

Purchasing or Providing Nursing Home Care: Can Quality of Care Data Provide Guidance

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OBJECTIVES: To examine whether quality of care differed for veterans in Department of Veterans Affairs (VA) nursing homes and those on contract in community nursing homes and whether the VA was contracting with nursing homes providing better quality of care than other nursing homes.

DESIGN: Observational study using administrative databases from 1997 to 1999.

SETTING: Ten VA and 650 community nursing homes in New York state.

PARTICIPANTS: Four thousand seven hundred sixty-three veteran and 195,438 nonveteran residents of these nursing homes.

MEASUREMENTS: Risk-adjusted rates of pressure ulcer development, functional decline, behavioral decline, and mortality.

RESULTS: Veterans in VA nursing homes were significantly ($P < .05$) less likely to develop a pressure ulcer (odds ratio (OR) = 0.63) but more likely to experience functional decline (OR = 1.6) than veterans in community nursing homes. Residents of community nursing homes with VA contracts were significantly ($P < .05$) less likely to develop a pressure ulcer (OR = 0.91) but more likely to die than residents in noncontract homes. Few nursing homes were consistently among the best or worst performers on all measures; only seven of 650 nursing homes were in the top or bottom decile and 34 in the top or bottom quartile for each measure.

CONCLUSION: Large purchasers and providers of nursing home care such as the VA are unlikely to find information on quality of care useful in making decisions on whether they should “make” or “buy” care. Nursing homes performing well on one quality measure may perform poorly on another, and it is difficult to identify nursing homes that are consistently among the best or worst. Other consumers may encounter similar difficulties when using data on nursing home quality. *J Am Geriatr Soc* 53:603–608, 2005.

Key words: nursing homes; quality of health care; risk adjustment; outcome assessment

In response to widespread concerns regarding the quality of nursing home care, information on outcomes of nursing home care is increasingly being made available to a broad range of consumers including patients and families, clinicians, regulators, and purchasers.¹ The Centers for Medicare and Medicaid Services (CMS) now disseminates provider-specific information on 10 different quality indicators through its Nursing Home Compare Website, and numerous states maintain similar efforts.² These report cards are expected to aid patients and families in their selection of nursing homes and guide quality improvement efforts, although it has also been recognized that such information on the quality of care will be of considerable interest to other consumers such as large healthcare organizations who often must make decisions regarding the purchase and provision of nursing home care.³ As purchasers, healthcare organizations will be interested in selecting those nursing homes providing the best outcomes, ensuring that they get value for their payments. As providers, they will be interested in knowing whether the quality of care that they produce is comparable with or better than what they could purchase from other providers. Yet it is unclear whether consumers or healthcare organizations will find such data on quality useful in guiding their decisions regarding nursing home care. This article now provides one such example for a large purchaser and provider of nursing home care, the Department of Veterans Affairs (VA), by examining quality of care in a key market, New York state.

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The VA is the largest integrated healthcare system in the country. It provides nursing home care to eligible veterans via two primary mechanisms. First, it maintains approximately 14,000 nursing home beds in about 130 VA medical centers. Second, it contracts with community nursing homes to provide care for veterans. Decisions on when to use contract nursing home care are complex and are based on availability of VA beds and geography. An important policy question for the VA is whether it should continue to provide care in its own nursing homes or purchase care through community contracts. Information on the quality of care is critical to addressing this issue. Consequently, two key questions were examined. First, how does the quality of care received by veterans in VA nursing homes compare with that received by veterans on contract in community nursing homes? Second, is the VA contracting with nursing homes that provide better quality of care to patients, both veterans and nonveterans? In answering these questions, quality of care was operationalized through the use of four risk-adjusted outcome measures: mortality, pressure ulcer development, functional decline, and behavioral decline. These measures have been extensively used in previous studies and capture different aspects of the effectiveness of care.

METHODS

Data Sources

Information used in this study was obtained entirely from existing databases. The primary sources of data were the VA Patient Assessment File (PAF) and the New York Patient Review Instrument (PRI). These databases were originally developed for case mix-based reimbursements in long-term care based on Resource Utilization Groups II and contain almost identical data elements.⁴ Information is included on demographics, functional status, and behaviors, as well as limited diagnostic data. A strength of these databases is that, through the use of serial assessments, patients may be followed over time for changes in health status.⁵ Registered nurses familiar with the patients collect data at regular times during a nursing home stay. In the case of the VA PAF, data collection occurs at the time of admission and then semiannually on April and October 1. The New York PRI also collects data near admission and semiannually, but each nursing home sets its own semiannual date for assessments, and an admission assessment will not be performed if the admission is within 3 months of the semiannual assessment date. Both databases are audited to ensure quality and have been used in research studies evaluating quality of care.^{6–9}

Additional data used in deriving the sample, identifying predictors for the risk-adjustment models, and determining outcomes were obtained from several other databases. The VA Fee Basis File was used to identify veterans placed on contract in community nursing homes and the specific nursing homes with VA contracts. Diagnostic information (*International Classification of Disease, Ninth Revision, Clinical Modification* codes) used in predicting behavioral decline was obtained from the VA Patient Treatment File and Outpatient Clinic File. Dates of death were obtained from the VA Beneficiary Identification and Record Locator Subsystem file and the Medicare Denominator and Cross-

Reference Files, along with the Patient Treatment File. Disagreements between these data sources in mortality status and dates of death were resolved using the National Death Index.

Outcome Measures

Study investigators reviewed potential outcome measures for use in this study using several criteria, including use in other studies, availability and reliability of necessary data elements in both databases, availability of clinically credible predictors for use in risk-adjustment models, and ability to capture distinct aspects of nursing home care. Among the potential outcome measures that were considered but failed to meet one or more of these criteria were dehydration, physical restraint use, and accidents. Four outcome measures that capture changes in health status over a period of up to 6 months were selected for these analyses. These outcomes were risk adjusted to help ensure that differences in outcomes reflect the care provided rather than care of a “sicker” population.

Pressure ulcer development was considered present when a patient with intact skin developed a Stage 2 or deeper pressure ulcer on a subsequent assessment. Functional decline was defined as a decline of two or more points in a summary activity of daily living (ADL) scale (3–15 range) that includes the late-loss ADLs of mobility, transferring, and eating. Behavioral decline was present when there was a decline of one or more points in a summary scale (3–11 range) that included verbal disruption, physical aggression, and socially inappropriate behavior. Mortality was examined for the 6 months after an assessment.

Risk-adjustment models for these outcomes were developed using regression models and predictors described in prior work.^{10–13} Predictors were initially examined individually through bivariate testing, and new coefficients were then calculated in logistic regression models. The same predictors were included in risk-adjustment models examining the two study questions, although the value of their coefficients could vary. Only for the outcome of behavioral decline was it necessary to develop a new risk-adjustment model. Study clinicians initially identified potential predictors for this model, which included mental health diagnoses obtained from VA databases, based on literature reviews and clinical judgment. Because similar diagnostic information was not available for nonveterans, behavioral decline was not used as an outcome for Question 2 comparing New York nursing homes with VA contracts to those without a contract. Predictors used for each outcome are described in Appendix 1.

Study Settings and Samples

All nursing homes in New York state that completed the VA PAF or the New York PRI during 1997–1999 (fiscal years for VA, calendar years for community nursing homes) were considered. This included 10 VA and 650 community nursing homes, 137 of which had VA contracts for the care of at least one veteran. The mean number of veterans on contract in a community nursing home was 7.0 and ranged from 1 to 57.

For the outcomes of pressure ulcer development, functional decline, and behavioral decline, nursing home residents were included in the analyses if they met three criteria.

First, residents were included if they had an index PAF or PRI assessment at the start of a 6-month period and an outcome assessment at least 2 weeks, but no more than 6 months, after this index assessment. For long-stay residents, this interval was always 6 months, but it could be shorter for new admissions. Second, there could be no prolonged hospitalizations between the two assessments. Third, residents had to be eligible for the specific outcome. For example, severely functionally dependent residents with an ADL summary score of 14 or 15 on their index assessment were excluded because the scale could not capture a 2-point decline. For mortality, all residents with a single assessment in a given 6-month period were considered. Thus, the mortality sample was larger because it did not require a second PAF/PRI assessment. An index assessment was excluded from the mortality sample if it was within 6 months of the subsequent period's index assessment so as to ensure that an outcome (death within 6 months) could not be counted for two time periods. Three hundred thirty veterans with observations in both VA and community nursing homes were also excluded from the sample.

The unit of analysis, thus, was a resident 6-month period in which the initial PAF/PRI assessment for that period was used to determine baseline status, including risk adjustors, and the subsequent PAF/PRI was used to determine outcomes (except for mortality). For all outcomes, individual residents could contribute up to six observations to the sample, reflecting the 3 years of data used. Because of the different entry criteria for each outcome, the number of residents and nursing homes included in each analysis varies.

Statistical Analyses

For Question 1, comparing veterans in VA and community nursing homes, a two-level hierarchical model was used to account for clustering within each facility and avoid potential overestimation of covariate effects. The hierarchical model also separates out patient information from facility-level characteristics (e.g., indicator for VA facility) by placing data at different levels of the hierarchy. The odds ratio (OR) with 95% confidence intervals (CIs) of developing each outcome measure was estimated for veterans in VA facilities compared with veterans in contract nursing homes

after adequately adjusting for patient case mix. For Question 2, comparing community nursing homes with and without VA contracts, there was a much larger sample of patients from each community nursing home. Consequently, results were taken from risk-adjustment models and data were aggregated at the facility level. Aggregated data were analyzed using a random effect logistic model, and the odds for residents in nursing homes with contracts compared with residents in noncontract nursing homes were estimated. All models except for simple logistic regressions were fitted using WinBUGS software (MRC Biostatistics Unit, Cambridge, UK).¹⁴

RESULTS

Outcomes for two samples of nursing home residents were evaluated. First, in comparing veterans in VA nursing homes with veterans in contract community nursing homes, 4,763 residents were included; 3,802 of these were in VA nursing homes. At the time of their first study assessment, veterans in community nursing homes tended to be older and more functionally impaired and had considerably more pressure ulcers than those in VA nursing homes (Table 1). The second sample used in comparing contract and noncontract nursing homes consisted of 195,438 residents of community nursing homes; 52,286 of these resided in homes with VA contracts (Table 1). Differences in baseline characteristics for residents of community nursing homes with and without VA contracts, although statistically significant, were small.

Results comparing veterans in VA nursing homes and on contract in community nursing homes are presented in Table 2. Veterans in VA nursing homes were less likely (3.5% vs 4.8%) to develop a new pressure ulcer (risk-adjusted OR = 0.63, 95% CI = 0.45-0.83), but 16.1% of veterans in VA nursing homes experienced functional decline, compared with 10.5% of veterans in community nursing homes, resulting in a significant OR of 1.6 (95% CI = 1.1-2.1). Veterans in VA nursing homes were also less likely to die but more likely to experience behavioral decline, but these differences did not achieve statistical significance after risk adjustment.

Table 1. Baseline Characteristics at First Assessment for Residents Included in the Analyses

Characteristic	Veterans in VA Nursing Homes (n = 3,802)	Veterans in Community Nursing Homes (n = 961)	Residents of Contract Nursing Homes (n = 52,986)	Residents of Noncontract Nursing Homes (n = 142,452)
Nursing homes, n	10	137	137	513
Age	72.9	75.1	81.3	81.7
Male, %	97.6	95.8	31.8	28.1
With pressure ulcer (≥Stage 2), %	8.2	15.0	11.9	12.2
Activity of daily living score*	7.9	8.8	9.1	8.9
Behavioral score†	3.5	3.4	3.4	3.3

Note: All comparisons of veterans in Department of Veterans Affairs (VA) versus community nursing homes and contract versus noncontract nursing homes were significant (P < .05).

* Range 3-15 (15 most dependent); sum of eating, toileting, and transferring items, each on a 1 to 5 scale, with 5 most dependent.

† Range 3-11 (11 most severe); sum of physical aggression (range 1-4), verbal disruptions (range 1-4), and disruptive/socially inappropriate behavior (range 1-3) items, with higher number indicating more-severe problems.

Table 2. Comparison of Veterans in Department of Veterans Affairs (VA) Nursing Homes and on Contract in Community Nursing Homes on the Four Outcome Measures

Outcome Measure	VA Nursing Homes		Community Nursing Homes		Risk-Adjusted Odds Ratio (95% Confidence Interval)*
	(n = 10)		(n = 137)		
	# of observations	Rate (%)	# of observations	Rate (%)	
Pressure ulcer development	3,942	(3.5)	1,625	(4.8)	0.62 (0.47–0.83)
Functional decline	3,986	(16.1)	1,734	(10.5)	1.6 (1.2–2.1)
Behavioral decline	4,145	(16.0)	1,794	(8.7)	1.5 (0.86–2.7)
Mortality	7,508	(13.7)	2,464	(15.3)	0.82 (0.62–1.1)

* Reference group is community nursing homes.

There were small but significant differences in outcomes of residents of nursing homes with VA contracts and those without a contract (Table 3). Residents of contract nursing homes were less likely to develop a pressure ulcer (risk-adjusted OR = 0.91, 95% CI = 0.83–0.99), but they were significantly more likely to die within the subsequent 6 months (OR = 1.07, 95% CI = 1.03–1.12). No difference in functional decline was noted.

For each outcome, nursing homes with VA contracts were found among the top and bottom performers. Only three nursing homes, one with a VA contract and two without contracts, were in the top decile of performance on all three measures. Four nursing homes, two with contracts and two without, were in the bottom decile of performance on all measures. Using less stringent criteria, 19 nursing homes, of which four had VA contracts, were in the top quartile on all three performance measures. Fifteen nursing homes, seven of which had VA contracts, were in the bottom quartile on all performance measures.

DISCUSSION

Innovative approaches toward improving the quality of nursing home care are being proposed in response to persistent concerns regarding the quality of this care.¹⁵ Although the reporting of risk-adjusted outcomes data has long been considered an important tool for improving the quality of nursing home care,¹⁶ as with other sectors of the healthcare industry, market-based approaches using these data are now being increasingly advocated. The Bush ad-

ministration, in response to a recent study documenting inadequate staffing, suggested publishing “data on the number of workers at each nursing home in the hope that staffing levels may simply increase due to the market demand created by an informed public.”¹⁷ Information on nursing home outcomes is now easily available to consumers on numerous federal and state Websites. Much of the focus has been on whether and how patients and families may use such data in selecting a nursing home, yet such information may be useful to other consumers, including large healthcare purchasers who may be particularly well placed to demand quality.³ Little information exists, though, of whether these data may actually be useful to purchasers. This study now provides an example of the use of risk-adjusted outcome measures in addressing an important policy issue for the VA: whether the VA should provide care in its own nursing homes or place veterans in community nursing homes via VA contracts. In addressing this issue, the results highlight potential strengths and limitations in the reporting and use of risk-adjusted outcome measures.

A central concern to a large healthcare organization such as the VA is procuring the best quality care at the most attractive price, a practice increasingly referred to as “value-based purchasing.”¹⁸ Specifically, the VA must decide whether it should “make” or “buy” nursing home care, and if it is to “buy” care, from whom. In making this decision, it is important to understand how outcomes of residents treated in specific facilities (VA) differ from care that can be purchased elsewhere (from community nursing homes). The results demonstrate that significant differences

Table 3. Comparison of Residents in Nursing Homes with Department of Veterans Affairs (VA) Contracts to Those without a VA Contract on Three Outcome Measures

Outcome Measure	Noncontract Nursing Homes (n = 513)		Contract Nursing Homes (n = 137)		Risk-Adjusted Odds Ratio (95% Confidence Interval)*
	n (%)		n (%)		
Pressure ulcer development	314,324	(4.4)	106,470	(4.2)	0.91 (0.83–0.99)
Functional decline	320,003	(12.1)	108,889	(12.0)	1.04 (0.98–1.10)
Mortality	386,364	(13.1)	145,602	(13.9)	1.07 (1.03–1.12)

Note: Information on behavioral decline is not presented due to the unavailability of data needed for the risk-adjustment model.

* Reference group is noncontract nursing homes.

exist in outcomes of veterans cared for in these different settings. These differences are large and should be of interest, and concern, to managers and clinicians making decisions about where care is to be provided.

Although the results demonstrate that risk-adjusted outcomes could potentially be useful in making decisions on purchasing or providing nursing home care, ultimately they highlight a major limitation of this approach. Despite extensive analyses, guidance cannot be provided as to what the VA should do if their decision is to be based on quality of care. It is impossible to say whether VA care is better or worse than that which can be purchased in the community. VA nursing homes did significantly better at preventing pressure ulcers but worse at preventing functional decline. Similarly, a large set of community nursing homes with which the VA should or should not contract cannot be identified. Although significant differences in outcomes between nursing homes with and without VA contracts were found, the magnitude of these differences was small. Moreover, contract nursing homes were found in both the top and bottom performers, whether defined by deciles or quartiles, on each outcome measure. Nursing homes performing well on one outcome measure may perform poorly on other outcomes, and few community nursing homes were among the top or bottom performers on all measures. Only 19 nursing homes in the entire state were identified in the top quartile on the three measures.

Other studies examining nursing home outcomes have also found a poor correlation between different quality measures.^{9,19} This places all consumers—purchasers, patients, and families—in the difficult situation of needing to balance one outcome against another. Is it preferable to select a nursing home where residents are more likely to experience functional decline but less likely to develop a pressure ulcer? Rather than make such decisions, many consumers may actually end up ignoring the data. Thus, although extensive data on nursing homes are now available to consumers, it may not be helpful in making critical decisions. Development of composite measures has been described in other settings,²⁰ and a similar approach to developing a global measure of nursing home care might be helpful. It is unclear, though, whether the development of such a valid measure is feasible.

It is interesting to speculate why nursing homes may perform well on one outcome but worse on others. It may be that staff and skills required to perform well on one quality measure may be different from what is required for another measure. For example, preventing functional decline may be highly dependent on the presence of skilled physical and occupational therapists, whereas pressure ulcer care may depend primarily on how nursing aides are organized in performing highly routinized care. Performing well in all areas may prove to be exceedingly difficult. This further highlights the difficulties that all consumers face in trying to select a high-quality nursing home.

Two additional issues may limit the usefulness of quality report cards for nursing homes.² First, many nursing home markets are not competitive because they contain a small number of facilities. Consequently, nursing homes will have considerable market power, and consumers, including the VA, may not be in a position to demand better quality. Second, large public payers such as Medicaid dom-

inate the nursing home market. These payers typically do not vary their rates based on quality of care, and Medicaid patients often have to accept placement in a facility when a bed becomes available. This again limits the ability of other consumers to demand quality care.

Ultimately, an important goal is understanding how nursing homes achieve better outcomes. These results do not provide any clear answers, but it is interesting that VA nursing homes performed better on pressure ulcer care, given that this was the focus of an earlier quality-improvement effort.²¹ Some benefits of this effort may have been maintained in these nursing homes, although the system-wide benefit was not sustained.⁶ Efforts to improve care may need to focus on each individual outcome.

These quality measures focused on the effectiveness of nursing home care. Other dimensions of quality, particularly quality of life and satisfaction, are equally important.²² New quality measures to capture this aspect of care are being developed, but it is difficult to see how the inclusion of additional dimensions would simplify the decision for consumers.

This study was based on databases originally developed for reimbursement using Resource Utilization Groups. Most nursing homes now use the Minimum Data Set (MDS), a more-comprehensive database intended to assist in the clinical management of nursing home residents. VA nursing homes, though, have only recently started using the MDS, and MDS data on community nursing homes have only recently become available from CMS. Thus, the MDS could not have been used for the present study. Although MDS data allow the development of more comprehensive risk-adjustment models²³ and the examination of additional quality measures,²⁴ given the magnitude of the effects that were seen, it is doubtful that it would have dramatically altered the results. This would need to be assessed in future research studies based on MDS data.

It has long been assumed that empowering purchasers and other consumers to use information on quality of care will eventually stimulate broader improvements in care. Although there is limited evidence to suggest that this may be the case with hospital care,^{25,26} the results of the current study suggest that this assumption might be overly optimistic for nursing homes. Although information on quality of care is now widely available to consumers, the utility of this information in making decisions might be limited. Rather than helping consumers, such information may only add to the difficulties in identifying nursing homes providing the best care.

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Appendix 1. Predictors Used in Risk-Adjustment Models for Each of the Four Outcomes

Predictor	Pressure Ulcer Development	Functional Decline	Behavioral Decline	Mortality
Age	X	X	X	X
Mobility dependence	X		X	X
Transfer dependence	X			X
Eating dependence			X	
Toileting dependence	X			X
ADL summary score		X		
ADL summary score squared		X		
Stage 2 or higher pressure ulcer		X		X
Stage 1 pressure ulcer	X			
Behavioral summary score		X	X	
Physical disruptive behavior				X
Terminal illness	X	X		X
Urinary tract infection	X			
Stasis ulcer	X			X
Wound care	X			
Internal bleeding				X
Oxygen dependence				X
Respiratory care				X
Hemodialysis				X
Chemotherapy				X
Transfusions				X
Dehydration				X
Female				X
Dementia			X	
Dementia with psychosis			X	
Schizophrenia			X	
Brief psychosis			X	
Time between assessments	X	X		
First assessment				X

Values for predictors used in the risk-adjustment models were from the index assessment for each 6-month period. Predictors were selected based on literature reviews and clinical judgment. The form of the predictor (whether continuous, dichotomous, squared, etc.) was determined based on results from bivariate testing and simple regression models.

ADL = activity of daily living.