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Families' and Residents' Perspectives of the Quality of Nursing Home Care: Implications for Composite Quality Measures

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Abstract

Objectives—To assess (1) the relationship of consumers' assessment of overall nursing home quality to their assessment of specific dimensions of quality; and (2) the implications of this relationship for composite quality measures in Nursing Home Compare.

Design—A survey conducted in 2017 elicited respondents' assessments of the quality of overall care and thirteen specific dimensions of care.

Settings and Participants—The sample consisted of 4,449 respondents who either resided in a nursing home or had a family member who resided in a nursing home during the 6 months prior to the survey.

Methods—We estimated regression models to infer the relationship between consumers' assessments of overall quality and 13 specific dimensions of quality. The regression coefficients, indicating the implicit importance/weight assigned by respondents to each dimension as a component of the consumers' assessment of overall quality, were used to create a prototype composite quality measure.

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Conflicts of Interest: None of the authors have any conflict of interest.

Results—For long-stay residents, 8 of the 13 quality dimensions were significantly associated with their overall ratings of quality. Five dimensions achieved significance for short-stay residents. The magnitude of importance weights varied substantially across dimensions of care.

Conclusions and Implications—Our findings suggest that Nursing Home Compare could be improved by augmenting the technical information in the 5-Star composite measure with consumers' assessments of the additional, non-technical dimensions of quality.

Brief summary:

Consumers perceive resident experience dimensions of quality excluded from the 5-Star measure as important components of overall quality. A composite measure based on them could complement the 5-Star in Nursing Home Compare.

Keywords

Quality measures; nursing homes; report cards; consumers; 5-Stars, preferences

Introduction

The Centers for Medicare & Medicaid Services (CMS) published a nursing home quality report card since 2002. Currently, this report, Nursing Home Compare (NHC), provides information about 29 quality measures, nurse staffing, and survey deficiency citations for all Medicare and Medicaid certified U.S. nursing homes.[1] NHC is intended to inform consumers, providers, and payers about the relative performance of nursing homes.

In 2008, CMS added an important feature to NHC – the 5-Star composite measure.[2] This measure summarizes, using different weights, three types of quality indicators (QIs): quality measures (QMs) capturing care processes and health outcomes, staffing ratios, and deficiency citations issued by state surveyors. The 5-Star measure was added because of concerns that consumers may have difficulty choosing nursing homes when faced with a large number of QIs.[3] Indeed, studies show that the 5-Star influenced nursing home consumers' choice,[4] unlike the individual QIs available prior to the 5-Star introduction.[5]

The 5-Star measure, composed of staffing levels adjusted for resident case mix, deficiency citations, and QMs (e.g. risk adjusted rates of residents with pressure ulcers), includes primarily technical dimensions of quality. Although central to nursing home quality, these more technical dimensions do not capture all facets of quality that may be important to residents. Dimensions of quality that reflect the lived experience in the facility, such as interpersonal relationships between staff, residents, and families, sense of security, and cleanliness, may also be valued by residents in selecting a nursing homes.[6,7]

Prior studies examined the relationship between nursing home quality and residents' and families' satisfaction (e.g[8-10]). Few studies examining relationships between the 5-Star and residents' and families' lived experiences reported inconsistent findings. Calikoglu et al.[11] found for Maryland nursing homes an association between families' experience and the staffing and citation components of the 5-Star measure, but not with the QMs. Williams et al.[12] studying Ohio nursing homes, found a limited relationship between satisfaction and the

5-Star measure. In a study of 32 Detroit nursing homes, Kim et al.[13] found no relationship of the 5-Star measure to privacy, relationship to staff, or resident autonomy. These suggest that the 5-Star measure, based on the technical dimensions of quality, is not comprehensive, and raise the question of whether NHC should be complemented by an additional composite measure of residents' lived-experiences in the nursing home.

This article offers new information and a prototype approach for addressing this potential gap in public reporting of nursing home quality. We obtained, in a national survey, ratings of past residents' and families' of their nursing home experience. We asked for their overall quality assessment and their assessments of specific quality components. We applied statistical techniques to create a weighted composite quality measure based on their responses. Such a composite measure could be complimentary to the 5-Star technical composite measure. We describe the survey, results, and construction of the prototype composite measure below.

Methods

Survey participants

During September, 2017 we conducted a national survey of residents and family members recruited from the Survey Sampling International (SSI) multimillion member U.S. online panel. Because nursing home residents comprise less than 1% of the 18-75 year old population, only a small fraction of the general population would qualify as our survey respondents. In such low prevalence situations, internet panels like the SSI offer feasible, low-cost identification of national respondents. Analyses of surveys of the general population based on similar samples of respondents have shown similar results and no bias when comparing internet panel to random digit dialing survey methodology.[14] We sent screening email invitations to 549,349 panelists. Inclusion criteria were: 18 years or older, and either a current or recent (prior six months) nursing home resident or a family member of a current or recent (prior six months) nursing home resident. Qualified participants completing the full survey were awarded SSI loyalty-program incentive points that could be exchanged online for gifts. The target sample was 3,800. The final sample had 4,536 respondents with care experience in a nursing homes in all 50 states. This 0.82% response to the 549,349 invitations sent out is similar to the percent of nursing home residents among the 18-75 year old population.

Survey development and administration

Respondents completed the survey on the Web with a unique URL, ensuring that participants could respond only once. The survey included questions about respondent being resident or family member, current or within last six months, short- or long-stay, resident's and respondent's socio-demographic characteristics, resident's health status, and nursing home's name and address. Family members were asked about their degree of involvement and knowledge of the resident's care. Respondents were asked to rate the overall quality of care they or their family members experienced: 1) "Please rate your assessment of overall quality of care on a scale from 0 to 100, where 0 means extremely overall poor quality and 100 means extremely overall high quality." Similar questions were asked about specific

quality dimensions: attentiveness to residents, personal care, routine medical care, physical environment, cleanliness, social environment, food quality, communication with family, communication with residents, emergency medical care, physical therapy, activities, and personal security. We chose these dimension based on review of the literature and other surveys. Surveys were pilot tested online for clarity and ease of use with individuals similar to those in the target population and revised based on feedback. To avoid order effects, our online survey randomized the quality dimensions. The study was approved by the authors' University IRBs with a waiver of consent.

Other data

We merged the survey data with the 5-Star data available through NHC to capture the published quality rankings of the relevant nursing homes during the same period considered by the respondents. The merge was based on facility name and address provided by respondents. The merge resulted in 3,609 unique nursing homes, of which 80% had only a single matched respondent and 20% had two respondents.

Sample size

Of the 4,536 respondents, 37 were excluded because of incomplete data for a final sample of 4,499.

Analyses

We calculated the average overall quality score for all respondents, and stratified by short-stay versus long-stay, and family members versus residents.

To understand the relationships between respondents' overall quality assessments and their assessments for specific quality dimensions and the 5-Star composite, we estimated ordinary least squares models. The unit of analysis was the respondent. The dependent variable was the overall quality assessment and the independent variables were the assessments for each of the 13 individual quality dimensions and the nursing home's published 5-Star ranking. Because these relationships might vary by resident type (short- versus long-stay) and by respondent type (resident versus family member) we repeated the analysis for stratified samples.

We hypothesized that these relationships might be influenced by other respondent characteristics. Therefore, we estimated models that included the degree of involvement in choosing the nursing home, white race, college education or above, income exceeding $50,000, and reporting to be very or extremely involved in care (family respondents only). Other respondent characteristics did not show statistically significant associations with overall quality at the 0.05 level and were not included in the final models.

Results

Sample description

Table 1 presents survey responses. Of the 4,536 respondents, 1,279 (28%) represented short-stay and 3,257 (72%) represented long-stay residents. Almost 90% were family members.

Average age of all respondents was 40 and of residents 75. Majority were female (about 75%) and white (80%). Annual household income was mostly below $100,000. Only 6% said that they were hardly familiar with the quality of care in the facility.

Overall quality assessments by respondents

Figures 1 shows a box-and-whiskers plot of respondents' quality assessments. The median overall quality was around 75 on a scale from 0-100, where 0 is extremely poor and 100 is extremely high quality, with the average (not shown on the chart) at 72, indicating that on average, respondents assessed overall quality of the nursing homes they or their family assessed to be about three quarters of the scale to extremely high. Only residents had a somewhat higher assessment (median=80). The variation, indicated by both the interquartiles ranges (the box) and the whiskers (the lines), was largest for the short-stay respondents and smallest for resident respondents.

Weights assigned by respondents to quality dimensions: Regression results

Tables 2 and 3 report the results of the regression models. Table 2 reports results for the full sample and the samples stratified by stay type: long- and short-stay. Table 3 further stratifies the stays into respondents' types: family members and resident respondents. All models have a relatively high R^2, ranging from around 0.4 to around 0.6. The lower values are for the model with the resident respondents, for which we have the smallest sample. In fact, the sample size for the long-stay resident stratum is very small, at 86, relative to the number of estimated covariates. We, therefore, do not present estimates for this model, which is over identified and unreliable.

The quality dimensions in Tables 2 and 3 are sorted by the magnitude of their estimated coefficients in the regression for the full sample. The regression coefficient of each quality dimension indicates the relative importance, or weight, that respondents implicitly associated with the contribution of the dimension to overall quality.

Because short- and long-stay respondents differ substantially in perspective we discuss the weights that each group associates with each dimension separately. As shown in the third column in Table 2, respondents for long-stays view attentiveness to residents as most important; its estimated weight (coefficient) is the highest at 1.79. The next three categories – personal care, routine medical care, and physical environment – have similar weights of 1.30, 1.40 and 1.27, respectively. The next set of four quality dimensions, cleanliness, social environment, food quality, and communication with family, while also significant, have weights that are half as much or even less, ranging from 0.47 to 0.67. All other dimensions – communication with residents, emergency medical care, physical therapy, activities, and personal security, as well as the 5-Star rating – have much lower weights, mostly around 0.1, and are not statistically significant at the 0.05 level.

Respondents for short-stay (Table 2 column 4) also view attentiveness to resident as most important with a higher weight at 1.95 compared with 1.79 estimated for the long-stayers. They also place a high weight on personal care at 1.83. However, beyond this, their perspective differs from that of respondents for long-stayers. Unlike the long-stay model that finds six other significant dimensions, the short-stay model identifies three significant

quality dimensions: routine medical care at 0.88, substantially lower than long-stayers at 1.40, cleanliness at 0.70, similar to the long stayers at 0.67, and physical therapy at 0.95, which is not significant in the long-stayers model.

There are also interesting differences between the short-stay residents themselves and family members of short-stay residents (Table 3 columns 3 and 4). While both have similar weights for attentiveness to residents at 1.76 for family and 1.81 for residents, personal care is substantially more important to residents at 2.04 compared with 1.71 for family members. Only two other dimensions achieve statistical significance for short-stay residents, cleanliness and physical therapy with coefficients of 1.35 and 1.37 respectively, while four dimensions have significant coefficients for short-stay family members – the physical environment at 0.88, communication with the family and the resident at 0.66 and 0.99 respectively, and similar to the residents, although with a lower weight, physical therapy, at 0.90.

As with responders for long-stay residents, the 5-Star ranking is not significantly associated with the overall quality assessments of either the short-stay family members or the short-stay residents.

We performed several sensitivity analyses, testing whether including characteristics of the respondent or the resident changed the relationship between overall quality and the individual quality dimensions. These did not change the relationships between overall quality and the individual quality dimensions and, therefore, we include the model with these covariates in the appendix and do not discuss it here.

Discussion

This study presents findings about assessments of the overall quality of care and its components made by a large national sample of individuals with nursing home experience. It statistically infers the relative importance consumers attribute to non-technical quality dimensions as contributing to overall quality. The study finds that consumers view several non-technical dimensions of quality as important components of overall quality. These include attentiveness to residents, personal care, routine medical care, physical environment, cleanliness, social environment, food quality, communication with families, and physical therapy. None of these are captured by the 5-Star composite measure. This suggests that consumers might benefit from a composite quality measure that summarizes information about these dimensions, in addition to the 5-Star composite measure.

Our analyses suggest an approach for constructing such a composite. Based on a survey similar to the one we administered (for example, the Nursing Home Consumer Assessment of Healthcare Providers and Systems (CAHPS®)[15] that has many of the same domains) one can compute a composite measure as follows:

- Survey a representative sample of residents/families in each nursing home to obtain the quality assessments for multiple quality dimensions specific to the facility.

- Pool the data across all nursing homes and estimate a regression model. The estimated coefficients of this model are the national importance weights implicitly assigned by the average consumer to the quality dimensions.
- To calculate a composite measure for each nursing home, multiply the national weights from the regression by the nursing home specific quality assessments for each dimensions and then sum over all dimensions.

For example, the composite for nursing home i, based on the assessments measured for nursing home i and the weights calculated in our regression and shown in table 2 (using the overall sample weights) would be as follows:

$$\text{Composite measure for nursing home i} = 1.81\,X\,(\text{attentiveness to residents})_i + 1.52\,X\,(\text{personal care})_i + 1.17\,X\,(\text{routine medical care})_i + 0.95\,X\,(\text{physical environment})_i + 0.69\,X\,(\text{cleanliness})_i + 0.44\,X\,(\text{social environment})_i + 0.44\,X\,(\text{food quality})_i + 0.39\,X\,(\text{communication with family})_i$$

where the numbers 1.81; 1.52; etc. are the weights calculated in the regression.

Consideration should also be given to constructing separate composites for short- and long-stay respondents. While both respondent types view several of the same dimensions as important, other dimensions are important only to one or the other type. The short-stayers value physical therapy, while the long-stayers value the physical environment, the social environment, food quality, and communication with family. Furthermore, even dimensions that are valued by both, carry different weights. Thus, separate regression models should be estimated for each to determine separate importance weights for each composite and it is likely that a composite measure calculated for short-stay consumers may rank nursing homes differently than a composite calculated for long-stay consumers.

We should note a few limitations of this study. Our data are based on the SSI panel. One might be concerned about the generalizability of these data to the whole US resident and family member population, even though we had respondents with nursing home experience in all 50 states. However, such large panels of willing respondents are now widely used in social science research because they generally produce results similar to those resulting from direct random sampling.[14]

All quality assessments that require consumers input, whether based on phone, web, mail or in-person surveys, may face barriers to completion when applied to vulnerable populations, especially those with language barrier or severe cognitive impairment, as do about 50% of nursing home residents.[16] This presents a difficult dilemma: Should relatives be used as proxies, while recognizing that their perceptions and preferences may differ from those of the residents, as is demonstrated in our findings, or should assessment of the care provided to these vulnerable residents be omitted from the overall assessment of the nursing home altogether.

We also note that our sample, of only one to two cases per facility, was not designed to assign or report quality scores for specific nursing homes. Our objective is to demonstrate the need for, and the feasibility of, creating a prototype composite measure to capture the

quality of the care experiences of individuals that is not captured by the 5-Star measure. Our sample provides insights into an approach that measures the relationship between consumer's perception of overall quality and specific dimensions of quality as perceived by individuals experiencing them. Public reporting of a facility-level composite measure, such as the one we suggest, requires accurate assessments of the quality elements for each nursing home and, therefore, a more robust survey than the one we were able to conduct.

Finally, implementing a quality reporting system as we propose would require a new survey data collection effort that will impose new and ongoing cost. This apparently has been viewed as acceptable in other care settings, such as hospitals and home health, which have been required to collect CAHPS® data for several years.[1,17] These CAHPS® data have been included in both Hospital Compare and Home Health Compare. Furthermore, the experience gained with respect to sampling methodology and sample size with Home Health CAHPS® can prove useful in ensuring data reliability and accuracy for NHC. And while nursing home population surveys present some unique challenges, including the difficulty in surveying residents and the need to account for differences between short- and long-stayers, this study offers a potential web-based, approach[18-20] that could be employed as a component of efforts to elicit consumers' assessments.

Conclusions and Implications

The evidence we provide here, as well as evidence from prior studies,[11-13] suggest that residents' and families' perceptions of overall nursing home quality is related to several non-technical dimensions of quality, which are not captured by the information currently provided in NHC and the 5-Star composite measure. Adding to NHC a composite measure that offers consumers information about the quality of the less technical dimensions of care in nursing homes as reported by persons who have experiences with that care would address this gap. The weights used to create the composite measure could be determined using a similar approach to the one we demonstrated. This resident experience score would complement the more technical quality score currently provided by the 5-Star measure.

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Appendix

Appendix Table A1.

Estimated Ordinary Least Square Models Predicting Overall Quality Based on Individual Quality Domain and Socioeconomic Characteristics of the Responder: Full And Stratified Samples [95% Confidence Intervals]

Variables	Full sample	Long-stay sample	Short-stay sample	Long-stay	Short-stay	
				Family	Family	Residents
Attentive to residents	1.78 [1.42,2.14]	1.77 [1.35,2.19]	1.84 [1.17,2.51]	1.81 [1.39,2.23]	1.72 [0.96,2.49]	1.34 [0.03,2.66]
Personal care	1.52 [1.16,1.19]	1.35 [0.92,1.78]	1.73 [1.02,2.44]	1.56 [1.13,1.99]	1.64 [0.82,2.47]	1.75 [0.41,3.08]
Routine medical care	1.28 [0.92,1.64]	1.50 [1.06,1.93]	0.99 [0.33,1.65]	1.48 [1.05,1.92]	0.88 [0.10,1.66]	1.18 [−0.03,2.40]
Physical environment	0.88 [0.53,1.23]	1.20 [0.79,1.61]	0.30 [−0.37,0.97]	1.12 [0.70,1.53]	0.86 [0.08,1.64]	−0.35 [−1.60,0.91]
Cleanliness	0.72 [0.39,1.05]	0.66 [0.28,1.05]	0.81 [0.18,1.44]	0.68 [0.29,1.06]	0.54 [−0.22,1.29]	1.12 [0.01,2.23]
Social environment	0.48 [0.14,0.81]	0.68 [0.29,1.08]	0.08 [−0.55,0.71]	0.64 [0.25,1.04]	−0.28 [−1.02,0.45]	0.79 [−0.42,1.99]
Food quality	0.36 [0.10,0.63]	0.48 [0.18,0.79]	−0.03 [−0.57,0.50]	0.55 [0.25,0.85]	−0.08 [−0.68,0.53]	0.06 [−1.02,1.15]
Communicate with family	0.35 [0.07,0.63]	0.42 [0.09,0.74]	0.18 [−0.38,0.73]	0.21 [−0.12,0.54]	0.63 [−0.00,1.27]	−1.12 [−2.18,−0.06]
Communicate with residents	0.30 [−0.02,0.62]	0.20 [−0.18,0.57]	0.46 [−0.14,1.07]	0.30 [−0.08,0.67]	1.03 [0.33,1.72]	−0.97 [−2.15,0.21]
Emergency medical care	0.29 [−0.02,0.60]	0.19 [−0.18,0.55]	0.47 [−0.12,1.07]	0.11 [−0.26,0.48]	0.74 [0.05,1.42]	0.13 [−1.01,1.27]
Physical therapy	0.17 [−0.11,0.44]	−0.17 [−0.48,0.14]	0.99 [0.42,1.55]	−0.21 [−0.52,0.11]	0.91 [0.25,1.56]	1.32 [0.25,2.40]
Activities	0.13 [−0.16,0.43]	0.08 [−0.26,0.42]	0.16 [−0.41,0.74]	0.12 [−0.22,0.47]	0.36 [−0.31,1.04]	−0.57 [−1.68,0.55]
Personal security	0.01 [−0.027,0.29]	0.07 [−0.25,0.39]	−0.04 [−0.60,0.51]	0.08 [−0.23,0.40]	−0.33 [−0.94,0.29]	0.70 [−0.46,1.87]
Nursing Home Compare 5 Star	0.11 [−0.18,0.40]	0.08 [−0.25,0.41]	0.19 [−0.39,0.78]	0.10 [−0.23,0.43]	0.24 [−0.42,0.91]	0.04 [−1.11,1.19]
Very involved in choosing the nursing home	2.21 [1.33,3.08]	1.55 [0.55,2.54]	4.10 [2.23,5.97]	1.52 [0.53,2.51]	1.72 [−0.29,3.72]	13.75 [9.22,18.28]
White	1.47 [0.50,2.43]	1.97 [0.84,3.10]	0.23 [−1.65,2.11]	1.97 [0.83,3.10]	0.51 [−1.68,2.70]	1.29 [−2.29,4.87]
Education of college and above	1.08 [0.24,1.92]	1.07 [0.13,2.00]	1.06 [−0.77,2.89]	1.07 [0.14,2.00]	0.78 [−1.34,2.89]	1.10 [−2.36,4.55]
Annual family income > $50,000	1.13 [0.30,1.97]	1.14 [0.21,2.07]	1.28 [−0.52,3.08]	0.96 [0.04,1.89]	1.05 [−0.95,3.04]	2.36 [−1.48,6.19]
Very/extremely familiar with care in the nursing home	0.97 [0.03,1.90]	1.18 [0.13,2.23]	0.42 [−1.60,2.44]	1.28 [0.25,2.31]	0.19 [−1.86,2.23]	N/A
Constant	5.85 [3.73,7.98]	4.44 [1.97,6.90]	7.93 [3.72,12.13]	4.28 [1.83,6.73]	3.61 [−1.11,8.32]	20.64 [12.00,29.27]

Variables	Full sample	Long-stay sample	Short-stay sample	Long-stay	Short-stay	
				Family	Family	Residents
Sample Size	4499	3234	1265	3148	897	368
R^2	0.59	0.61	0.57	0.62	0.62	0.47

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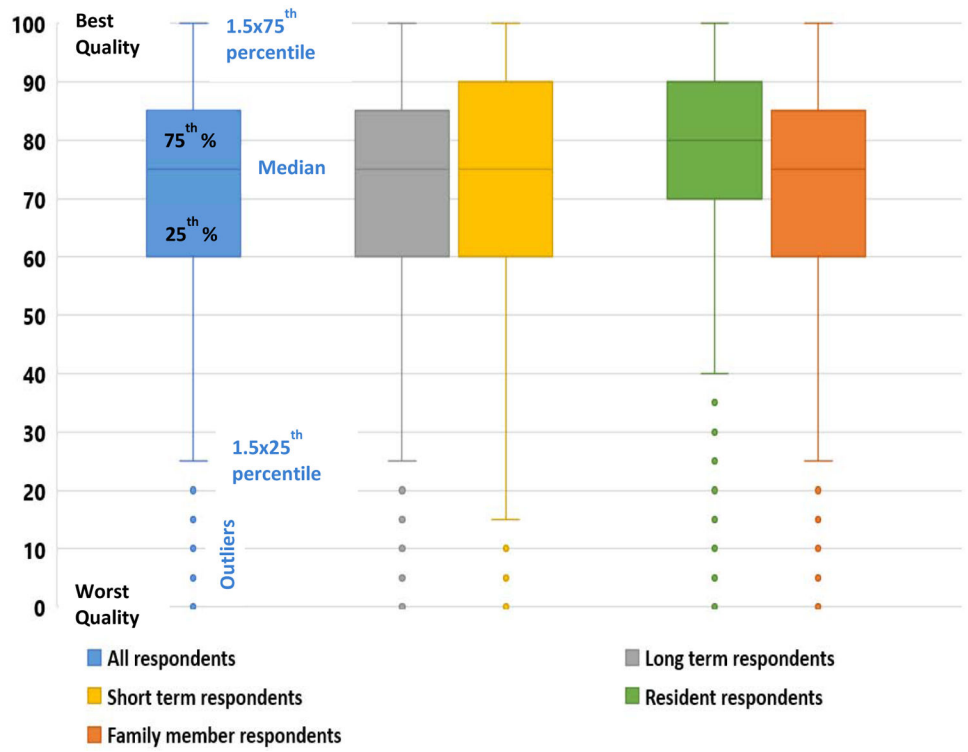

Figure 1: Consumers' Assessments of Overall Quality

Description: Distribution of overall quality assessment ratings by survey respondent type

Note: Median = line inside the box.

Interquartile range = from bottom to top of box.

1.5Xinterquartile < Whiskers = lines from ends of box.

Dots = outliers >= 1.5Xinterquartile

Table 1:

Survey responses (N = 4,536)

Number of respondents by type	**N (%)**
Short-stay	1,279 (28.2)
Family member	905 (20.0)
Resident	374 (8.2)
Long-stay	3,257 (71.8)
Family member	3,169 (69.9)
Resident	88 (1.9)
	Mean (SD)
Overall Quality Assessment (Range: 0=extremely poor quality to 100=extremely high quality)	72.0 (20.4)
Quality Assessment by Item (Range: 0=extremely poor quality to 10=extremely high quality)	**Mean (SD)**
Attentiveness to residents	7.4 (2.2)
Personal care	7.5 (2.1)
Routine medical care	7.6 (2.0)
Physical environment	7.5 (2.0)
Cleanliness	7.7 (2.1)
Social environment	7.4 (2.1)
Food quality	7.0 (2.2)
Communication with family	7.6 (2.2)
Communication with residents	7.3 (2.2)
Emergency medical care	7.7 (2.1)
Physical therapy	7.4 (2.1)
Activities	7.3 (2.1)
Personal security	7.5 (2.2)
RESPONDENDENTS' CHARACTERISTICS	
	Mean (SD)
Age	39.9 (15.6)
Gender	**N (%)**
Male	1,201 (26.5)
Race	
White	3,636 (80.2)
Black or African American	386 (8.5)
Asian or Pacific Islander	143 (3.2)

Other	371 (8.2)
Education	
High school or less	1,074 (23.7)
High school but less than college	1,719 (37.9)
College but less than graduate	1,178 (26.0)
Graduate degree	565 (12.5)
Annual household income	
Less than $50,000	1,907 (42.0)
$50,000-$100,000	1,701 (37.5)
More than $100,000	785 (17.3)
Decline	143 (3.2)
Familiarity with quality of care	
Hardly at all familiar	259 (5.7)
Somewhat familiar	1,121 (24.7)
Very familiar	1,526 (33.6)
Extremely familiar	1,630 (35.9)
Involvement in selection of nursing home	
Not involved at all	888 (19.6)
Hardly at all involved	549 (12.1)
Somewhat involved	839 (18.5)
Very involved	1,145 (25.2)
Extremely involved	1,103 (24.3)
Missing	12 (0.3)
Visiting frequency	
Almost never	317 (7.0)
Less than once a month	939 (20.7)
Less than weekly	682 (15.0)
Once a week	976 (21.5)
2 to 3 times a week	910 (20.1)
4 to 5 times a week	380 (8.4)
6 or more times a week	332 (7.3)
RESIDENTS' CHARACTERISTICS	
	Mean (SD)
Age	75.2 (19.9)

Gender	**N (%)**
Male	1,500 (33.1)
Major nursing home payer	
Medicare	1,436 (31.7)
Medicaid	1,022 (22.5)
Private medical insurance	494 (10.9)
Private LT care insurance	357 (7.9)
Out of pocket	687 (15.2)
Do not know	540 (11.9)
Physical health condition	
1 Unable to do any activities without assistance	660 (14.6)
2	1,165 (25.7)
3	1,094 (24.1)
4	1,131 (24.9)
5 Able to do activities without assistance	473 (10.4)
Missing	13 (0.3)
Mental health condition	
1 Serious disability: need assistance for all activities	393 (8.7)
2	904 (19.9)
3	906 (20.0)
4	1,268 (28.0)
5 No disability: affect daily activities	1,055 (23.3)
Missing	10 (0.2)
Have memory problems	
Yes	2,066 (45.6)
No	2,272 (50.1)
Do not know	197 (4.3)
Missing	1 (0.0)
Need complex care	
Yes	1,757 (38.7)

Table 2.

Estimated Ordinary Least Square Models Predicting Overall Quality Based on Individual Quality Domains: Full and Stratified Samples by Type of Stay [95% Confidence]

Variables	Full sample	Long-stay sample	Short-stay sample
Attentive to residents	1.81 [1.45,2.17]	1.79 [1.36,2.21]	1.95 [1.27,2.62]
Personal care	1.52 [1.15,1.89]	1.30 [0.86,1.73]	1.83 [1.11,2.54]
Routine medical care	1.17 [0.81,1.54]	1.40 [0.96,1.83]	0.88 [0.21,1.55]
Physical environment	0.95 [0.59,1.30]	1.27 [0.86,1.69]	0.31 [−0.36,0.99]
Cleanliness	0.69 [0.36,1.02]	0.67 [0.28,1.06]	0.70 [0.06,1.34]
Social environment	0.44 [0.10,0.77]	0.66 [0.26,1.06]	0.04 [−0.60,0.68]
Food quality	0.44 [0.17,0.71]	0.53 [0.23,0.83]	0.20 [−0.34,0.73]
Communicate with family	0.39 [0.11,0.68]	0.47 [0.15,0.80]	0.23 [−0.33,0.79]
Communicate with residents	0.29 [−0.03,0.61]	0.19 [−0.19,0.57]	0.46 [−0.16,1.07]
Emergency medical care	0.26 [−0.05,0.58]	0.15 [−0.22,0.51]	0.51 [−0.10,1.11]
Physical therapy	0.22 [−0.05,0.49]	−0.12 [−0.43,0.20]	0.95 [0.38,1.51]
Activities	0.20 [−0.09,0.50]	0.12 [−0.23,0.46]	0.30 [−0.28,0.89]
Personal security	0.06 [−0.22,0.34]	0.13 [−0.19,0.45]	−0.07 [−0.63,0.50]
Nursing Home Compare 5 Star	0.17 [−0.12,0.46]	0.12 [−0.21,0.45]	0.30 [−0.29,0.89]
Constant	8.33 [6.40,10.27]	7.52 [5.31,9.73]	9.14 [5.22,13.07]
Sample Size	4499	3234	1265
R^2	0.58	0.60	0.55

Table 3.

Estimated Ordinary Least Square Models Predicting Overall Quality Based on Individual Quality Domains: Samples Stratified by Type of Stay and Family and Resident Respondent [95% Confidence Intervals]

Variables	Long-stay	Short-stay	
	Family	Family	Resident
Attentive to residents	1.82 [1.39,2.25]	1.76 [0.99,2.52]	1.81 [0.44,3.19]
Personal care	1.50 [1.07,1.94]	1.71 [0.89,2.54]	2.04 [0.64,3.44]
Routine medical care	1.38 [0.94,1.81]	0.82 [0.04,1.60]	0.99 [−0.29, 2.27]
Physical environment	1.19 [0.77,1.60]	0.88 [0.10,1.66]	−0.32 [−1.64,0.99]
Cleanliness	0.68 [0.29,1.07]	0.48 [−0.28,1.23]	1.35 [0.18,2.51]
Social environment	0.63 [0.23,1.03]	−0.30 [−1.03,0.43]	0.33 [−0.93,1.60]
Food quality	0.59 [0.29,0.89]	0.00 [−0.60,0.59]	0.71 [−0.42,1.83]
Communicate with family	0.27 [−0.06,0.60]	0.66 [0.02,1.29]	−0.97 [−2.08,0.14]
Communicate with residents	0.30 [−0.07,0.68]	0.99 [0.30,1.68]	−0.90 [−2.14,0.34]
Emergency medical care	0.08 [−0.29,0.45]	0.73 [0.04,1.41]	0.28 [−0.92,1.48]
Physical therapy	−0.16 [−0.48,0.15]	0.90 [0.25,1.56]	1.37 [0.24,2.49]
Activities	0.16 [−0.19,0.50]	0.41 [−0.26,1.08]	−0.51 [−1.68,0.66]
Personal security	0.15 [−0.17,0.47]	−0.31 [−0.93,0.30]	0.55 [−0.68,1.77]
Nursing Home Compare 5 Star	0.14 [−0.19,0.47]	0.32 [−0.35,0.98]	0.09 [−1.12,1.29]
Constant	7.31 [5.12,9.51]	4.77 [0.47,9.07]	24.59 [15.69,33.50]
Sample Size	3148	897	368
R^2	0.61	0.62	0.40