

# Verifying Nursing Home Care Quality Using Minimum Data Set Quality Indicators and Other Quality Measures

Researchers, providers and government agencies have devoted time and resources to the development of a set of Quality Indicators derived from Minimum Data Set (MDS) data. Little effort has been directed toward verifying that Quality Indicators derived from MDS data accurately measure nursing home quality. Researchers at the University of Missouri-Columbia have independently verified the accuracy of QI derived from MDS data using four different methods; 1) structured participative observation, 2) QI Observation Scoring Instrument, 3) Independent Observable Indicators of Quality Instrument, and 4) survey citations. Our team was able to determine that QIs derived from MDS data did differentiate nursing homes of good quality from those of poorer quality. Key words: *MDS data, nursing homes, quality management*

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**M**ANY RESEARCHERS and providers are devoting time and resources to developing and using quality indicators in nursing homes. Regulators are especially interested in that the Minimum Data Set (MDS) may be used to derive process and outcome measures of quality of care for nursing home residents.<sup>1</sup> Developing and testing quality indicators (QIs) from resident level MDS data is the focus of ongoing research at the University of Wisconsin-Madison and the Health Care Financing Administration (HCFA) sponsored multistate Nursing Home Case Mix and Quality Demonstration (NHCMQ).<sup>2</sup> The purpose of ongoing research by our multidisciplinary research team at the University of Missouri-Columbia is analysis of the range of quality outcome performance of nursing

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homes in a statewide MDS data base.<sup>3</sup> This study was undertaken by our research team to: 1) independently verify observed care quality with MDS QI scores; 2) evaluate the utility of qualitative data collection and scoring instruments for the care processes and outcomes measured by MDS QIs; and 3) evaluate the sensitivity of an independent observable care quality quantitative measure developed by the research team.

## BACKGROUND

Quality is an elusive and difficult concept to measure. The quality of nursing home care has long been a concern of individuals as well as public and private entities in the United States.<sup>4</sup> The Omnibus Reconciliation Act of 1987 (OBRA 87), the most recent legislative effort to improve care in nursing homes, was passed in response to the 1986 Institute of Medicine Report, *Improving the Quality of Care in Nursing Homes*.<sup>5</sup> The OBRA 87 legislation mandated that residents be routinely assessed in-depth using the standardized MDS Resident Assessment Instrument.<sup>6</sup> The assessment process was envisioned as a multidisciplinary resident health and functional assessment. A complete assessment is done annually and with each significant change in the resident's condition; an abbreviated version is completed quarterly.

Included in the MDS is information about each resident's cognitive abilities, functional abilities, presence of depression, disease profile, and rehabilitation/restorative treatments. Eventually, all states will collect MDS data and transmit data electronically to HCFA. Many states, including Missouri, began collecting and compiling statewide computerized data sets in the early 1990s to prepare for eventual nationwide transmission and analysis. Missouri is particularly interested in helping facilities use MDS data for quality improvement activities.

Using MDS data provides the opportunity to track and retrieve resident-level information that may indicate potential quality problems. The Center for Health Systems Research and Analysis (CHSRA), of the University of Wisconsin-Madison, in cooperation with other researchers in the multistate NHCMQ, developed QIs derived from MDS data to serve as a foundation for quality improvement activities.<sup>2</sup> The QIs were systematically developed with extensive interdisciplinary input, empirical testing, and field testing.<sup>7,8</sup> The QIs do not measure quality, but are markers of potential poor care practice and resident outcomes. The most current version includes 30 QIs, measuring areas such as accidents, behavioral and emotional patterns, clinical management, cognitive patterns, elimination and continence, infection control, nutrition and eating, physical functioning, psychotropic drug use, quality of life, sensory function, communication, and skin care.<sup>2</sup> The QIs are primarily outcome measures, but some are process measures or could be both outcome and process measures of quality.

Researchers and clinicians are recommending the use of MDS data for quality improvement measurement in nursing homes.<sup>9,10</sup> Glass<sup>10</sup> points out the great potential for using MDS data to improve nursing home care.<sup>11</sup> The MDS data provide a mechanism that can be used to generate many pertinent resident outcomes.<sup>12,13</sup> Quality indicators from MDS data can be a crucial first step in quality management. Quality indicators describe

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***Quality indicators describe potential opportunities for improvement and change in nursing home care at the resident and facility level.***

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potential opportunities for improvement and change in nursing home care at the resident and facility level. Benchmarking opportunities supported by the use of QIs derived from MDS data would allow nursing homes to make better use of their own data to improve care processes and resident outcomes.<sup>1</sup> As aggregate MDS data becomes more readily available, more states are expected to become interested in using MDS data and QIs for quality improvement.

Our multidisciplinary MDS research team has analyzed the Missouri MDS data set using the NHCMQ QIs for several years to understand care quality and design ways to help facilities use the MDS data in their individual quality improvement programs.<sup>3</sup> We began with the 30 QIs and narrowed our choices to 14 that have sufficient variation among facilities, are related to well-documented quality problems in nursing homes, represent diverse aspects of quality care, and are amenable to clinical practice intervention. Box 1 lists the QIs the MDS research team used to analyze resident outcomes in Missouri. As noted in the box, most are outcome measures but some are process measures that can be interpreted as both outcome or process measures of quality.

While it is tempting to use the MDS QIs immediately for quality improvement activities, there is value in validating that the QIs measure the actual level of quality observed in a facility. Using the 14 selected QIs, the MDS research team developed instruments to collect qualitative information about the QIs and to calculate a composite score of nursing home quality. Subsequently, these instruments were used in nursing homes to independently verify the level of quality for each QI derived from MDS data. Second, we used a measure of observable care quality under development by the team as an independent quality measure separate from the MDS QIs and their related observations and

### **Minimum Data Set Quality Indicators Used in Analyses**

Prevalence of any injury (outcome)  
 Prevalence of falls (outcome)  
 Prevalence of problem behavior toward others (outcome)  
 Use of 9 or more scheduled medications (process)  
 Prevalence of bladder or bowel incontinence (outcome)  
 Prevalence of bladder or bowel incontinence without a toileting plan (outcome/process)  
 Prevalence of indwelling catheters (process)  
 Prevalence of fecal impaction (outcome)  
 Prevalence of weight loss (outcome)  
 Prevalence of bedfast residents (outcome)  
 Prevalence of daily physical restraints (process)  
 Prevalence of little or no activity (outcome)  
 Prevalence of Stage 1-4 pressure ulcers (outcome)  
 Insulin-dependent diabetes with no foot care (outcome/process)

scores. Third, we tabulated survey citations as a proxy quality measure.

### **METHOD**

*Sample.* Using MDS data from 1994-1995, nursing homes were identified that performed particularly well and particularly poorly on the 14 QIs from the NHCMQ. Low scores for MDS QIs indicate good performance and high scores indicate poor performance. Building on the team's understanding of the range of performance of QIs in Missouri,<sup>3</sup> homes were identified as performing well on QIs if their scores were at or below the 10th percentile (good score) on at least one indicator and their remaining scores were no greater than the 80th percentile (poor score). Using these definitions, 35 homes in Missouri were identified as performing well on QIs. Homes were

**Table 1.** Demographic characteristics of sample homes

	<b>Group 1 Homes with Good MDS QI Scores</b>	<b>Group 2 Homes with Poor MDS QI Scores</b>
Bed size		
60	1	3
120	3	2
330	1	—
Ownership		
Proprietary	5	3
Not-for-profit	—	2

identified as performing poorly if they scored at or above the 80th percentile (poor score) on one or more of the QIs and none below the 10th percentile (good score). Using these definitions 124 homes were identified as performing poorly on QIs.

A purposive sample of seven homes was selected from each of the good performance and poor performance lists based on geographic location (within 120 miles), bed size, and research team members' lack of prior knowledge or experience with any of the homes. No attempt was made to control for ownership; there was an effort to include homes of varying size. A research nurse who was blind to the QI performance results contacted the homes to participate in a field study examining quality of care. The study was approved by the university's institutional review board. Ten homes agreed to participate: five identified by QIs as performing well and five identified as performing poorly. Homes were unaware of their QI performance. Demographic characteristics of bed size and ownership of the 10 homes are summarized in Table 1.

*Instruments.* To facilitate systematic collection of on-site observation data regarding care delivery associated with each QI, a qualitative data collection instrument (the QI

Observation Instrument) and detailed data collection procedure were designed by the research nurse and research team. For example, for the QIs of "injury" and "falls," observations of the staff assisting residents to activities or the dining room are outlined. These include noting the verbal cues used by staff and identifying whether the cues are appropriate and effective in bringing about a desired behavior and, therefore, avoiding injury or fall. The physical environment is observed, including floor luster, rails, floor covering, elevation changes, and obstacles that could interfere with safe mobility. The instrument is semistructured to guide data collection and facilitate identification of care processes and services that staff provide. The detailed data collection procedure prompts the research nurse to dictate detailed field notes for analysis. Field notes include observations about care delivery processes used by the staff that appear to support the care outcomes detected by the QIs derived from the MDS data.

A second instrument (the QI Observation Scoring Instrument) was constructed by the research team to score the observations of care delivery for each MDS QI. Clearly defined criteria on a three point scale were used to judge whether staff care delivery processes were effectively managing each quality area. For example, a good score of 0 for bladder or bowel incontinence was used if "a plan or schedule is used to toilet incontinent residents;" an average score of 1 was used if there is "a plan or schedule for toileting incontinent residents, but toileting inconsistent;" a poor score of 2 was used if there is "no toileting plan for incontinent residents." This instrument was constructed to parallel the scoring of the MDS QIs so that low scores indicate good performance and high scores indicate poor performance.

A third instrument (the Independent Observable Indicators of Quality Instrument)

was tested during the observational experiences. The Independent Observable Indicators of Quality Instrument measured six dimensions of nursing home quality: interaction, milieu, individualized care, staff, environment, and safety. Each dimension of quality was derived from descriptive statements of participants in focus groups designed to explore the multidimensional concepts of quality.<sup>14</sup> This instrument is designed to be a broad independent measure of nursing home care quality, not a specific measure directly tapping the domains in the MDS QIs. The Independent Observable Indicators of Quality Instrument was completed within the first 20–30 minutes of entering the home and again just prior to exit after other notations and dictation were completed. Again, scoring of the instrument was constructed so that low scores indicate good performance and high scores indicate poor performance.

**Procedure.** Using participant observation methods and the qualitative QI Observation Instrument, data were collected during a day-long on-site observation of care delivery for each of the ten nursing homes. Upon entering the facility the research nurse asked the Director of Nursing to identify residents with high risk conditions: decubitus ulcers, contractures, urinary catheters, feeding tubes, constipation, residents with insulin-dependent diabetes, and residents with late loss of activities of daily living. Care of residents with those conditions was tracked during the observation period and their charts were reviewed for information about the conditions; whether the condition originated from hospital or nursing home, and what interventions were being done to reverse or limit the effect of the condition.

At the completion of the observational experience at each home the research nurse made final contact with the staff, thanking them for their help and cooperation. The research nurse reviewed her field notes writ-

ten on the QI Observation Instrument, dictated additional detailed field notes which included observations about the day, and concerns about the instruments or scoring process. After dictation was completed the research nurse scored each QI using the QI Observation Scoring Instrument, and scored the second Independent Observable Indicators of Quality Instrument.

Survey citations for homes in each group were tabulated for 1994–1995 to correspond with the time frame of the MDS data used to calculate QI performance. Citations were considered proxy, not direct, measures of care quality.

## FINDINGS

Descriptive analysis of the scores revealed a strong association between the MDS QI scores, the QI Observation Scoring Instrument scores, the Independent Observable Indicators of Quality scores, and the mean number of survey citations for each group. Descriptive statistics summarized in Table 1 are appropriate for use with this small purposive sample. The findings are important because they indicate that it is possible to verify the accuracy of the MDS QI scores using methods that are independent from the MDS QIs. Group 1 nursing homes (homes with good quality based on MDS QIs) had a mean score of 3.6 with a range of 1–9 on the QI Observation Scoring Instrument and a mean score of 2.7 with a range of 0–6 on the Independent Observable Indicators of Quality scale. Additionally, the Group 1 homes had a mean number of survey citations of 4.2 with a range of 0–14. The results for Group 1 homes are in the direction of good quality scores on all four measures. Group 2 nursing homes (homes with poor quality based on MDS QIs) had a mean score of 8.2 with a range from 5–12 on the QI Observation Scoring Instrument and a mean score of 12.9 with

a range of 2–16 on the Independent Observable Indicators of Quality scale. Additionally, the Group 2 homes had a mean number of survey citations of 8.2 with a range of 1–20. The results for Group 2 homes are in the direction of poor quality scores on all four measures. Table 2 shows the results of the quality score comparisons.

The qualitative analysis of the field notes from the nursing homes yielded insights into the actual systems and processes that were different in homes with good and poor quality scores using MDS QIs. Homes with good quality outcomes generally had more registered professional nurses (RNs) actively involved in care and good care processes such as focused ambulation/mobility programs to encourage mobility, toileting programs to promote continence, and nutritional programs to assure each resident is getting nutritional needs met. The RNs in good quality homes were not nurses hired solely to complete the MDS process, but were available to assess residents reported as having problems, par-

ticipated and took responsibility for communication with physicians, and directed the plan of care and treatment for residents. They also served in an educative, supportive role to the LPN nursing staff and nursing assistants. In good quality homes, the Director of Nursing was actively engaged in working with the staff nurses and was aware of resident care requirements and status changes.

Residents in homes with good quality also had good care processes; that is, they were actively toileted, ambulated, and encouraged to be as independent as possible. Rehabilitation staff (physical, occupational, and speech therapy) had an active presence and worked with the other staff to ensure that restorative care needs were understood, communicated in the plan of care, and implemented. The number of decubitus ulcers stage II and above, prevalence of weight loss, incontinence and restraints were fewer in homes with good quality scores compared to homes with poor quality scores. Finally, the homes with good quality scores generally had a

**Table 2.** Results of quality score comparisons

	Group 1 Homes with Good MDS QI Scores*	Group 2 Homes with Poor MDS QI Scores**
QI Observation Scoring Instrument		
Mean	3.6	8.2
Range	1–9	5–12
Independent Observable Indicators of Quality Instrument		
Mean	2.7	12.9
Range	0–6	2–16
Survey Citations		
Mean	4.6	8.2
Range	0–14	1–20

\*Homes with good MDS QI scores were at or below the 10th percentile (good score) on at least one indicator and their remaining scores were no greater than the 80th percentile (poor score)  
 \*\*Homes with poor MDS QI scores were at or above the 80th percentile (poor score) on one or more of the QIs and none below the 10th percentile (good score)

pleasant ambiance, were clean, odor-free, well lit, and did not seem chaotic.

Nursing homes with poor quality scores using MDS QIs, however, were not diametrically opposite to homes with good care quality scores. Homes with poor quality scores were a composite of some good care processes and some poor care processes. Nursing homes with poorer outcomes were more inconsistent in how they met the residents' needs. They were more likely to have care plans with little resident individualization and the care plans were not readily available to all staff for use. Registered professional nurses did not have a strong presence and were not directly involved in the day to day assessment and care of residents. The RNs were more commonly hired to only do the MDS assessment and care planning process. In these homes, communication with physicians regarding resident needs was done by LPNs. Typically, the director of nursing was minimally involved in assessing resident status and determining resident care requirements.

In homes with poor quality scores, restorative programs were less consistent and rehabilitation staff were not readily available to work with other nursing home staff. Wheelchairs were used as a primary means of assisting resident locomotion. Fewer residents were routinely ambulated, toileted, and encouraged to get dressed to go the dining room for meals. More invasive treatments, such as feeding tubes and urinary catheters, were used to treat problems. When reviewing why invasive treatments were chosen, the research nurse was not able to determine the history of assessment and care that occurred prior to tube placement. Systems of care were not as well defined in homes with poorer quality scores. Nursing homes of poorer quality were not strikingly different in appearance than nursing homes of good quality, but the ambiance of poorer quality homes

was generally not as pleasant and the environment seemed more chaotic and noisy.

## DISCUSSION

Quality indicators derived from MDS data measure potential poor or good quality practices and resident outcomes. The research team selected for analysis 13 out of 30 QIs that offered enough variation to discriminate good from poor quality homes based on QIs derived from MDS data. We then verified the information obtained from the QIs by using a QI Observation Instrument, QI Observation Scoring Instrument, and Independent Observable Indicators of Quality Instrument. Additionally, we tabulated the survey citations for the homes as a proxy measure of quality. We found that the QI scores derived from MDS data did discriminate between homes with good and poor care quality. We were able to independently verify the level of quality in each facility using alternative methods of measurement.

The QIs derived from MDS data have implications for care decisions made at the resident and facility level. Quality indicator scores may serve as an important first step in the quality improvement process for nursing homes. Nursing homes have access to data that can identify outcomes that are potentially problematic based on the QI results for their home. Further examination of those areas identified as potentially problematic by the QI data can occur at the resident level using more in-depth process assessment criteria. Once processes are fully understood it becomes possible to alter the systems of care by changing key processes and subsequently improve resident outcomes.<sup>1,3,4,13,15,16</sup>

It was possible to identify good resident outcomes as measured by the QIs derived from MDS data. This has important policy implications as well as implications for resi-

dents and their families. The possibility of a data-driven survey has been considered with interest at both the federal and state level.<sup>2,11,13</sup> The data-driven survey is seen as one method to place scarce resources where they may be needed most. Facilities that score particularly well on QIs may receive a less lengthy and involved survey than those homes identified as performing poorly on QIs. Residents and their families may find that they can make comparisons with quality information when determining where to live, or where to have an older relative placed.<sup>1,17,18</sup>

Nursing homes with good quality care used registered professional nurses to their fullest potential. However, in many homes it has become increasingly common to use RNs to “coordinate” the MDS process. This trend is particularly disturbing in the face of a growing body of research that shows when RNs are involved in resident care, functional outcomes improve, mortality is reduced, and there are more discharges back to the community.<sup>19-21</sup> Homes with good care used RNs to assess residents, communicate with physicians, and direct and support resident care. These homes also had better resident outcomes as measured by fewer decubitus ulcers, less weight loss, incontinence, and restraint use when compared to homes with poorer quality.

The study is limited by a small sample size of 10 homes. While a sample of 10 homes may be adequate for qualitative analysis it is a small sample to use for quantitative analysis. It was also necessary to select a purposive sample instead of a random sample to control for home size, travel distance, and team members’ prior knowledge of a home’s care processes. In future studies other demographic characteristics, such as ownership, location, and staffing, should be controlled to enhance generalizability. Much additional research is needed to substantiate these

findings and more fully understand the processes of care and staffing that influence resident outcomes in nursing homes.

## IMPLICATIONS

Quality indicators derived from MDS data are being seen as a measure of quality. Little has been done to verify the accuracy of QI information using other methods of comparison. It is understood that quality is elusive, difficult to measure, and multidimensional in nature. One all-inclusive measure of quality may never be found. Quality indicators derived from MDS data can serve as a reasonable first step in determining what level of quality exists in a facility. Our team determined that it is possible to verify QI scores with other methods of observation and quantification. Determining that QIs derived from MDS data are associated with observed care quality in the clinical setting strengthens the case for using QIs derived from MDS data to improve resident outcomes using the quality improvement process.

Further work is needed before QIs derived from MDS data are used to benchmark facility quality to the public or determine type of survey intensity. The lack of studies that verify QIs derived from MDS data with other methods of quality measurement is striking. To date we do not have good information describing the best report format to use when giving QI information to facilities, government agencies, and the public.

Quality indicators derived from MDS data do seem to provide valuable and useful information. It would be wise to look closely at how facilities and government agencies can best use this information. Although further verification work is needed, facility staff need to be educated to use QIs derived from MDS data to make informed changes in care process to improve resident outcomes.



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