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Determinants of performance failure in the nursing home industry[★]

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Abstract

This study investigates the determinants of performance failure in U.S. nursing homes. The sample consisted of 91,168 surveys from 10,901 facilities included in the Online Survey Certification and Reporting system from 1996 to 2005. Failed performance was defined as termination from the Medicare and Medicaid programs. Determinants of performance failure were identified as core structural change (ownership change), peripheral change (related diversification), prior financial and quality of care performance, size and environmental shock (Medicaid case mix reimbursement and prospective payment system introduction). Additional control variables that could contribute to the likelihood of performance failure were included in a cross-sectional time series generalized estimating equation logistic regression model. Our results support the contention, derived from structural inertia theory, that where in an organization's structure change occurs determines whether it is adaptive or disruptive. In addition, while poor prior financial and quality performance and the introduction of case mix reimbursement increases the risk of failure, larger size is protective, decreasing the likelihood of performance failure.

Keywords

USA; Nursing home industry; Case mix reimbursement; Performance failure; Structural inertia theory

All developed nations are experiencing the rapid growth of the aged population and most have numerous residential long term care settings serving frail elders lacking family support or those whose needs exceed the capacity of their family members to care for them (Ribbe et al., 1997; Weimer et al., 2007). Factors affecting the viability of these facilities are gaining increased policy scrutiny (Netten, Darton, & Williams, 2003). The volatility of the U.S. nursing home industry in recent years provides an ideal context for investigating the determinants of performance failure (Zinn, Mor, & Gozalo, 2000). Most attribute the industry's vulnerability to changes in the operating climate, particularly the phase-in of Medicare's prospective payment system (PPS), which reimbursed providers according to predetermined daily rates tied to resident diagnoses and related care needs, replacing cost-based reimbursement (Health Care Financing Administration, 1998). Under this system, nursing homes receive a flat daily payment regardless of the cost of services rendered to

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post-acute Medicare beneficiaries, and as a result a number of firms sustained major losses. For example, Genesis Health Ventures, a major nursing home chain, reported a 25% drop in average daily payments after PPS implementation (Saphir, 2000). Furthermore, these cuts in Medicare reimbursement limited the ability to cross-subsidize the care of Medicaid-covered residents in states where Medicaid payment rates are below costs (BDO Seidman, 2001). Finally, privately paying residents migrated from nursing home admission to the less restrictive environment of assisted living facilities, siphoning off the payment source providing the highest profit margins (Bishop, 1999; Gruneir, Lapane, Miller, & Mor, 2007).

Environmental changes were not the sole reason for increased vulnerability to performance failure. Some of the damage was self-inflicted. Facilities were forced to make investment decisions in the context of market uncertainty. In part due to a misreading of the changing reimbursement environment, nursing home chains grew rapidly throughout the 1990s, financing acquisitions through debt. The consequences became apparent as many struggled to cover the cost of debt service. Other costs were also on the rise at the same time revenues were on the decline. For example, in response to concerns about the quality of nursing home care, regulatory pressure to boost staffing levels intensified despite serious labor shortages. Finally, malpractice lawsuits increased the costs of liability insurance, hastening the departure of facilities from more litigious markets, such as Florida (Galloro, 2000).

The determinants of nursing home performance failure should be of considerable interest from both a policy and a managerial perspective. However, while extensively investigated in hospitals, the determinants of performance failure in nursing homes are not well understood and few studies have addressed this topic (Dalton & Howard, 2002; Kitchener, Bostrom, & Harrington, 2004; Kitchener, O'Neill, & Harrington, 2005). In this study, we examine the internal and external determinants of performance failure in nursing homes. Because of the industry's dependence on public financing, our measure of failed performance (termination from Medicare and Medicaid program participation) has particular relevance for nursing home policy. Termination disrupts the care of residents with respect to both access and quality. Nursing homes at greater risk of termination are also more likely to serve poor, frail residents whose options for care are limited at best (Mor, Zinn, Angelelli, Teno, & Miller, 2004). In addition, our longitudinal data allow us to overcome the limitations posed by cross-sectional studies by establishing the temporal precedence of hypothesized determinants over organizational failure.

Theory and hypotheses

Change and organizational failure

According to structural inertia theory (Hannan & Freeman, 1984, 1989) where in the organization change occurs determines whether it is disruptive, contributing to performance failure or adaptive, contributing to reliable and accountable performance. Changes in core structure are often disruptive and destabilizing, and as a result, inertia, resistance to change, is thought to be strongest in core structure (Hannan & Freeman, 1989). The underlying logic of this argument is that organizations that change core structural features confront anew problems that are typical during the creation of new organizations. In effect, radical change in core structure resets the "liability of newness" clock (Amburgey, Kelly, & Barnett, 1993). In sum, these arguments suggest that core change will have a detrimental effect on performance (Wischnevsky & Damanpour, 2006).

Core structural features encompass mission, authority structure (ownership), technology, market strategy and other fundamental organizational attributes that determine how work activity and relationships are organized internally and how the organization acquires resources (Hannan & Freeman, 1984). Because of its potential impact on mission, strategies,

and resource acquisition, change in ownership (authority structure) is often cited as an example of core structural change increasing the risk of organizational failure (Alexander, D'Aunno, & Succi, 1996; Barnett & Hansen, 1996; Lee & Alexander, 1999). The factors driving change in ownership could be internal, external or both. For example, even a facility with exemplary prior performance newly acquired by a corporation struggling to cover its debt service may be under-capitalized and hence at risk for performance failure. In addition, multiple changes in ownership may signify managerial or fiscal instability that could increase the likelihood of program termination. These considerations motivate our first hypothesis:

Hypothesis 1: Nursing homes that experience changes in ownership will be more likely to experience performance failure.

Peripheral structure, on the other hand, buffers the organization's core structure by mediating relationships with other entities in its operating environment (Thompson, 1967). Structural inertia theory as initially proposed by Hannan and Freeman (1984, 1989) did not elaborate on the relationship between peripheral change and organizational performance. However, because its purpose is to improve the fit between environmental demands and organizational structure, peripheral change is intentionally adaptive. Because peripheral change buffers rather than threatens core structure, it generates less controversy from either within or outside the organization, and thus is less constrained by structural inertia.

Related diversification has been identified as an example of peripheral change intended to achieve a better fit with environmental demands while supporting the existing organizational mission (Alexander et al., 1996; Carroll, 1984; Lee & Alexander, 1999; Longo & Chase, 1984). How related diversification can enhance performance has been a major theme in the strategic management literature (Ramanujan & Varadarajan, 1989). For example, hospital diversification into long term care services may benefit the acute care mission by facilitating discharge of post-acute patients. A study of U.S. substance abuse treatment centers found that those engaging in related service diversification were less likely to close than those that did not (Knudsen, Roman, & Ducharme, 2005).

The growing demand for post-acute care represents one viable opportunity for nursing homes to engage in related diversification, because it allows expansion into new referral sources without necessarily disrupting the core technology of providing long term care. As such, it may support the long term care mission by enabling new revenue streams for facilitating cross-subsidization, providing a means to avoid the squeeze of falling revenues and increased costs in the traditional line of business.

In summary, there are likely to be performance benefits from expanding in directions that are similar to existing services (Haveman, 1992). However, the degree to which related diversification has a positive impact on performance may depend on whether implementation is sufficient to effectively address environmental demands. For example, studies have found that hospitals with low levels of diversification are more likely to close than those with high levels (Longo & Chase, 1984). This implies that nursing homes that diversify into post-acute care and are fully committed to the investment required for effective implementation may be more likely to achieve successful performance. These considerations motivate the following hypothesis:

Hypothesis 2: Facilities with a greater commitment to related diversification in post-acute care will be less likely to experience performance failure.

Environmental shock and organizational failure

The higher levels of environmental uncertainty accompanying extreme environmental change can place organizations at greater risk for performance failure (Carroll, 1984; Kim, 2005). The histories of many industries are occasionally punctuated by dramatic exogenous shocks such as radical technological innovation, social and political turmoil, major changes in government regulation and economic crashes (Haveman, Russo, & Meyer, 2001). For example, in their study of the Finnish newspaper industry, Amburgey et al. (1993) found that the outbreak of war was associated with organizational failure.

Similar to the impact of the implementation of Medicare's prospective payment system for hospitals (Gruca & Nath, 1994), the implementation of PPS for skilled nursing facilities in 1998 was a major environmental shock affecting reimbursement for short-stay Medicare beneficiaries. In addition, many states implemented case mix reimbursement for long-stay residents whose care is covered by Medicaid. The shift to case mix methodology by public payers significantly increased the degree of uncertainty in the nursing home environment, particularly with respect to the predictability of reimbursement levels. Under cost-based reimbursement, revenues were generally determined by the volume of services provided. With most facilities historically running at close to full capacity, revenues were relatively stable and predictable. Under case mix reimbursement, revenues are determined by both volume and the characteristics of the residents generating that volume, making them less predictable and increasing uncertainty.

There is evidence that the introduction of case mix reimbursement disrupted nursing home operations. Dalton and Howard (2002) found that the skilled nursing care market contracted after the introduction of Medicare PPS as facilities began to exit the market. Several studies found a decline in professional nurse staffing after Medicaid case mix (Grabowski, 2002) and Medicare PPS (Konetzka, Yi, Norton, & Kilpatrick, 2004; White, 2003) implementation. Worsening of certain quality indicators for long-stay residents post-PPS has been attributed to the reduction in professional staffing under PPS (Konetzka, Norton, Sloane, Kilpatrick, & Stearns, 2006). Thus, we anticipate that the introduction of case mix reimbursement will place nursing homes at greater risk for performance failure.

Hypothesis 3: Nursing homes will be more likely to experience performance failure after the introduction of Medicaid case mix reimbursement by individual states and the 1998 introduction of Medicare PPS.

Prior performance and organizational failure

Poor prior performance in key functional areas, such as finance and quality control, signifies that the organization is experiencing difficulty in obtaining resources in its current domain and thus cannot sustain its operations in the market or is unable or unwilling to assess the causes of a performance shortfall (Alexander et al., 1996; Mullner, Rydman, Whitels, & Rich, 1989). To the extent that it constrains the ability to secure needed resources, poor quality and financial performance are precipitating factors that could contribute to public program termination (Alexander et al., 1996; Boeker, Goodstein, Stephan, & Murmann, 1997).

Hypothesis 4: Facilities experiencing poor prior performance in key functional areas will be more likely to experience organizational failure.

Size and organizational failure

Size is strongly related to organizational performance and survival (Stoerberl, Parker, & Joo, 1998). Larger facilities command greater internal resources, including a larger administrative staff, and may be more able to accommodate environmental change through

internal restructuring. The greater resources of large organizations buffer them from internal and external disturbances relative to smaller counterparts and thus protect against performance failure (Gifford & Mullner, 1988; Hannan & Freeman, 1984, 1989; Nyhan, Ferrando, & Clare, 2001). In structural inertia theory, the relative disadvantage faced by smaller organizations is referred to as the “liability of smallness” (Hannan & Freeman, 1984). Significant negative relationships between size and closure have been found in the telecommunications, wine, semi-conductor and hospital industries (Alexander et al., 1996; Barnett & Freeman, 2001; Gifford & Mullner, 1988; Lee & Alexander, 1999; Longo & Chase, 1984; Nyhan et al., 2001; Zucker, 1987). We expect to find a similar relationship to size in the nursing home industry.

Hypothesis 5: Larger facilities will be less likely to experience performance failure.

Methods

Data and sample

The primary data for this study come from the longitudinal Online Survey Certification and Reporting (OSCAR) system. An administrative database maintained by the Centers for Medicare and Medicaid Services (CMS), OSCAR includes organizational characteristics for all Medicare/Medicaid certified nursing homes in the U.S. and aggregate resident data routinely collected as part of the licensure and certification process. CMS contracts with each state to conduct onsite inspections, which occur, on average, about once a year.

We used OSCAR data from 1996 (the first year complete data needed for this study were available) to 2005. Because the structural characteristics of rural markets influence the resources available to nursing home facilities and may limit options for services provided, we restricted our analysis to all urban free-standing nursing homes located within the boundaries of a Metropolitan Statistical Area (MSA). We chose not to include hospital based facilities because their managerial decisions are influenced (or determined) by the hospital that owns them. The final analytic sample included 91,168 surveys from 10,901 unique facilities, which was merged with the Area Resource File (ARF) for the same period to obtain relevant market (county) level variables.

Measures

Description of the dependent variable—We define performance failure as termination from participation in the Medicare and Medicaid programs. Because these public payer programs reimburse the care of three out of four nursing home residents, continuity of these revenue streams is critically important to the financial viability of nursing homes. Alternatively, bankruptcy, not uncommon during the time period covered by our data, could be used to define failure. However, program termination may have more serious consequences for organizational survival than entering Chapter 11. While nursing homes continue to be reimbursed while operating under bankruptcy, reimbursement ceases upon termination from participation in the Medicare and Medicaid program, a serious blow to the nursing home’s financial viability. While the facility may be re-certified subsequent to restructuring or other corrective action, termination represents failure on the part of current management to maintain facility standing. Furthermore, from a practical perspective, longitudinal national data on bankruptcies at the nursing home level do not exist at this time.

At each annual survey for a nursing home, we measured failure as a dichotomous variable indicating whether the home was terminated from public program participation during the months preceding its next annual survey. Thus, in the multivariate analysis we used time varying, lagged covariates to predict termination that occurred in the 12 months or so

following each annual survey date. In the aggregate, a total of 1231 nursing homes (11.5% of all homes) were terminated over the study period from 1996 to 2005.

Description of independent variables—Table 1 presents the percentages or means (and standard deviations) of the independent variables included in the model.

Change in ownership (hypothesis 1): Two measures were included to test our hypothesis concerning core change in authority structure. The first is an indicator of the number of ownership changes a facility experienced from 1996 to the most current survey date. This variable ranged in value from 0 to 7. Because the effect of ownership change is unlikely to be linear, we partitioned the variable into three categories: no changes in ownership over the study time period (the reference category), one change in ownership, and two or more changes in ownership. The second is a dichotomous variable indicating whether a stand-alone for-profit facility was acquired by a for-profit chain during the study period.

Related diversification (hypothesis 2): To represent peripheral change we constructed a measure representing the extent of related diversification into post-acute care. This measure reflects the resource investments needed to care for the medical and rehabilitative care needs of residents with higher case mix acuity. The following resources were used to construct this measure:

- presence of a ventilator care unit
- presence of a rehabilitation unit
- presence of a hospice program
- employment of nurse practitioners or physician assistants
- employment of over ½ FTE physical or occupational therapists

We constructed a single implementation score for each nursing home in our data set for each year in the study based on the above set of resource investments.

Introduction of Medicaid and Medicare case mix reimbursement (hypothesis 3): To test the effect of a shock to the reimbursement environment, we included two variables. One indicates if Medicaid case mix reimbursement was introduced during the study time frame. To measure the impact of PPS introduction, we constructed three time periods from yearly dummy variables. The first corresponds to the PPS phase-in (1998–2000), and the second captures the post-PPS years (2000–2005) during which time subsequent regulatory and market developments may have mitigated the PPS effect. 1996–1997 is the reference time period.

Prior performance: Because we were particularly interested in the impact of prior inferior performance in key functional areas, we measured performance relative to peers within the MSA in which the focal facility is located. Thus, as described below, all of our performance measures are dichotomous, with 1 indicating inferior performance and 0 otherwise.

Occupancy is one of the most commonly used measures of performance in hospital studies and has been shown to be related to the likelihood of failure for both for-profit and non-profit hospitals (Alexander et al., 1996; Lee & Alexander 1999; Zucker, 1987). It serves as a proxy for the ability to capture market share in a competitive marketplace. Reflecting the public's perception of nursing home quality, higher occupancy facilities should be less likely to terminate from Medicare and Medicaid participation.

Source of revenue (payer mix) is a basic indicator of nursing home financial performance. The extent to which facilities are able to attract residents providing revenue streams from more lucrative sources and minimize dependence on less lucrative sources is an indicator of the effectiveness of payer mix management. Thus, nursing homes may choose to aggressively manage payer mix to assure a sufficient and economically advantageous balance between private pay, Medicaid and Medicare residents (Davis, Brannon, Zinn, & Mor, 2001). The Medicaid program is the largest purchaser of U.S. nursing home services (Strahan, 1997). While there is considerable variation in Medicaid per diem payment rates from state to state, these rates are usually lower than other payers, and may be below the actual cost of providing care (BDO Seidman, 2001). Such payment constraints make it difficult for facilities to maintain acceptable levels of performance in a turbulent environment. Thus, greater dependence on Medicaid may be associated with greater likelihood of performance failure. Facilities in the upper quartile of the distribution of Medicaid census in the MSA were categorized as Medicaid dependent.

Finally, an important dimension of nursing home performance is the quality of care provided. Poor quality care may lead to termination from public program participation. One indicator of quality is the number and type of deficiencies cited by state investigators during the annual recertification survey for Medicare and Medicaid program participation. A facility with a greater number of deficiencies relative to other facilities in its local market may be more likely to terminate. In addition, by requiring facilities to respond to each deficiency with a plan of corrections, citations increase the administrative burden and divert resources and attention from other essential functions. However, there is considerable variability across states in the number of deficiencies and in how state inspection agencies determine specific deficiency citations (Angelelli, Mor, Intrator, Feng, & Zinn, 2003), prohibiting direct comparison of deficiency counts across regions. Instead, we ranked all facilities within the local MSA by their total number of health related deficiencies, and measured quality as a dichotomous variable based on their relative ranking. Facilities in the upper quartile of the distribution of deficiencies in their MSA were categorized as high deficiency (signifying relatively inferior performance).

Size: A categorical variable, rather than a continuous one, was used to capture the possible curvilinear effect of facility size on survival. Facility size was measured by total number of beds and was partitioned into four categories: fewer than 100 beds (the reference group), 100 or more but less than 150 beds, 150 or more but less than 200 beds, and 200 or more beds.

In addition, control variables that could influence performance failure were included in the analytical model:

Organizational factors: The proportion of Medicare recipients in total resident census was included because the impact of PPS implementation on termination may vary with Medicare volume. For profit status was included to control for differences in mission that may influence the likelihood of termination. System membership (chain affiliation), to the extent it may signify greater resource availability, could provide a buffer against termination.

Market conditions: Medicaid reimbursement rate was included since higher rates may afford some protection against termination. In more competitive environments, organizations share a limited resource pool (Pfeffer & Salancik, 1978), and performance may depend on how resources are allocated across competitors (Boeker, Goodstein, Stephan, & Murmann, 1997). For example, competition was found to increase the likelihood of failure in hospital studies (Alexander et al., 1996; Succi, Lee, & Alexander, 1997). We included a Herfindahl Index based on bed capacity computed by aggregating facility data

from OSCAR to the MSA level. Nursing homes in more munificent markets may be less likely to experience performance failure. Per capita income (from ARF; centered at the aggregate mean, \$25,100, with increment of \$1000) was included to control for differences in resource availability across markets. The hospital wage index was included to control for differences in cost of living across MSAs. Finally, professional (RNs and LPNs) nurses per capita were included to control for the availability of staffing in the MSA.

Statistical methods

We used a cross-sectional time series generalized estimating equation (GEE) model with a logit link function to predict termination from public program participation. The model takes the form:

$$\text{Log}\{P_{i,t}/(1-P_{i,t})\}=\alpha+\beta X_{i,t-1}+\varepsilon,$$

where $P_{i,t}$ is the probability that facility i terminated at time t , α is the intercept, $X_{i,t-1}$ is a vector of facility- and market-level characteristics measured at $t-1$, β is the model parameter for the effects of the covariates, and ε is the error term. GEE models properly account for within-facility correlations and are suitable for analyses of cross-sectional time series data like OSCAR. They provide population average estimates, which can be interpreted as the average effect on the population of nursing homes as opposed to a specific effect on a particular type of nursing home at a particular point in time. The XTGEE procedure available in STATA (2005) was used, along with the Huber–White sandwich estimator, to adjust for clustering of observations within facility. The final estimates from these methods are unbiased in both the parameter estimates and the standard errors. In this analysis, an exchangeable working correlation structure was assumed.

Results

Table 1 presents summary statistics for the variables included in our model, aggregated from OSCAR data (1996–2005). 73.7% of sample facilities were for-profit and 56.1% were chain-affiliated. Average Medicare census was 10.8%. 62.8% were located in states that had introduced Medicaid case mix reimbursement during the study time period.

Table 2 presents the logistic regression model results of the determinants of performance failure. As predicted by hypothesis 1, a facility experiencing one change in ownership over the study time frame is 26% more likely to terminate compared to those experiencing no change in ownership over the study period. Those experiencing two or more ownership changes had a 44% increase in the likelihood of failure ($p < .001$). The effect of ownership change is particularly evident in for-profit facilities acquired by a chain. The odds of failure increase by almost 42% ($p < .05$) for facilities changing status from free-standing to chain affiliate, compared to all other facilities. This suggests that the major reorganization entailed in ownership change may in effect “reset the clock”, renewing vulnerability to the liability of newness and increasing the likelihood of performance failure (Amburgey et al., 1993). However, as predicted by hypothesis 2, higher levels of peripheral change, in the form of greater commitment to post-acute care diversification is adaptive, reducing the likelihood of performance failure by 10% ($p < .01$).

Supporting hypothesis 3, facilities are 46% more likely to experience performance failure following introduction of Medicaid case mix reimbursement ($p < .001$). In addition, relative to the pre-PPS time period (1996–1997), the odds of termination increased by 55% ($p < .001$) during the PPS phase-in period (1998–2000). This suggests in the years immediately

following PPS implementation a “shake-out” occurred with more vulnerable facilities facing greater odds of performance failure.

Results also confirm the role of prior poor performance in increasing the likelihood of organizational failure (hypothesis 4). Poor financial and quality performance were associated with a higher likelihood of termination ($p < .001$). Specifically, low occupancy more than tripled the likelihood of termination, while facilities in the upper quartile of the Medicaid census distribution in the local market were two and one-half times more likely to be terminated. Finally, being in the upper quartile of the distribution of cited deficiencies within the local market more than doubled the odds of termination.

There is also evidence for the “liability of smallness” (Gifford & Mullner, 1988; Nyhan et al., 2001). The odds of termination decrease monotonically with increasing size ($p < .001$). Nursing homes with over 200 beds are 62% less likely to experience performance failure than those with fewer than 100 beds.

With respect to control variables, there was no significant association with the percent Medicare in total resident census, for-profit status or chain affiliation. Of the market-level variables, higher per capita income, a proxy for resource availability, had a statistically significant effect on organizational failure ($p < .05$). The odds of termination also decrease 7% for every \$10 increase in the CPI-adjusted Medicaid payment rate ($p < .001$).

Discussion

Our results support the contention, derived from structural inertia theory, that where in the organization change occurs determines whether it is disruptive and thus contributes to performance failure or adaptive, protecting against failure. Our results indicate that change of ownership, particularly when it occurred with greater frequency over the study period, increases the likelihood of termination from public program participation. This suggests that major reorganization required by change in ownership disrupts the organization’s structural stability and accountability, increasing the risk of performance failure (Hannan & Freeman, 1984, 1989). Change to for-profit chain affiliation also increased the odds of a free-standing nursing home being terminated from Medicare/Medicaid participation. While this result may be time sensitive, reflecting the increased vulnerability associated with membership in financially over-extended chains during the study period, it supports the contention that organizations that undergo core structural change in a sense become newagain and at risk for the “liability of newness” (Nyhan et al., 2001). However, while our results are consistent with prior studies that found that firms are most likely to fail at founding and reorganization (Zucker, 1987), a more recent study suggests that the hypothesis of a renewed liability of newness associated with core change might not be applicable to older and larger organizations (Wischnevsky & Damanpour, 2006).

Prior studies have argued that while the process of change is disruptive and potentially detrimental, the content of change may be beneficial if it results in a better fit with environmental demands (Haveman et al., 2001). Peripheral change in the form of related diversification represents a rational response to a confluence of market and regulatory events that change the expectations of key resource providers regarding the role of the nursing home. However, while statistically significant, the effect of related diversification was modest, suggesting that peripheral change in a complex and challenging operating environment may offer limited protection against performance failure.

Major change in reimbursement clearly increases the vulnerability of U.S. nursing homes to performance failure. As the major payer for nursing home services, changes in Medicaid reimbursement may be particularly disruptive. With respect to Medicare, our results suggest

that there was fall-out during the years of PPS phase-in, in that the likelihood of program termination was significantly higher in the years 1998–2000. However, there was no sustained impact in later years. This suggests that while the impact of this environmental shock was profound, it was limited to facilities lacking the financial strength (as our results suggest, perhaps due to high Medicaid census or low occupancy) to withstand it. The departure of these weaker facilities may have left the industry more financially robust and increased the level of quality industry-wide through elimination of those providing the poorest quality of care, both of which may be desirable consequences. However, the facilities terminated from program participation in the wake of PPS may be those serving the poorest and most vulnerable populations. Thus, an unintended consequence of both federal and state case mix implementation may have been to decrease nursing home access to those in greatest need (Mor, Zinn, Angelelli, Teno, & Miller 2004; Smith, Feng, Fennell, Zinn, & Mor, 2007).

Consistent with studies of hospital failure (Alexander et al., 1996; Zucker 1987), inferior financial and quality performance increases the likelihood of public program termination. The consistency of this finding across multiple measures of performance is noteworthy. This suggests that a performance “report card” incorporating these and potentially other performance measures, may be a useful predictor of nursing homes at risk for termination. From a policy perspective, termination from public program participation reduces access to care for vulnerable residents whose care is reimbursed by these programs, particularly in markets with fewer nursing home care providers. An “early warning” system based on reported performance measures could be usefully employed by regulators to intervene (if deemed to be in the public interest given available alternatives) by identifying problems and taking corrective action before program termination. New Jersey recently implemented such an “early warning system” based on monthly reporting of financial indicators, intended to detect hospitals in underserved areas whose poor financial health may place them at risk for failure (Tamari, 2008).

There is also evidence for another concept derived from structural inertia theory, the “liability of smallness”, since the odds of failure decrease monotonically with size, with the largest facilities (over 200 beds) being least likely to fail. Gifford and Mullner (1988) found that small hospitals are more likely to close, consistent with this concept and our findings with respect to nursing home performance failure.

The impact of the control variables included in our analysis merits some comment. Our assumption that a more munificent environment, represented by per capita income, would be a buffer against organizational failure was born out, although the effect was minimal. Of considerable interest, higher Medicaid payment rates, which have recently been associated with better nursing home quality (Grabowski, Angelelli, & Mor, 2004), were found to reduce the odds of termination in our study. However, how much society is willing to subsidize the entire nursing home industry to reduce the risk of a small number of failures has not been explicitly discussed in debates about the cost of delivering high quality nursing home care.

While some of the factors we considered, such as Medicare PPS introduction, are specific to the U.S. nursing home industry, we believe our findings have relevance for other countries facing similar challenges in long term care provision. Efforts by policy makers in the U.S. and United Kingdom (U.K.) to assure the quality of institutional care while at the same time increasing the availability of home care have focused on payment reforms and increased regulatory oversight (Clarkson, Hughes, & Challis, 2003; Weimer et al., 2007). Price pressures a decade ago apparently contributed to closures of facilities in many regions of the U.K. (Darton, Netten, & Forder, 2003). Thus, as in our study, pricing policy may be an

important contributor to declining performance culminating in failure. However, the literature on facility closures suggests that while reimbursement rates and local prices have not kept pace with rising costs, policy changes related to increasing support for home care also appear to have been a factor (Clarkson et al., 2003; Darton et al., 2003; Netten et al., 2003). A survey of local authorities in the U.K. revealed that during 2000–2001, six percent of homes were closed, primarily smaller homes. Thus, like U.S. facilities, U.K. homes may be vulnerable to the “liability of smallness”.

In addition to facing similar price and cost pressures, there are similarities in the changing operating environment. Similar to the effect that assisted living has had on the demand for nursing home services in the U.S., changes in demand for U.K. nursing homes is reflected in the placement of high dependency residents in residential facilities rather than nursing homes (Netten et al., 2003). Finally, while more related to cost than price, the change in care standards in the U.K. that appears to have increased vulnerability to closure may be an environmental shock with ramifications similar to the introduction of case mix reimbursement (MacDonald & Cooper, 2007).

While we believe the results of this study provide important baseline information regarding the determinants of performance failure in nursing homes, there are some limitations to our analyses. First, in measuring peripheral change we were confined to examples of investment in post-acute care diversification that were available in our data. Other types of adaptive peripheral change (for example, implementation of clinical information systems or staff development initiatives) may also reduce the likelihood of performance failure, but data reflecting these innovations are not available on a national basis. In addition, because 1996 was the first year that all relevant data items were recorded in OSCAR, we cannot determine if diversification efforts preceded that date. Also, our measure of the extent of diversification does not reflect changes in the composition of the service portfolio over time, only in the level of investment. Also, while we have established that our measures of core and peripheral change, environmental shock and performance relate to organizational failure as we have defined it, these relationships may not bear out under alternative definitions. Because we limit our analysis to urban facilities, findings are not generalizable to rural locations. Finally, while theory posits that core structural change is disruptive and would lead to performance failure, measurement imprecision may compromise the accuracy of temporal sequencing with respect to ownership change and termination. Thus, we cannot rule out the potential for reverse causality. However, most of the effect of ownership change on termination appears to be anterior because the frequency of ownership changes is strongly related to termination and most termination date events occur after the ownership change date.

In conclusion, while prior studies have examined determinants of poor performance in nursing homes (Zinn, Mor, Feng, & Intrator 2007a, b), to the best of our knowledge, our study is the first to consider how differences in the location of structural change, prior performance in key functional areas, and environmental shock contributes to major performance failure. Given the key role nursing facilities play in caring for the frailest and most vulnerable populations, the causes of performance failure need to be better understood, particularly if these causes are the unintended consequences of policy change. Future research should consider what aspects of prior performance are most predictive of failure and how implementation of adaptive mechanisms like diversification lowers risk. Poor performance and the frequency of change in ownership may reflect weak management unable to sustain acceptable levels of quality resulting in greater risk for termination. Effective management will institute adaptive organizational changes in response to environmental scanning. Knowledge of how managers identify and then adapt to the myriad threats they encounter on an ongoing basis can inform effective intervention strategies.

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Table 1

Description of variables, aggregated from OSCAR data (1996–2005).

	Mean (SD)	Percentage
Outcome: Terminated (<i>N</i> = 10,901 facilities over 1996–2005)		11.5
H1: Cumulative # of prior ownership changes:		
0		56.6
1		36.1
2 or more		7.3
Change from for-profit & non-chain to for-profit & chain		2.6
H2: Implementation Score (range 0–5)	1.2 (0.9)	
H3: State Medicaid case-mix reimbursement (1 year lagged)		62.8
1996–1997 (pre-PPS; reference)		20.1
1998–2000 (PPS shakeout)		29.4
2001–2005 (post-PPS shakeout)		50.5
H4: Prior performance:		
High % Medicaid (uppermost quartile in MSA)		24.5
High deficiencies (uppermost quartile in MSA)		24.3
Low occupancy (lowest quartile in MSA)		23.7
H5: Number of beds:		
<100 (Reference)		41.9
100–149		34.8
150–199		13.7
200 or more		9.5
Percent Medicare residents	10.8 (13.5)	
For-profit		73.7
Chain membership		56.1
Market (MSA) and regulatory characteristics:		
Herfindahl Index	0.1 (0.1)	
Per capita income (\$1000)	24.6 (5.2)	
Hospital wage index	0.93 (0.13)	
Number of nurses per 1000 population	4.8 (2.1)	
Medicaid payment rate (1 year lagged & CPI-adjusted)	114.61 (24.50)	
N: Surveys		91,168
Facilities		10,901

Table 2

Cross-sectional time series GEE logistic regression model results for the likelihood of performance failure.

	AOR	95% CI
H1: Cumulative # of prior ownership change		
1	1.257 ***	1.106–1.429
2 or more	1.439 ***	1.172–1.768
Change from for-profit & non-chain to for-profit & chain	1.418 *	1.067–1.884
H2: Implementation Score	0.901 **	0.839–0.968
H3: Case-mix reimbursement (1 year lagged)	1.458 ***	1.280–1.661
Calendar year (Reference = 1996–97):		
1998–2000 (PPS shakeout)	1.548 ***	1.299–1.844
2001–2005 (post-PPS shakeout)	0.993	0.819–1.205
H4: Prior performance:		
High % Medicaid (uppermost quartile in MSA)	2.511 ***	2.221–2.840
High deficiencies (uppermost quartile in MSA)	2.089 ***	1.862–2.343
Low occupancy (lowest quartile in MSA)	3.452 ***	3.083–3.864
H5: Number of beds (Reference = Less than 100):		
100–149	0.536 ***	0.469–0.613
150–199	0.418 ***	0.342–0.511
200 or more	0.375 ***	0.294–0.477
Percent Medicare residents	0.995	0.989–1.001
For-profit	1.049	0.899–1.223
Chain membership	0.954	0.842–1.081
Market (MSA) characteristics:		
Herfindahl Index (per 1 SD)	0.928	0.830–1.038
Per capita income (per \$1000)	1.019 *	1.001–1.037
Hospital wage index (per 1 SD)	0.953	0.870–1.044
Number of nurses per 1000 population	0.969	0.929–1.012
CPI-adjusted Medicaid payment rate (1 year lagged; per \$10)	0.933 ***	0.906–0.961
Model χ^2 /d.f./N	1440.5/21/91,168	

Statistical significance:

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