

# Do corporate chains affect quality of care in nursing homes? The role of corporate standardization\*

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**Background:** Chain-owned nursing homes have become the predominant type of provider in the United States, but little is known about their management structures. Prior research has found that chain ownership has significant effects on health outcomes, but why that is the case is not well understood.

**Purpose:** This study examines the effects of corporate-mandated standardization and corporate-sponsored training in administrative and clinical processes on the total number of deficiencies reported for a facility and on the percentage of residents with pressure ulcers for chain-owned facilities in Michigan and North Carolina.

**Methodology:** Data on the corporate practices of standardization and training were collected in a mail survey of facility administrators in Michigan in 2001 and North Carolina in 2002. We received responses from 117 of 239 chain-owned facilities in Michigan and 86 of 270 in North Carolina. Survey responses were merged with facility characteristics taken from the On-line Survey, Certification, and Report System.

**Key words:** chain or corporate ownership, corporate practices, standardization

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Seemingly unrelated regression was used to estimate the effects of standardization on the count of health deficiencies and percentage of residents with pressure ulcers simultaneously.

**Findings:** Health deficiencies, but not pressure ulcers, were lower in facilities of chains with greater overall corporate standardization. More detailed analysis revealed that standardization of facilities' physical plant lowered both deficiencies and pressure ulcers and standardization of clinical activities lowered pressure ulcers (but not deficiencies). In contrast, standardization of administrative practices increased pressure ulcers (but not deficiencies).

**Practice Implications:** Corporate standardization of resident-centered activities such as clinical guidelines and common facility layouts may contribute to superior resident care, whereas primary reliance on administrative standardization may interfere with residents' needs. Chains need to balance administrative efficiency with the local needs of individual chain-owned facilities and their residents.

Chains have transformed the nursing home industry in the United States, becoming the predominant provider form in many regions of the country. Approximately two thirds of all nursing homes in the country were chain owned in 1997 (Institute of Medicine, 2001). Chain-owned nursing homes operate differently than independent nursing homes. Unlike independent nursing homes, chain-owned homes must respond to and interact with corporate headquarters, and this relationship will affect a facility's survival and effectiveness.

Prior research has found that ownership is an important factor in predicting quality of care and facility costs in nursing home (Holmes, 1996; McKay, 1991). Although some research shows chain ownership to have significant, often negative, effects on health outcomes (e.g., Harrington, Woolhandler, Mullan, Carrillo, & Himmelstein, 2001; Holmes, 1996), chain ownership is depicted as a uniform characteristic, and considerations of differences among facilities within chains have not been considered. Realistically, though, chains vary considerably in size and structure; for example, the number of facilities within a chain can vary from two to hundreds of facilities.

Several studies, however, have shown differences in such chain characteristics as profit orientation, size, membership composition, and the use of corporate practices have had significant effects on outcomes at the facility level (Banaszak-Holl, Berta, Bowman, Baum, & Mitchell, 2001; Baum, 1999). Baum (1999), for example, found that variation in the size, geographic spread, and naming strategies of nursing home chains affected facility failure and acquisition.

In this study, we focus on the importance of standardization within corporate chains and the availability of corporate training for facilities. Standardization is reflective of and reinforces the economic effects of ownership and clinical characteristics on residents' care. Economi-

cally, chain-owned facilities have been thought to lose their community focus and to focus more on profit seeking than their nonchain peers (Harrington et al., 2001; Light, 1986). Clinically, professionals working in chain-owned facilities face time pressures that may impair their clinical judgment largely because chain ownership can lead to a greater focus on efficiency maximization (Lemke & Moos, 1989; Rosko, Chilingirian, Zinn, & Aaronson, 1995). These arguments have been applied to facilities that are both for-profit and nonprofit and among facilities that belong to a variety of corporate chains.

Both economic and clinical arguments presuppose that corporate owners have mechanisms for affecting local facility behavior. Structurally, the development of training programs and standardization facilitates corporate control (Ingram & Baum, 2001). Here, we examine whether standardization of administrative, financial, and clinical processes imposed by corporate headquarters improves or detracts from the quality of resident care in chain-owned facilities. Our study is necessarily exploratory in the sense that these factors have not yet been examined. We developed new instruments to examine differences in corporate–facility relations and used them to survey chain-owned facilities in two states—Michigan and North Carolina.

## Background

The use of standardized administrative, financial, and work practices has been studied in several industries outside health care. Many scholars view standardization as a competitive advantage because it helps chains realize the advantages inherent in their size and multimarket structure (Baum, 1999; Romanelli, 1991). Standardization can contribute to product and service reliability and efficiency in ways that are valued by consumers and facilitates their decision making (Baum

& Ingram, 1998). Standardization of practices can also promote organizational learning (Tsai, 2001) by facilitating the transfer of knowledge of services and practices across facilities or, as more often used in the business literature, across units within the corporate chain (Baum, Li, & Usher, 2000; David & Rothwell, 1996; Greve, 1999). In addition, standardizing work processes can help improve the performance of individual care workers as they learn by doing (Anzai & Simon, 1979; Von Hippel & Tyre, 1995; Winter & Szulanski, 2002).

Transferring knowledge across facilities depends on several factors, including the characteristics of facilities involved, what practices and processes are being standardized, and the extent to which mechanisms are developed to facilitate learning (Berta & Baker, 2004). Here, we focus on enumerating the types of organizational practices and processes being standardized. Because standardization facilitates local learning, whether clinical or not, and forces facilities to adopt practices that they may not have been using previously, we expect it to be associated with better resident care within facilities of nursing home chains. We also expect that corporate-sponsored training will facilitate any effects of standardization and thus control for such efforts.

Alternatively, standardization may adversely affect the quality of resident care if corporate directives interfere with the ability to provide high-quality care. This can occur if standardization emphasizes efficiency at the expense of quality of care or if standard practices do not adequately meet the needs of individual residents receiving them. Our empirical analysis explores whether the potential benefits or disadvantages of standardization dominate.

## Data and Methods

Data for this study came from a mail survey of chain-owned nursing home facilities in the states of Michigan and North Carolina. The survey focused on the mechanisms, frequency, and quality of nursing facilities' communications with corporate headquarters, the availability of training programs, and corporate resource sharing. The survey data were subsequently merged with data from the On-line Survey, Certification, and Report System (OSCAR), accessed through the Nursing Home Compare (NH Compare) Web site, available from Medicare (<http://www.medicare.gov/>). As a pilot study, we chose states proximate to our academic institutions but that diverge in the penetration of corporate chains in the nursing home market. Both corporate membership and for-profit ownership are more prevalent in North Carolina than in Michigan. Forty-nine percent of Michigan nursing home facilities and 69% of those in North Carolina are chain owned. Sixty-three percent of Michigan nurs-

ing home facilities and 73% of those in North Carolina are for-profit. Both states are close to the national average (3.8%) of population 65 years or older residing within nursing home facilities: 3.2% in Michigan and 3.4% in North Carolina (Kaiser Family Foundation, 2006).

Data from OSCAR are available for all Medicare/Medicaid-certified facilities in the country and include the results of yearly facility inspections (Institute of Medicine, 2001). OSCAR data provide information on structural and quality characteristics of facilities, including staffing, deficiencies, and the prevalence of pressure ulcers and a number of resident case mix controls. Although there are limitations to OSCAR data (Straker, 1999), they have considerable face validity and reliability (Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000). The data are widely used as a secondary source of nursing home characteristics because of their availability and coverage of all certified nursing homes (Grabowski, 2001; Harrington & Carillo, 1999; Hughes, Lapane, & Mor, 2000; Zhang & Grabowski, 2004).

Our survey was mailed to all facility administrators of chain-owned nursing home facilities in Michigan in 2001 (excluding two facilities that served as pilot sites;  $n = 239$ ) and in North Carolina in 2002 ( $n = 279$ ). Our sample includes all facilities identified in the OSCAR as chain owned and operating at the time of the survey. We used telephone follow-ups to contact nonrespondents and improve response rates. In Michigan, we received responses from 117 of the 239 facilities (49% response rate), and in North Carolina, we received responses from 86 of the 279 facilities (31% response rate). These response rates are comparable with those of other recent studies, including the study by Calhoun, Banaszak-Holl, and Hearld (2006) on marketing practices, which had a 44% response rate, and the study by Castle (2005), on nursing home administrators' views on NH Compare, which achieved a 34% response rate. Our rate is significantly below that in Castle's study (2006) of nursing home administrators' reports of staff turnover, which had an unusually high 80% response rate.

Respondents belonged to 72 distinct corporate chains, 45 operating in Michigan and 34 in North Carolina—7 of which operated in both states. The number of facilities in the sample belonging to the same chain ranged from 1 to 12 in Michigan and 1 to 14 in North Carolina. Chains that owned a single facility in either Michigan or North Carolina owned facilities in other states.

One of the most common threats to survey validity is whether respondents represent the larger population of chain-owned nursing homes. Using OSCAR data, we tested for differences between responding and nonresponding facilities on reported health deficiencies, size, and ownership. We found no significant differences (using independent  $t$  tests) between respondents and nonrespondents in health deficiencies, pressure ulcers,

and number of beds in the facility. Nonrespondents were, however, more likely than respondents to be for-profit ( $p < .05$ ), which may reflect the lower response rate in North Carolina, where for-profit chain facilities are more prevalent. Given the limited differences between respondents and nonrespondents, we do not expect sample selection bias to affect our ability to study care quality outcomes.

### **Dependent Variables**

The analyses used two dependent variables. First, we assessed the total count of health deficiencies for a facility. Second, we assessed the percentage of residents with pressure ulcers. Both measures are from NH Compare in the year of our survey (2001 in Michigan, 2002 in North Carolina).

The two measures provide complementary assessments of quality. The number of health deficiencies is a count of federal and state requirements that the nursing home fails to meet. We adjust the count of total deficiencies by dividing by the average deficiencies in the state because known regulatory differences across states lead to differences in deficiency counts. Total health deficiencies is a meaningful but imperfect measure of care quality because the purpose of state inspections is to screen for facilities that have extensive health deficiencies; aggregate deficiencies therefore include disparate problems related not only to residents' quality of care but also to their quality of life, as well as other problems within the facility (Harrington & Carillo, 1999; Harrington et al., 2001). Our second dependent variable, the percentage of residents with pressure ulcers, is an indicator of care quality because pressure ulcers are preventable and can be treated with such straightforward interventions as repositioning the resident (Zhang & Grabowski, 2004).

### **Independent Variables**

Our independent variables of interest are related to standardization of facility practices and processes as required by the corporate chain. We measured level of standardization based on reports from facility administrators regarding the extent to which 20 facility-level activity areas were standardized within the chain. Relying on research in organizational learning and on assistance from administrators of two pilot facilities, we identified these areas as both susceptible to standardization and easily recognizable by facility staff and administrators. The 20 facility-level activities examined in the survey were as follows:

- 1) administrative structures and procedures
- 2) information systems for medical records

- 3) information systems for human resources
- 4) health outcomes survey preparation and reports
- 5) performance measurement
- 6) financial procedures and reporting systems
- 7) compensation systems
- 8) cost-control initiatives
- 9) strategic planning
- 10) marketing initiatives
- 11) community relations
- 12) regulatory affairs
- 13) staff training
- 14) promotions and career advancement
- 15) clinical protocols
- 16) quality assurance systems and indicators
- 17) measurement of resident satisfaction
- 18) facility layout
- 19) physical equipment
- 20) facility expansion

The extent of standardization of each activity was measured using a 7-point Likert scale, where 1 indicated that a chain did not attempt to standardize its facilities in an activity, and 7 indicated that a chain imposed clear standards across its facilities in an activity.

We constructed four measures of facility-level standardization based on the survey responses. First, we computed an overall level of standardization, defined as the mean across all 20 activities for all respondents from the same chain. We also computed measures for three general areas of facility activity: (a) administrative (i.e., Activities 1–14), (b) clinical (i.e., Activities 15–17), and (c) physical plant (i.e., Activities 18–20). Cronbach's alpha was high for each of the three measures, indicating their internal consistency. For Michigan, alpha equaled .92, .93, and .93 for administrative, clinical, and physical plant measures, and for North Carolina, alpha equaled .86, .86, and .93, respectively. Cronbach's alpha for the overall standardization measure was also high—.93 for Michigan and .95 for North Carolina—although factor analyses also supported the use of standardization subscales.

Our standardization measures are based on reports from facility-level administrators and may differ from assessments of corporate-level administrators. Although corporate reports can indicate more accurately whether a chain *intends* to standardize its facilities, they are not used here for two reasons. First, facility administrators' reports are more likely to accurately reflect *actual* levels of facility standardization, which more directly affect resident outcomes than corporate intentions. Second, because there is no comprehensive list of corporate owners in the industry, we would have to contact facilities directly to identify their corporate owners and appropriate corporate respondents; such a two-stage survey would be difficult to implement.

## Control Variables

The control variables for each facility include the number of beds or size of the facility, whether the facility was acquired by its current owner (yes = 1), years under current ownership, staffing level (measured as the average daily hours worked by registered nurses divided by number of residents), resident case mix (measured as the percentage of residents with restricted motion, eating problems, and incontinence), facility reports of corporate for-profit orientation (for-profit = 1), state location (Michigan = 1), and the extent of corporate administrative and clinical training programs for staff.

Corporate training and for-profit ownership were taken from our facility survey. Respondents were asked whether their corporate owner provided training for facility staff in five areas identified with input from pilot facility administrators (yes = 1): (a) conflict resolution, (b) management education, (c) minimum data set training, (d) aide certification, and (e) clinical training. We measured the extent of administrative training as whether a chain provided training in the first two areas—conflict resolution and management education—and the extent of clinical training as that provided in the three remaining areas. Preliminary models not reported in this article also included effects for whether the chain had acquired the facility (as compared with starting it de novo) and for the administrator's tenure within the chain. We dropped these models from reported analyses because neither variable was significant.

## Methods of Analysis

Data were analyzed in two steps. First, descriptive statistics and bivariate correlations were computed to characterize the respondents and sample facilities and assess potential for multicollinearity problems. Second, we conducted multivariate regression analyses to estimate the effects of standardization and the control variables on the total number of deficiencies and the percentage of residents with pressure ulcers. Analyses were performed using seemingly unrelated regression to take into consideration the correlation between error terms (i.e., residuals) from the two models. Models were estimated using SAS PROC SYSLIN, which estimates models simultaneously and accounts for correlation among residuals, which produces efficient estimates of both coefficients and standard errors (Srivastava & Giles, 1987). We also conducted an unconditional means test to assess whether facility reports of health deficiencies or pressure ulcers varied by chain, in which case, we would have included chain-level effects in a hierarchical model (Raudenbush & Bryk, 2002; Singer, 1998). Tests showed that use of multilevel models was

not necessary. Two-tailed statistical significance tests are reported for the regression analysis.

## Results

Table 1 provides descriptive information on the responding facilities. Ninety-five percent of respondents in Michigan and 89% in North Carolina were senior administrators or executive directors; others completing the survey included directors of nursing ( $n = 8$ ), assistant administrators ( $n = 1$ ), and of unknown title ( $n = 7$ ). On average, respondents had held their position title for 9.2 years in Michigan and 11.5 years in North Carolina and had worked within their current facility for 4.6 years in Michigan and 5.9 years in North Carolina. Compared with the high turnover commonly observed in nursing homes (Castle & Engberg, 2005), senior administrative staff in our sample have relatively stable tenures.

Facilities showed considerable differences across states. Although the average number of health deficiencies reported was 8.3 for the full sample, Michigan facilities reported 9.5, whereas North Carolina facilities reported 6.7. Michigan facilities also had more residents with pressure ulcers (10% vs. 9.2%) and restricted motion (24.6% vs. 15.7%) but fewer residents who experienced eating problems (10.3% vs. 25.7%). Incontinence rates were similarly high in both states, with, on average, 57.3% of residents with incontinence.<sup>1</sup> Among structural characteristics, facilities in our study had been operated by their current owners, on average, for 11.0 years in Michigan and 13.3 years in North Carolina. Michigan facilities were also larger and more likely to have previously been acquired than those in North Carolina (120 vs. 106 beds, and 81% vs. 66%, respectively).

Table 2 reports the descriptive statistics for the standardization and staff training scales, as well as for each of the 20 activities and five training areas individually. With the exception of physical plant standardization, each of the activities had a mean standardization of more than 5.0 on the 7-point Likert scale for both states, indicating a relatively high level of standardization in chain facilities across many activities. Lower average reports of standardization on physical plant likely result from physical facilities ranging in age, size, and design. Overall, standardization levels are somewhat higher in North Carolina.

Availability of corporate-sponsored staff training programs varied widely. Minimum data set training was available in 78% of facilities, whereas other clinical

<sup>1</sup>Graphical analysis identified two facilities whose pressure ulcer prevalence and staffing levels were both more than 5 SD above their respective means. These facilities were highly medically intensive, which may have contributed to their atypical scores. We excluded these two unusual facilities from the analysis.

**Table 1**  
Description of respondents and their facilities

	Full sample ( <i>N</i> = 203)		Michigan ( <i>n</i> = 117)		North Carolina ( <i>n</i> = 86)	
	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>
<b>Respondent</b>						
Respondent is senior administrative staff or executive director (yes = 1)*	0.92	0.24	0.95	0.16	0.89	0.31
Years as administrator	10.1	7.8	9.2	7.8	11.5	8.6
Years in this nursing home	5.2	6.0	4.6	6.0	5.9	5.6
<b>Chain</b>						
Standardization—overall	5.05	0.88	4.96	0.78	5.16	0.99
Standardization—administrative	5.09	0.82	5.08	0.68	5.09	0.98
Standardization—clinical	5.52	0.97	5.54	0.88	5.49	1.09
Standardization—physical plant	3.07	1.14	2.97	1.19	3.20	1.08
Nonprofit ownership (yes = 1)	0.29	0.42	0.29	0.46	0.12	0.32
<b>Facility</b>						
No. health deficiencies reported	8.3	6.1	9.5	5.7	6.7	6.2
% Residents with pressure ulcers	9.7	6.4	10.0	7.2	9.2	5.2
Staff training—administrative	0.48	0.41	0.47	0.41	0.48	0.41
Staff training—clinical	0.59	0.33	0.59	0.32	0.60	0.36
Staffing	0.61	0.33	0.63	0.39	0.58	0.23
Case mix, % residents with restricted range	20.8	14.3	24.6	16.9	15.7	7.2
% Residents with eating problems	16.9	12.4	10.3	8.5	25.7	11.4
Case mix, % residents with incontinence	57.3	12.7	57.2	11.6	57.5	14.0
Years owned by current owners	12.0	9.1	11.0	9.1	13.3	16.9
Previously acquired (yes = 1)	0.79	0.41	0.81	0.33	0.66	0.48
No. beds	114.3	42.0	120.0	43.9	105.9	38.24

\*The remaining respondents include eight directors of nursing, one administrative assistant, and seven with unknown job titles.

training was available in only 42% of facilities. Conflict resolution and aide certification training programs were available in slightly more than half the facilities, whereas management education was offered in slightly less than half. Overall, corporate-sponsored training program availability was nearly identical in Michigan and North Carolina.

Table 3 presents the bivariate correlations among the variables included in the analysis. In general, the correlations were low to moderate, with only four exceeding .60 (36% shared variance), three of which were between overall standardization and the three standardization subscales. High multicollinearity among explanatory variables can result in less precise parameter estimates (i.e., larger standard errors) for the correlated variables but will not bias parameter estimates (Greene, 1993; Kennedy, 1992). Hence, when building our models, we strategically estimated hierarchically nested models to ensure that multicollinearity did not affect our parameter estimates.

Table 4 reports the seemingly unrelated regression models estimating facilities' reported number of health deficiencies (Models 1–3) and percentage of residents

with pressure ulcers (Models 4–6). Models 1 and 4 provide baseline models that include the control variables, Models 2 and 5 add the overall standardization measure, and finally, Models 3 and 6 replace the overall measure with the three standardization subscales.

Overall standardization lowered the total number of health deficiencies significantly (Model 2) but did not affect pressure ulcer prevalence (Model 5). In Models 3 and 6, physical plant standardization significantly lowered both the number of health deficiencies and the percentage of residents with pressure ulcers. Coefficient estimates for clinical standardization were negative in both models but statistically significant only for pressure ulcers. In contrast, coefficient estimates for administrative standardization were both positive and associated with a significantly higher prevalence of pressure ulcers, but not health deficiencies. In sum, standardization benefits appeared to stem more from resident-centered activities (i.e., physical plant and clinical routines) than from seeking efficiency via standardization of administrative services.

In addition to their statistical significance, the magnitudes of these effects were sufficient to have meaningful

**Table 2****Descriptive statistics for standardization and staff training**

	Full sample ( <i>N</i> = 203)		Michigan ( <i>n</i> = 117)		North Carolina ( <i>n</i> = 86)	
	Mean	<i>SD</i>	Mean	<i>SD</i>	Mean	<i>SD</i>
Activity standardization						
Overall	4.98	0.88	4.87	0.78	5.11	0.99
Administrative	5.25	0.82	5.17	0.68	5.35	0.98
Financial procedures and reporting	6.40	0.98	6.45	0.88	6.32	1.11
Administrative structures and procedures	5.77	1.46	5.66	1.50	5.90	1.43
Information system for human resources	5.76	1.60	5.56	1.74	6.05	1.32
Information system for medical record	5.64	1.71	5.45	1.89	5.94	1.37
Regulatory affairs	5.68	1.56	5.59	1.57	5.77	1.57
Performance measures	5.51	1.69	5.47	1.74	5.58	1.62
Health outcomes survey preparation and reports	5.46	1.74	5.30	1.66	5.66	1.84
Cost control initiatives	5.31	1.70	5.25	1.79	5.35	1.60
Strategic planning	5.03	1.99	5.03	2.05	4.99	1.91
Marketing initiatives	4.52	2.05	4.50	2.10	4.51	2.00
Compensation	4.39	2.10	4.17	2.18	4.65	1.98
Promotions and career advancement	4.45	2.03	4.41	2.00	4.49	2.09
Community relations	4.35	2.05	4.35	2.12	4.30	1.96
Clinical	5.66	0.97	5.55	0.88	5.81	1.09
Clinical protocols	5.63	1.60	5.43	1.63	5.90	1.52
Quality assurance system and indicators	5.85	1.52	5.76	1.47	5.96	1.60
Resident satisfaction	5.51	1.77	5.46	1.90	5.57	1.56
Physical plant	3.10	1.14	2.90	1.19	3.36	1.08
Physical equipment	3.46	2.10	3.31	2.06	3.63	2.17
Facility expansion	2.95	2.12	2.79	2.06	3.16	2.19
Facility layout	2.90	2.14	2.61	2.02	3.29	2.26
Staff training						
Administrative	0.51	0.41	0.50	0.41	0.52	0.41
Conflict resolution	0.57	0.50	0.54	0.50	0.61	0.49
Management education	0.45	0.50	0.45	0.50	0.43	0.50
Clinical	0.58	0.33	0.58	0.32	0.59	0.36
MDS training	0.78	0.41	0.80	0.40	0.76	0.43
Aide certification	0.55	0.50	0.54	0.50	0.56	0.50
Clinical training	0.42	0.50	0.41	0.50	0.44	0.50

Note. Standardization variables are Likert scales (1 = low to 7 = high). Staff training program variables are categorical (no = 0, yes = 1). MDS = minimum data set.

impacts on facility quality. The estimate for overall standardization in Model 2 indicates that an increase of 1 *SD* in the level of overall standardization (*SD* = 0.88) would lower a facility's number of health deficiencies by 0.86. Although not a large value in absolute terms, relative to the mean number of deficiencies (mean = 8.30), this represents a 10.36% decline. Estimates in Models 3 and 6 indicate that an analogous increase of 1 *SD* in physical plant standardization (*SD* = 1.14) would lower a facility's number of deficiencies by 1.01 and its percentage of pressure ulcers by 0.80%. Again, these are meaningful changes—a 12.17% decline relative to the mean number of deficiencies and an 8.24% decline relative to the mean prevalence of pressure ulcers (mean = 9.70%). In addition, an increase of 1 *SD* in clinical standardi-

zation (*SD* = 0.97) would lower a facility's pressure ulcers by 0.95%, or 9.80% relative to the mean level of pressure ulcers. Finally, and in contrast, an increase of 1 *SD* in administrative standardization (*SD* = 0.82) would result in a 1.48% rise in the percentage of pressure ulcers, a 15.26% increase relative to the mean percentage of pressure ulcers.

As we expected, several control variables also influenced care quality. The availability of administrative staff training programs significantly increased the percentage of a facility's residents with pressure ulcers, whereas the availability of clinical staff training significantly decreased pressure ulcer levels. In contrast, the availability of corporate training programs had no effect on health deficiencies. Both facility deficiencies and

Table 3

## Bivariate correlations for regression analysis variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. No. health deficiencies														
2. % Residents with pressure ulcers	.29													
3. No. beds	.23	.15												
4. Staff training (administrative)	.01	.10	.10											
5. Staff training (clinical)	-.06	-.10	-.02	.35										
6. Staffing	-.06	-.05	-.02	.03	.08									
7. % Residents with incontinence	.01	.09	.06	.10	-.16	-.03								
8. % Residents with eating problems	-.16	.11	-.04	-.08	-.02	-.07	.07							
9. % Residents with restricted motion	.06	-.04	.01	.03	-.06	.02	.05	-.17						
10. For-profit	-.08	-.03	-.06	-.04	.03	-.21	-.04	.19	-.01					
11. Located in Michigan	.23	.07	.06	.07	-.02	.11	.02	-.64	.30	-.30				
12. Overall standardization	-.16	.00	.04	.15	.16	.14	.10	.07	-.01	.09	-.09			
13. Administrative standardization	.02	.12	.10	.19	.19	-.10	.09	-.02	.01	-.04	.05	.67		
14. Clinical standardization	-.03	.01	.12	.10	.14	-.08	.17	.02	.06	.15	.04	.64	.72	
15. Physical plant standardization	-.15	-.10	.10	.06	.11	-.01	-.07	.05	.03	.03	-.06	.64	.32	.29

Note.  $n = 201$ .

pressure ulcer prevalence were higher for larger facilities (i.e., greater number of number of beds) and for facilities located in Michigan. Among the case mix variables, only the percentage of residents with eating problems significantly affected care quality and then only pressure ulcer prevalence. Somewhat surprisingly, and in contrast to past studies showing that for-profit nursing homes provide lower quality care (e.g., Harrington et al., 2001), profit orientation did not affect care quality. One possible explanation for this difference is that previous studies include both independent and chain-owned facilities, whereas we focus here only on chain-owned facilities.

## Discussion

In this study, we examined the role of variation in nursing home chains' standardization of their facilities' operations as a predictor of the quality of resident care, using measures of overall, administrative, clinical, and physical plant standardization. We found that many aspects of nursing home operations are standardized within corporate chains. Overall standardization decreased the total number of health deficiencies but not the percentage of residents with pressure ulcers. However, the effects of standardization varied with the type of activity that was standardized. Although clinical and physical plant standardizations have positive effects on quality outcomes (the effects of clinical standardization are consistently positive but significant only for pressure ulcers), administrative standardization has a negative effect on quality outcomes that is statistically significant for pressure ulcers. These results are consistent with the

emerging view that standardization can be both beneficial and problematic for resident outcomes (Banaszak-Holl et al., 2001).

## Practice Implications

Our results suggest that a heavy emphasis on administrative standardization to the exclusion of standardizing other aspects of facility operations will be detrimental to resident care quality. If we consider the significant parameter estimates in Models 3 and 6 of Table 4, we will find that achieving an average level of clinical, administrative, and physical plant standardization leads to almost three times fewer deficiencies (i.e.,  $-0.884 \times 3.07$ ) and almost 2% fewer residents with pressure ulcers [i.e.,  $(1.80 \times 5.09) - (0.981 \times 5.52) - (0.705 \times 3.07)$ ]. Furthermore, if the harmful effect of administrative standardization was dropped, there would be almost 8% fewer residents with pressure ulcers.

For chain operators and nursing home managers, our results imply that quality improvement initiatives should focus on standardizing clinical care and, where practical, the equipment and physical layout of nursing facilities to the exclusion, at least initially, of standardizing administrative activities. Although administrative standardization likely contributes to operational efficiency, it will be achieved at the cost of quality of care. Where there is an interest in care quality improvements and a need to achieve efficiency, improvement efforts might begin with standardizing clinical care practices (e.g., introducing clinical practice guidelines) and other routines associated with the delivery of care (e.g., upgrading physical equipment and modifying the physical

Table 4

## Seemingly unrelated regression models of resident health deficiencies and pressure ulcer prevalence

	Health deficiencies			Pressure ulcers		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<b>Facility level</b>						
No. beds	0.031 (0.011)***	0.032 (0.011)***	0.036 (0.011)***	0.018 (0.010)**	0.017 (0.010)**	0.019 (0.010)**
Staff training— administrative	0.603 (1.092)	0.689 (1.123)	−0.152 (1.114)	2.574 (1.025)***	2.135 (1.045)**	1.510 (1.043)*
Staff training— clinical	−1.605 (1.326.)	−0.904 (1.399)	−0.530 (1.408)	−2.282 (1.246)**	−2.481 (1.302)**	−2.279 (1.318)**
Staffing	−2.208 (1.986)	−2.812 (2.062)*	−1.872 (2.059)	−1.618 (1.866)	−1.102 (1.919)	−0.412 (1.927)
Located in Michigan	2.767 (1.129)***	2.363 (1.180)**	2.566 (1.188)**	2.162 (1.061)**	2.660 (1.099)***	2.759 (1.112)***
% Residents with restricted motion	0.000 (0.031)	−0.003 (0.031)	0.002 (0.031)	−0.021 (0.029)	−0.034 (0.029)	−0.028 (0.029)
% Residents with eating problems	0.000 (0.046)	−0.010 (0.048)	0.000 (0.047)	0.113 (0.043)***	0.120 (0.044)***	0.129 (0.044)***
% Residents with incontinence	−0.008 (0.033)	−0.007 (0.034)	−0.010 (0.034)	−0.004 (0.031)	0.007 (0.032)	0.008 (0.032)
<b>Chain level</b>						
For-profit	0.112 (1.059)	0.381 (1.141)	0.199 (1.180)	0.006 (0.995)	0.292 (1.062)	0.656 (1.105)
Overall standardization		−0.975 (0.520)**			−0.048 (0.484)	
Administrative standardization			0.803 (0.787)			1.801 (0.737)***
Clinical standardization			−0.573 (0.661)			−0.981 (0.619)*
Physical plant standardization			−0.884 (0.411)**			−0.705 (0.384)**
Constant	5.491 (3.112)**	10.247 (3.989)***	6.252 (4.007)*	5.858 (2.923)**	5.229 (3.712)*	2.257 (3.751)
Adjusted R <sup>2</sup>	.117	.125	.145	.0953	.1008	.141
χ <sup>2</sup>	23.92***	24.34***	28.47***	19.08***	19.18***	27.57***

Note.  $n = 201$ . Values are presented as  $\beta$  (SE). Two-tailed  $p$  levels were used. Negative coefficients indicate that a variable increases quality by reducing the number of deficiencies (Models 1–3) or the percentage of residents with pressure ulcers (Models 4–6).

\*  $p < .10$ .

\*\*  $p < .05$ .

\*\*\*  $p < .01$ .

layout to improve resident safety) and end with standardizing administrative routines that support—or at the least, do not undermine—adherence to clinical care standards.

Certainly, there are situations where the imperative or need is to improve administrative efficiency or to dramatically and suddenly alter administrative routines, for example, upon a chain's acquisition of a nursing facility (Banaszak-Holl et al., 2001). In these instances, our results suggest that chain operators should anticipate—and possibly take measures to mitigate—a decline in some aspects of resident care quality. That said, our results show that the effects of administrative standardization

are not likely to be significantly negative for all aspects of care quality; here, we see an effect for pressure ulcers but not for the total number of health deficiencies. Hence, administrative standardization appears to have a bounded negative impact on resident health.

### Study Limitations and Suggestions for Future Research

The absence of an effect of for-profit orientation within the population of chain-owned facilities deserves future research attention, in light of organizational theorists'

arguments that ownership has less of an impact among corporate-owned facilities. Corporate structures provide greater accountability than is found in the for-profit sector more generally (Ingram, 1996). Standardization is an important part of raising corporate-owned facilities' reliability, that is, their capacity to produce a given quality service repeatedly. Accountability is also higher because interdependence among a chain's facilities puts pressure on each facility to maintain and enhance the chain's standards—poor quality care in any facility can damage the entire chain's reputation (Baum, 1999; Ingram, 1996). These constraints reduce search and monitoring costs for families of residents but, again, may be dependent on the balance of administrative and clinical standardization.

This study did not allow for differential effects of standardization within a single chain. Current learning theory suggests that corporate chains can use standardization strategically with more geographically distant facilities because it is more difficult to ensure quality over long distances (Argote, 1999). The study of these issues requires identifying geographical location of corporate chain's headquarters, which has not yet been done in studies of nursing home chains.

Finally, the process by which activities are standardized may be important for understanding the very high level of correlation across standardized activities. We suspect that corporate chains implement bundles of standardized activities at once, and our findings suggest that attention to the composition of these bundles is important to achieving a balance between operational efficiency and care quality. Hence, more extensive study of the dynamics of change in standardization within facilities would be very useful.

## Conclusion

Corporate managers must be sensitive to whether standardized protocols help local facilities and their staff and should collect feedback from local facilities on which corporate practices improve care and weigh these against the need for operational efficiency. As we noted at the outset of this article, corporate chains have become the predominant form of nursing home provider. Therefore, how corporate headquarters control and communicate with member facilities affects services for the majority of nursing home residents.

## References

- Anzai, Y., & Simon, H. A. (1979). The theory of learning by doing. *Psychological Review*, 86, 124–140.
- Argote, L. (1999). *Organizational learning: Creating, retaining and transferring knowledge*. Boston: Kluwer Academic Publishers.
- Banaszak-Holl, J., Berta, W., Bowman, D., Baum, J. A. C., & Mitchell, W. (2001). Causes and consequences of chain acquisitions: Health performance and operating strategy of U.S. nursing homes, 1991–1997. *Managerial and Decision Economics*, 23, 261–282.
- Baum, J. A. C. (1999). The rise of chain nursing homes in Ontario, 1971–1996. *Social Forces*, 78(2), 543–584.
- Baum, J. A. C., & Ingram, P. (1998). Survival-enhancing learning in the Manhattan hotel industry, 1898–1990. *Management Science*, 44, 996–1016.
- Baum, J. A. C., Li, S. X., & Usher, J. M. (2000). Making the next move: How experiential and vicarious learning shape the locations of chains' acquisitions. *Administrative Science Quarterly*, 45, 766–801.
- Berta, W., & Baker, G. R. (2004). Making the best of a sticky situation: Organizational learning and the transfer and retention of best practices for reducing error in hospitals. *Health Care Management Review*, 29(2), 1–8.
- Calhoun, J. G., Banaszak-Holl, J., & Hearld, L. (2006). Current marketing practices in the nursing home sector. *Journal of Healthcare Management*, 51(3), 185–200.
- Castle, N. G. (2005). Nursing home administrators' opinions of the Nursing Home Compare Web site. *The Gerontologist*, 45(3), 299–308.
- Castle, N. G. (2006). Measuring staff turnover in nursing homes. *The Gerontologist*, 46(2), 210–219.
- Castle, N. G., & Engberg, J. (2005). Turnover and quality in nursing homes. *Medical Care*, 43(6), 616–626.
- David, P. A., & Rothwell, G. S. (1996). Standardization, diversity and learning: Strategies for the coevolution of technology and industrial capacity. *International Journal of Industrial Organization*, 14, 181–201.
- Grabowski, D. C. (2001). Medicaid reimbursement and the quality of nursing home care. *Journal of Health Economics*, 20(4), 549–569.
- Greene, W. H. (1993). *Econometric analysis*. New York: Macmillan.
- Greve, H. R. (1999). Branch systems and non-local learning in organizational populations. In A. S., Miner, & P. C. Anderson (Eds.), *Population-level learning and industry change: Advances in strategic management*, Vol. 16. (pp.57–80). Stamford, CT: JAI Press.
- Harrington, C., & Carrillo, H. (1999). The regulation and enforcement of federal nursing home standards, 1991–1997. *Medical Care Research and Review*, 56(4), 471–494.
- Harrington, C., Woolhandler, S., Mullan, J., Carrillo, H., & Himmelstein, D. (2001). Does investor ownership of nursing homes compromise the quality of care? *American Journal of Public Health*, 91(9), 1452–1455.
- Harrington, C., Zimmerman, D., Karon, S. L., Robinson, J., & Beutel, K. (2000). Nursing home staffing and its relationship to deficiencies. *The Journal of Gerontology: Series B, Psychological Sciences and Social Sciences*, 55B(5), S278–S287.
- Holmes, J. S. (1996). The effects of ownership and ownership change on nursing home industry costs. *Health Services Research*, 31(3), 327–347.
- Hughes, C. M., Lapane, K. L., & Mor, V. (2000). Influence of facility characteristics on use of antipsychotic medication use in nursing homes. *Medical Care*, 38, 164–173.
- Ingram, P. (1996, Summer). Organizational form as a solution to the problem of credible commitment: The evolution of

- naming strategies among U.S. hotel chains, 1896–1980 [Special issue]. *Strategic Management Journal*, 17, 85–98.
- Ingram, P., & Baum, J. A. C. (2001). Interorganizational learning and the dynamics of chain relationships. In J. A. C., Baum, & H. R., Greve (Eds.), *Multunit organization and multimarket strategy: Advances in Strategic Management*, 18 (pp.103–139). Stamford, CT: JAI Press.
- Institute of Medicine. (2001). *Improving the quality of long-term care*. Washington, DC: National Academy Press.
- Light, D.W. (1986). Corporate medicine for profit. *Scientific American*, 255(6), 38-45.
- Kennedy, P. (1992). *A guide to econometrics*. Cambridge, MA: MIT Press.
- Kaiser Family Foundation. (2006). State Health facts for 2004. Accessed at: [http://www.statehealthfacts.org/cgi\\_bin/healthfacts.cgi](http://www.statehealthfacts.org/cgi_bin/healthfacts.cgi), October 2006.
- Lemke, S., & Moos, R. H. (1989). Ownership and quality of care in residential facilities for the elderly. *The Gerontologist*, 29, 209–215.
- McKay, N. L. (1991). The effect of chain ownership on nursing home costs. *Health Services Research*, 26(1), 109–124.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage Publishers.
- Romanelli, E. (1991). The evolution of new organizational forms. *Annual Review of Sociology*, 17, 79–103.
- Rosko, M. D., Chilingirian, J. A., Zinn, J. S., & Aaronson, W. E. (1995). The effects of ownership, operating environment, and strategic choices on nursing home efficiency. *Medical Care*, 33, 1001–1021.
- Singer, J. D. (1998). Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models. *Journal of Educational and Behavioral Statistics*, 24, 323–355.
- Srivastava, V., & Giles, D. (1987). *Seemingly unrelated regression equation models: Estimation and inference*. New York: Marcel Dekker.
- Straker, J. (1999). *Reliability of OSCAR occupancy, census, and staff data: A comparison with the Ohio Department of Health annual survey of long-term care facilities* (Technical Report Series 3-01). Oxford, OH: Scripps Gerontology Center.
- Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal*, 44(5), 996–1004.
- Von Hippel, E., & Tyre, M. J. (1995). How learning by doing is done: Problem identification in novel process equipment. *Research Policy*, 24, 1–12.
- Winter, S. G., & Szulanski, G. (2002). Replication of organizational routines. In C. W., Choo, & N. Bontis (Eds.), *The strategic management of intellectual capital and organizational knowledge*, (pp. 207–221). Oxford: Oxford University Press.
- Zhang, X., & Grabowski, D. C. (2004). Nursing home staffing and quality under the nursing home reform act. *The Gerontologist*, 44(1), 13–23.