Assessing Quality of Nursing Home Care: The Foundation for Improving Resident Outcomes

Efforts to improve the quality of care and outcomes for nursing home residents are constantly of concern to state and federal regulators, nursing home providers, nursing home advocacy groups, and health policy researchers. The article describes a study that analyzed the quality indicators identified by the Health Care Financing Administration–sponsored Case Mix and Quality Demonstration Project using the Missouri nursing home Minimum Data Set database. The range of performance was considerable, and five of the indicators analyzed were risk adjusted to account for variation in resident acuity within facilities. Determining quality of care from assessment information that is routinely collected for nursing home residents has the potential to influence dramatically public policy decisions regarding reimbursement, recertification, and regulation and can play a vital role in improving resident outcomes. Key words: *Minimum Data Set, nursing homes, outcomes, public policy, quality*

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HISTORICALLY, controversy has surrounded the question of whether nursing homes in America are providing good or poor quality care. The government response to such concerns has been the institution of various kinds of regulations, including licensure, certification, inspection of care, and regulation of nursing and nursing home personnel as well as ombudsmen programs organized under the Older Americans Act.[1] Despite these efforts, initiated in the 1970s and 1980s, quality problems in nursing homes continue. In 1983, the Institute of Medicine began a 2-year study of nursing home quality. Its 1986 report, *Improving the Quality of Care in Nursing Homes*, resulted in Congress mandating in the Omnibus Budget Reconcil-

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iation Act (OBRA) of 1987 several provisions intended to improve nursing home care. These provisions, implemented nationally in 1990, included developing a resident assessment process that includes the Minimum Data Set (MDS) for use in resident assessment and care planning. Nursing homes were mandated to use the MDS routinely for all nursing home residents and to establish and implement a quality assurance and assessment process to improve the quality of care.[2]

The development of a quality monitoring system using quality indicators (QIs) derived from items of the MDS represents another initiative.[3] This is a major focus of the Health Care Financing Administration–sponsored multistate Nursing Home Case-Mix and Quality Demonstration (NHCMQ) project. The QIs were formulated and refined through a systematic process of interdisciplinary input, empirical analyses, and field testing. The first draft of the QIs was reviewed by expert panels in July 1991. Since then, they have been revised several times. The 1995 version includes 30 QIs clustered in 12 domains ranging from accidents and clinical management to the use of psychotropic drugs and quality of life.[4]

In this article, we briefly review the status of quality monitoring in nursing homes, indicate the distribution of high and low scores on selected MDS QIs in Missouri nursing homes, and discuss how these indicators might be used to facilitate improvement in care delivery and subsequent resident outcomes.

QUALITY OF CARE IN NURSING HOMES

Quality monitoring in long-term care has developed along the traditional lines of structure, process, and outcome measurement suggested by Donabedian.[5,6] Existing programs have focused primarily on concurrently and retrospectively monitoring care delivery.[7-9] Outcomes measures for long-term care have become increasingly important, as has the development of organizational strategies to facilitate implementing and stabilizing practice changes based on findings of quality monitoring.[10-13] Nursing quality measurement studies are urgently needed in long-term care, particularly studies focused on resident outcomes. Based on an analysis of nursing quality measurement studies, long-term care has undergone far fewer studies than other health care settings.[14,15]

A major organizational strategy now influencing quality monitoring in long-term care is total quality management.[16-18] This industrial engineering approach of identifying and reducing variations in processes is based primarily on the work of W. Edwards Deming.[19] Benefits of total quality management are purported to be improved resident satisfaction, clinical outcomes, market share, teamwork, job satisfaction, cost reductions, and profits.[20] Other terms, such as *continuous quality improvement*, have evolved to describe overall organizational strategies for measuring quality of care and service delivery.[21,22] A shorter version of the term is simply *quality improvement*. Quality improvement models rely heavily on collecting and organizing data about QIs.[23] Providing feedback of results of quality improvement activities to staff who are capable of making the necessary changes in care delivery is essential. The ultimate objective of quality improvement efforts using total quality management, continuous quality improvement, or quality improvement programs is to measure and improve processes of service delivery continuously.

The success of such quality improvement programs has yet to be fully determined. Nevertheless, reports of systematic evaluations of individual long-term care organizations suggest that feedback of quality measurement information to staff results in better care processes and outcomes.[9,13,24-26] A randomized trial provided feedback of quality measurement information to staff in 60 Ca-

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nadian nursing homes. This resulted in performance changes and improvement in QI conditions of hazardous mobility and constipation.[27]

Although one of the reasons why the MDS was developed was to generate standardized quantitative data regarding the care needs of nursing home residents, there is a vast opportunity for interpreting the quality of care from these assessment data.[14,15] As mandated by OBRA 1987 for facilities participating in Medicaid and Medicare, MDS data are routinely obtained for all nursing home residents upon admission, at times of significant change in condition, and annually. By this year, selected MDS items will be required to be collected and reported quarterly. There is growing evidence in the literature of validity and reliability of the MDS instrument and data as well as beginning evidence of validity and reliability for the QIs derived from MDS data.[28-33] Although NHCMQ testing of the QIs is still underway, preliminary analyses indicate that it is possible to make judgments about quality based on MDS information for a specific resident, a specific nursing home, and nursing homes in the aggregate.[3,4] Recently, researchers and clinicians have recommended using MDS data for quality improvement measurement in nursing homes.[34,35]

METHODS

Since July 1992, the Missouri Division of Aging has been collecting, compiling, and storing computerized MDS information from all certified nursing homes. There are 456 certified nursing facilities with 44,331 Medicaid/Medicare certified beds in Missouri. Because data are being collected from residents in all certified homes regardless of payer source, the data set is complete for these homes. This is important because all residents in certified homes, rather than only those residents funded by Medicaid or Medicare, can be included in analyses of care quality.

Data received from the state of Missouri were checked to identify obvious coding or entry errors and to resolve missing data. Generally, we did not impute values to missing data except where careful examination of data retrieval forms and conservative assumptions suggested an appropriate choice. For example, when check-off boxes were coded as missing but at least one item in a group was selected, we coded the other items as absent rather than missing.

We then determined the current level of facility performance on individual QIs. Each QI is developed from specific items from Missouri MDS resident assessment data. In each case, we used MDS data to calculate the percentage of residents in a facility with the problem detected by a particular indicator. We then examined percentile scores by facility.

We began with 27 QIs developed and tested in the NHCMQ. Although the NHCMQ developed more than 27 QIs, some QIs require additional information that is not available in the standard MDS. Based on clinical and statistical judgments, we subsequently narrowed our choice of QIs to those with sufficient variation among facilities to discriminate a range of quality and those that are potentially amenable to staff interventions to improve resident status. At the conclusion of this process, 14 QIs were identified; analyses of these are discussed.

Because indicators are based on the prevalence of problems, lower scores on a single

indicator suggest better facility performance in that area. We operationally chose the lowest 10th percentile (good score) as an indicator of the best quality of care for a given area. We chose the highest 10th percentile (poor score) as a cutoff for indicating potentially poor quality of care. Homes scoring between the 10th and the 90th percentiles on each indicator were also identified to describe the distribution of performance on QIs by Missouri nursing homes.

RESULTS

Range of QIs

Table 1 displays the scores corresponding to various percentiles for selected QIs. For example, for the QI "injuries," the score of a facility is the percentage of residents who had an injury. Because the 10th percentile is 3 percent, a home with an injury score of 3 percent would rank in the top 10 percent of homes relative to injuries. Note that all calculations are based on each resident's most recent MDS assessment data and that percentiles are computed separately for each indicator. Facilities may (and do) have scores at different percentiles for different indicators. For example, a home may score at the 10th percentile (good score) on injuries but at the 50th percentile (average score) for behavior problems. Table 1 illustrates that, in homes scoring at the 10th percentile on the injury QI, 3 percent of their residents experienced an injury, whereas in homes scoring at the 90th percentile, 16 percent experienced an injury. Similarly, for falls, in homes scoring at the 10th percentile, 9 percent of residents fell in the last 90 days, whereas in homes at the 90th percentile, 27 percent fell. Homes scoring at the 100th percentile, those scoring most poorly on these QIs, reported injuries for 29 percent of their residents, and 45 percent of their residents fell.

Considering Table 1 overall, the range of performance is clearly considerable for each of the 14 QIs. For each of these important care indicators, there are homes doing very poorly on particular indicators and other homes doing very well.

Risk adjustment

To account partially for variation in resident populations in facilities, some QIs have been stratified by risk factors. MDS items are used to determine whether residents are at risk for a particular problem. Indicators are examined separately for residents meeting definitions for high or low risk for a particular QI. For example, residents are determined to be at high risk for behavior problems if they have cognitive impairment, Alzheimer's disease, dementia, or psychotic conditions. By grouping residents according to risk, the prevalences of occurrence of the problem can be represented more accurately for a facility. Some facilities have more residents at high risk for particular problems than other facilities.

Table 2 displays, separately for high- and low-risk residents, percentile scores for five QIs: falls, behavior problems, incontinence, bedfast state, and pressure sores. As before, the scores for the 0th (minimum), 10th, 50th, 90th, and 100th (maximum) percentiles are shown. It is important to note that, when residents are divided into groups at high and low risk for developing a problem, the prevalences for occurrence of these problems shift. For example, in the best homes for the fall indicators, the prevalence of falls in residents at high risk for falls is higher (9 percent) than in residents at low risk for falls (0 percent). In the worst homes for the fall indicators, 47 percent of the residents at high risk fell, and 36 percent of the residents at low risk fell.

Dramatic differences in important resident outcomes that address both physiological

Table 1. *Percentile scores for selected QIs*

QI	0th Percentile (minimum or best score)	10th Percentile (good score)	50th Percentile (average score)	90th Percentile (poor score)	100th Percentile (maximum or worst score)
Injuries	0%	3%	8%	16%	29%
Falls	0%	9%	17%	27%	45%
Behavior problems	1%	10%	21%	36%	77%
9+ Scheduled medications	0%	4%	14%	29%	53%
Incontinent bowel/bladder	4%	28%	42%	54%	70%
Bowel/bladder incontinence without toileting plan	0%	7%	19%	36%	60%
Indwelling catheter	0%	3%	10%	20%	38%
Fecal impaction	0%	3%	9%	17%	41%
Weight loss	0%	6%	13%	26%	55%
Bedfast state	0%	3%	9%	18%	33%
Daily physical restraints	0%	5%	15%	26%	50%
Little or no activity	1%	28%	57%	77%	96%
Stage 1–4 pressure ulcers	0%	5%	13%	22%	50%
Diabetic without foot care	0%	5%	32%	64%	100%

Note: Numbers of nursing homes in each QI category ranged from 403 to 419 for all categories except diabetic without foot care (n = 352).

care (e.g., pressure ulcers) and psychosocial nursing care (e.g., behavior problems) are apparent. Homes with the highest quality scores were able to achieve zero quality problems for low-risk residents in the area of falls, bedfast state, and pressure ulcers. Even among homes with the highest quality care, however, some negative outcomes could not be eliminated for some high-risk residents.

Perhaps even more disturbing are the prevalences of problems such as pressure ulcers in low-risk residents. In homes with the worst score, 28 percent of residents at low risk for pressure ulcers developed them. Other homes were able to prevent all residents at low risk from developing pressure ulcers. Additionally, there were homes where even high-risk residents did not develop pressure ulcers. These findings document that, although risk is related to the incidence of a negative resident outcome, homes with poor quality care have frequent quality problems even among residents who are considered low risk. Homes with good quality care are able to minimize negative resident outcomes for residents at high risk as well as those at low risk.

DISCUSSION

Differences in resident outcomes

The findings of this study document that important resident outcomes vary considerably among nursing homes in the state of Missouri. The large magnitude of differences between homes with the highest and lowest scores on a specific QI (e.g., a 6 percent compared with a 29 percent incontinence rate for residents at low risk for incontinence)

Table 2. Percentile scores by high-risk level for selected QIs

QI	Risk level	0th Percentile (minimum or best score)	10th Percentile (good score)	50th Percentile (average score)	90th Percentile (poor score)	100th Percentile (maximum or worst score)
Falls	High (n = 419)	0%	9%	19%	29%	47%
	Low (n = 301)	0%	0%	8%	18%	36%
Behavior problems	High (n = 416)	0%	13%	28%	45%	88%
	Low (n = 413)	0%	3%	10%	25%	63%
Incontinence bowel/bladder	High (n = 417)	10.3%	42%	57%	69%	84%
	Low (n = 408)	0%	6%	15%	29%	50%
Bedfast state	High (n = 412)	0%	5%	16%	29%	59%
	Low (n = 401)	0%	0%	4%	10%	26%
Pressure ulcers	High (n = 414)	0%	7%	15%	27%	61%
	Low (n = 337)	0%	0%	0%	8%	28%

Note: Numbers of nursing homes in each QI category ranged from 301 to 419.

strongly suggests that systems of care have a significant impact on meaningful outcomes. Research that purposefully and carefully examines outcomes of care can provide the foundation for scientific inquiry that evaluates that efficacy and effectiveness of quality of care interventions.

These data document that nursing homes provide both excellent and poor care. These findings also document that a few nursing homes are providing notoriously poor care, including homes where more than half the residents at risk for pressure ulcers develop pressure ulcers and homes where almost one third of the residents at low risk for pressure ulcers develop them. These findings also document that some nursing homes are providing such high quality care that, even among residents at high risk for negative outcomes, the quality of care is generally sufficient to avoid problems of poor clinical outcomes. Additionally, these findings suggest that researchers can no longer consider nursing homes a homogeneous group when quality of care is an important issue.

The differences in quality of care are particularly interesting in nursing homes, a component of the health care industry that traditionally has employed large numbers of nonprofessional staff and has used high ratios of nonprofessional to professional staff. These findings suggest that quality of care

can be dramatically affected within an industry employing primarily nonprofessional employees. In our experience, this is critically dependent upon high quality leadership provided by professional and administrative staff.

Using the MDS data for quality improvement

How can nursing facilities use MDS data to facilitate quality improvement efforts? There are a variety of potential approaches. The conditions of individual residents can be evaluated over time in light of their potential for rehabilitation or maintenance of capabilities. Tracking prevalences of the QIs can be helpful for individual units within a facility. Units can be compared with each other and with composite prevalences for the facility. For additional comparisons, data can be pooled for analysis. Pooling within corporate divisions or within nursing home associations not only is possible but also can be done readily with computer-assisted technology. Pooling of data can provide a large enough sample to develop norms for interpretation of QI performance by individual facilities. Comparisons could be made with peer groups of facilities clustered according to resident characteristics or facility mission. Nursing facilities can request that data be analyzed to develop statewide norms for facilities to use to evaluate their performance.

It is important that the range of performance among large samples be analyzed and reported for facilities to use. Ranges should include those homes scoring the best as well as those scoring the worst. Using the 10th and 90th percentiles as standards for good and poor scores is one approach. Simple averages of prevalences do not provide enough information to help facilities understand their performance and interpret when changes in practice may be indicated. Providers need to target their efforts to achieve excellence in care, not average care. If simple averages become the standard for interpretation of adequate quality, residents will suffer. Facilities performing at average scores need to examine their care delivery processes and make an effort to improve care to achieve better than average resident outcomes.

There are advantages to using MDS data for quality improvement efforts. These data are collected at regular intervals for each resident using the standardized MDS instrument. These same data can be used to monitor care quality and resident outcomes; it is not necessary to collect additional data to calculate the MDS QIs. Facilities are collecting these data every 90 days, so that monitoring can be done continuously, tracking changes in residents and facility performance over time.

Disadvantages of using MDS data for quality comparisons should also be acknowledged. Although researchers report that MDS data are reliable, facilities supply the data, and some may be more accurate than others. To make preparation of reports and multiple comparisons feasible, computerization of the data is essential. Although most nursing homes use computers to some degree, many are not equipped to calculate the QIs readily using MDS data and make meaningful comparisons.

The advantages of using MDS data in quality measurement far outweigh the disadvantages. The MDS was developed specifically for measuring the complex care needs of nursing home residents. It can be used to measure diverse aspects of care quality and important resident outcomes. Because MDS data collection is mandated in all states, the data are available nationwide. Steps should be taken to prepare normative information about the range of performance of nursing homes on QIs using MDS data. This study is one such effort.

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