington, DC: Author.

General Accounting Office. (1999). *Nursing homes: Additional steps needed to strengthen enforcement of federal quality standards* (Publication No. GAO/HEHS-99-46). Washington, DC: Author.

Gertler, P. J. (1989). Subsidies, quality, and the regulation of nursing homes. *Journal of Public Economics, 38,* 33–52.

Grabowski, D. C. (2001). Medicaid reimbursement and the quality of nursing home care. *Journal of Health Economics, 20,* 549–569.

Harrington, C. (2001). Regulating nursing homes: Residential facilities in the United States. *British Medical Journal, 323,* 507–510.

Harrington, C., Carrillo, H., Thollaug, S. C., & Summers, P. R. (2000). Nursing facilities, staffing, residents, and facility deficiencies, 1993–1999. San Francisco: University of California. Retrieved August 2, 2002, from http://www.cms.hhs.gov/medicaid/services/nursfac99.pdf

Harrington, C., Zimmerman, D., Karon, S. L., Robinson, J., & Beutel, P. (2000). Nursing home staffing and its relationship to deficiencies. *Journal of Gerontology: Social Sciences, 55B,* S278–S286.

Hawes, C. (1996). *The history and impact of federal standards in OBRA-87.* New York: The Commonwealth Fund.

Health Care Financing Administration. (1998). *Report to Congress: Study of private accreditation (deeming) of nursing homes, regulatory incentives and non-regulatory incentives, and effectiveness of the survey and certification system.* Retrieved August 2, 2002, from http://www.cms.hhs.gov/medicaid/reports

Institute of Medicine. (2001). *Improving the quality of long-term care.* Washington, DC: National Academy Press.

The Lewin Group. (2002). *Payer-specific financial analysis of nursing facilities.* Prepared for American Health Care Association/Alliance for Quality Nursing Home Care. Falls Church, VA: Author.

Medicare Payment Advisory Commission. (2002). *Report to Congress.* Washington, DC: MedPAC.

Nyman, J. A. (1988). Improving the quality of nursing home outcomes—Are adequacy or incentive oriented policies more effective? *Medical Care, 26,* 1158–1171.

Rudder, C., & Phillips, C. D. (1998). Citations and sanctions in the nursing home enforcement system in New York State: Their use and effects. *Generations, 21,* 21–24.

Spector, W. D., & Drugovich, M. L. (1989). Reforming nursing home quality regulation: Impact on cited deficiencies and nursing home outcomes. *Medical Care, 27,* 789–801.

StataCorp. (1997). *Stata statistical software (release 5.0)* [computer software]. College Station, TX: Stata.

The NewsHour with Jim Lehrer/Kaiser Family Foundation. (2001). *National Survey on Nursing Homes.* Retrieved August 2, 2002, from http://www.kff.org

Walshe, K. (2001). Regulating U.S. nursing homes: Are we learning from experience? *Health Affairs, 20,* 128–144.

Wood, E. (2002). *Termination and closure of poor quality nursing homes: What are the options?* Retrieved August 2, 2002, from http://research.aarp.org/il/2002_05_homes_1.html

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