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VALIDATING MDS DATA FROM VA NURSING HOME CARE UNITS: DATA APPEARS TO BE INTERNALLY CONSISTENT AND RELIABLE

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1.0 Overview

During fiscal year 2001, VA fully implemented the collection of health and functional status data for VA nursing home patients using the Minimum Data Set (MDS) Version 2.0 instrument developed by the Centers for Medicare and Medicaid Services (CMS).[1] Prior to that time, VA used a VA-developed instrument - the Patient Assessment Instrument - to collect a smaller set of somewhat similar data stored in the Patient Assessment File (PAF). The MDS instrument was initially designed for use in community nursing homes; the first version was fielded in 1991.

Nursing home patient (or resident) assessment data provide the foundation for quality monitoring, case mix adjustment, and outcomes research in both community and VA nursing facilities. The adoption of the MDS 2.0 as the patient assessment instrument in VA holds the promise of more detailed data for application to VA research questions as well as data that, for the first time, could be easily comparable to resident assessment data collected in community nursing facilities.

Both in its original development and in its subsequent revision, the MDS has undergone extensive validation [Hawes 1997]. Some validation studies use the concept of inter-rater reliability, where MDS assessments conducted by different nurses are compared [Morris 1990, Morris 1997, Hawes 1995]. Other studies validate MDS items by comparing individual items or summary scores derived from several of them to data or summary scores available from other sources or assessments [Morris 1994, Hartmaier 1994, Frederikson 1996, Gambassi 1998, Snowden 1999]. Validation of MDS cognition assessment has been one domain of considerable research, with several studies comparing the MDS' cognitive performance scale with other summary measures of cognition [Morris 1994, Frederikson 1996, Snowden 1999, Gruber-Baldini 2000]. Another study [Fries 2001] developed and validated an MDS pain scale which consists of MDS items found to be most predictive of the Visual Analogue Scale (VAS), a self-reported measure of pain [Herr 1993]. Few studies address the validity of MDS assessments conducted in a non-research setting. Thus, less is known about the validity of MDS assessments as they are completed by facility nurses under normal operating conditions [Stineman 2000].

This research project (Validating MDS Data From VA Nursing Home Care Units - SDR 03-211-2) is the first attempt to validate the MDS for the VA patient population. The goals of this project are to:

1. Evaluate the internal consistency of VA MDS data, checking different items on the same assessment and checking longitudinally across assessments for the same patient.
2. Evaluate the comparability of VA MDS data relative to PAF data from prior years and other VA administrative data.
3. Compare basic quality indicators constructed from VA MDS data to the same measures constructed from MDS data collected from community nursing homes.

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[1] See CMS website http://www.cms.hhs.gov/quality/mds20/default.asp? for MDS 2.0 manuals and forms.

This Data Brief reports our findings with regard to the first goal – evaluating the internal consistency of VA MDS data. The analyses described here are part of a broader set of analyses that taken together will shed light on the validity of the MDS 2.0 for the VA population.

The key findings of our analyses are:

- Data quality was much better than expected and was relatively even across both time and region.
- Fewer than 10% of records were flagged as potentially inconsistent when evaluating whether different items on the same assessment were coded consistently with one another.
- Fewer than 5% of records were flagged as potentially inconsistent when evaluating whether the same item is coded consistently from one assessment to the next.
- Two of the 21 VISNs[2] (VISNs 5 and 15) have significantly greater percentages of records that are flagged as potentially inconsistent after controlling for case mix.
- Only one VISN (VISN 16) has a significantly lower percentage of records that are flagged as potentially inconsistent after controlling for case mix.

Given these results, VA MDS data appears to be consistent and reliable enough to support a variety of uses by administrators and researchers. Administratively, MDS data could be used for casemix adjustment, care planning, and quality monitoring. Among other uses, researchers may find MDS data invaluable in developing new risk-adjusted outcome-based measures of quality of care.

2.0 Methods – Overview

The study population for this project is all VA nursing home care unit patients in FY2001-FY2004. The principal source of data for this project is the VA MDS 2.0 database currently maintained at the Austin Automation Center. We obtained the assessment data for all VA Nursing Home Patients for FY2001 through third quarter FY2004: 449,774 assessments for 112,060 patients. Patients may have multiple assessments administered. Generally assessments are administered at admission and quarterly thereafter, as well as upon transfer or change of medical status.

In order to check for internal consistency we examined the data in two different ways. First, we examined different but related items on the same assessment; next, for an individual patient, we examined the same item on two sequential assessments. Choosing which items to select for analysis presented a challenge. Our criteria for selecting items included:

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[2] The Veterans Health Administration is organized into a system of 21 regional networks called Veterans Integrated Service Networks (VISN). See Appendix 1 for a list of all 21 VISNs.

- Items should appear on the different types of assessments (admissions, annual, quarterly, significant change in status, and significant correction of prior assessment). This ensured the largest study size possible.
- Items should be objective in nature. We excluded items such as "patient in unpleasant mood in morning."
- Items selected to test for internal consistency on the same assessment should have some overlapping content. It was difficult to identify items for this purpose because the MDS instrument was designed to avoid duplication.
- Items selected to test for consistency over time should be very unlikely to change over time.

2.1 Methods - Different data elements on same assessment

We initially hypothesized that patients who were recorded as bedfast would not simultaneously be recorded as able to walk or wheel around the room, corridor or unit independently or with supervision. Patients are coded as bedfast if they are in bed or in a recliner in their own room for 22 hours or more per day for at least 4 out of the 7 days.

The patient's ability to independently walk or wheel around the room corridor or unit is assessed by the MDS items listed in Table 2.1 below.

Table 2.1: Items assessing ability to walk/wheel independently or with supervision

MDS Section	Section Description	Item Number	Item Description	Value Selected
G	Physical Functioning and Structural Problems	1c	Walk in room	Self support = (0,1) 0= independent 1= supervision
G	Physical Functioning and Structural Problems	1d	Walk in corridor	Self support = (0,1) 0= independent 1= supervision
G	Physical Functioning and Structural Problems	1e	Locomotion on unit	Self support = (0,1) 0= independent 1= supervision
G	Physical Functioning and Structural Problems	1f	Locomotion off unit	Self support = (0,1) 0= independent 1= supervision

In consultation with clinical experts, we determined that a bedfast patient was extremely unlikely to be able to walk and very unlikely to be able to locomote[3] independently or with supervision. Patients were coded as able to walk or locomote around the room, corridor or unit independently or with supervision if they received a rating of "0" or "1" in the categories listed in the table above. Ratings were assigned based upon a resident's performance over all shifts during the last seven days.[4] A "0" indicates that the patient is independent. Either no help or oversight is needed or help or oversight is provided only

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[3] Locomote includes the ability to move from one location to another in a wheelchair.
[4] Description of how ratings are assigned are taken directly from the MDS 2.0 September 2000 Full Assessment Form instructions.

one or two times during the last seven days. A "1" indicates that the patient requires some supervision: oversight, encouragement or cuing is provided three or more times during the last seven days; additionally physical assistance may be provided one or two times during the last seven days. Ratings of 2, 3, 4 and 8 were also possible. Patients receiving any of these ratings were not coded as being able to walk or locomote independently or with supervision.

In order to test the hypothesis, we created a new item titled "walk" which combines the "walk in room" and "walk in corridor" items into one category and a second new item "locomotion" which combines the items "locomotion on unit" and "locomotion off unit" items into one category. If a patient had a "0" or a "1" in either the "walk in room" or "walk in corridor" items they were coded as being able to walk. If a patient had a "0" or "1" in either the locomotion on unit or the locomotion off unit categories they were coded as capable of locomotion.

The data are considered internally consistent if a patient is recorded as bedfast and not also coded as being able to walk or capable of locomotion. The data are considered potentially inconsistent if a patient is coded as bedfast and also as able to walk in the room or corridor. We choose the term potentially inconsistent because we believe that sometimes items might be flagged as potentially inconsistent, but in fact are consistent with each other. This might occur in situations where patients experience acute onset of a condition such as a fractured hip, a massive stroke or a head injury. For example, a patient may be coded as able to walk independently for the first or second day of a seven day period and but then because of a hip fracture they may also be coded as bedfast for the last four days of the same seven day period. This patient may be legitimately coded as both bedfast and able to walk. It is unknown how often this occurs.[5] Records coded for legitimate reasons like this are included in our count of records flagged as potentially inconsistent resulting in both numbers and percentages of records that overestimate the rate of true errors in the data.

For fiscal year 2001 through the 8th month of fiscal year 2004 the number of records in which patients were recorded as bedfast equaled 24,884. Total number of records for 2001 was 6,451; for 2002 was 7,135; for 2003 was 7,240 and for 2004 (8 months of data only) was 4,058.

2.2 Methods - Same data element over time (sequential assessments)

We hypothesized that certain items should not show improvement over time if the data were recorded correctly. To test this hypothesis we chose to look at two items in Section C, Communication/Hearing Patterns. These were item C4 - Making Self Understood (expressing information content) and item C6 - Ability to Understand Others (understanding verbal information content). Both these items were coded on a 0-3 scale

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[5] Ideally, upon sudden onset of an acute condition, a significant change in status assessment would be administered and we would not encounter records where patients were legitimately coded as both bedfast and able to walk. However, very few of these assessments are actually administered in VA, thus allowing for the possibility that records are coded inconsistently for legitimate reasons.

with a "0" indicating the highest level of functioning (see Table 2.2). Our hypothesis is based on the assumption that the majority of patients scoring poorly (1-3) on the items are long term nursing home patients suffering from chronic conditions such as dementia or the long term effects of a stroke; thus improvement would not be expected.

Table 2.2: Items used to assess internal consistency of sequential assessments

Level of Functionality	Item C4 - Making Self Understood	Item C6 - Ability to Understand Others
0	Understood	Understands
1	Usually Understood- difficulty finding words or finishing thoughts	Usually understands – may miss some part/intent of message
2	Sometimes understood – ability is limited to making concrete requests	Sometimes understands – responds adequately to simple, direct communication
3	Rarely/never understood	Rarely/never understands

We analyzed all possible pairs of sequential assessments for each patient. Most pairs consisted of two quarterly assessments. Other combinations of pairs were admissions and quarterly assessments, annual and quarterly assessments, significant change in status and quarterly assessments and significant correction of prior assessment and quarterly assessment. If the second of a pair was administered because of a change in status or a significant correction to a prior assessment that pair was excluded from the study because we were not sure the same expectation (for no improvement in functioning) would hold given the change in the patient's status. Pairs administered too closely together or too far apart were also excluded from the study.[6] A pair was assigned to a fiscal year based upon the date of administration of the second assessment in the pair.

Depending on the analysis, between 110,697 and 111,423 assessments were analyzed for approximately 39,378 patients. This was 43% of total patients for whom assessments were available for the time period under study.

For both of these items, the data is considered internally consistent if the level of functioning from one assessment to the next remains the same or declines. The data is considered potentially inconsistent if the level of functioning increases from one assessment to the next. Again, we choose to use the term potentially inconsistent to acknowledge possible instances in which it might make sense for the patient's level of functioning to be recorded as improved (such as in the case of an elderly patient undergoing surgery who experienced delirium for several days because of a reaction to anesthesia or tranquilizers but who improved over time).

2.3 Methods – Data Analysis Techniques

Data is reported on and analyzed in several different ways. We look at the data by VISN, by RUG category (a measure of casemix) and by Fiscal Year. Basic descriptive analyses

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[6] Pairs were included in the study if the period between paired assessments fell between the 5th and 95th precentiles (inclusive). Pairs with more than 98 days (95th percentile)) between assessments were excluded and pairs with less than 70 days (5th percentile) between assessments were excluded.

look at the percentage of potentially inconsistent records by VISN by year and by RUG category by year for individual VISNs, for all VISNs combined and for all years combined. Comparisons of 95% confidence intervals of the mean percentage of potentially inconsistent records for all years combined yields an initial understanding of whether there are differences by VISN. Finally, a logistic regression analysis provides a more comprehensive understanding of differences among VISNs by controlling for case mix (RUG category) and year effects.

VISN
The Veteran Health Administration health delivery system is organized into 21 networks across the country known as Veterans Integrated Service Networks (VISNs). Results are presented by VISN and for the nation as a whole (see Appendix 1 for list of VISNs)

RUG Category
Analyzing the data by RUG category (see Appendix 2 for a list) provides us with a method for understanding differences in the numbers of potentially inconsistent records that may be due to differences in the health and functional status of patients. Analysis by RUG category roughly adjusts for case-mix differences among the VISNs included in this analysis.

The MDS 2.0 supports the RUG-III classification system (Appendix 2). This system classifies nursing home residents into 44 homogenous groups according to their health status as well as the amount and type of resources utilized. The 44 groups are then organized into 7 major RUG categories. The analyses presented here report on results by the 7 major RUG categories with one modification. We divided the clinically complex RUG category into two subcategories, yielding a total of 8 new classifications for analysis. The new subcategories were: clinically complex – less independent (ADL index $>= 12$) and clinically complex – independent (ADL index $<= 11$). We did this because our initial investigation of the 44 RUG groups that make up the 7 categories showed that differences existed in the percentage of records coded inconsistently within the clinically complex category depending on whether the ADL index was above or below 11.

In VA data, RUG scores are reported on residents' admissions and annual assessments as well as on any assessment performed for a change of status or significant correction. RUG scores are also reported on approximately 57% of quarterly assessments. To include all quarterly assessments in the analysis, we imputed RUG scores to all quarterly assessments for which they were not reported. RUG scores were imputed from the closest previous assessment for which they were available.

Fiscal Year
Fiscal year analysis is by the four fiscal years for which we have data FY2001 – FY2004 For FY2001 through FY2003 we have data for 12 months of each fiscal year and for FY2004 we have data for 8 months (October 1, 2003 through May 26, 2004).

Percentage of potentially inconsistent records
The percentage of potentially inconsistent records is calculated by dividing the number of records that are potentially inconsistent by the total number of records.

Comparison of 95% Confidence Intervals
The 95% confidence intervals of the mean percentage of potentially inconsistent records for each VISN over all the years under study are compared to the mean percentage of potentially inconsistent records for all VISNs for all years. If the confidence intervals overlap, the difference is not considered significant. If the confidence intervals do not overlap, the difference is considered significant. Because we are dealing with the 95% confidence interval, significance is at the $p < 0.05$ level.

Logistic Regression – Odds Ratio
Comparing 95% confidence intervals to identify VISNs with percentages of potentially inconsistent records that were significantly above or below the national average is a relatively simple method that does not account for differences that may exist among VISNs. One way in which we expect VISNs to differ from one another is in the mix of patients they serve. The average severity of illness as well as functional status of the patients may substantially differ from one VISN to the next.

Therefore, to control for potential differences in casemix, we constructed a logistic regression model for each set of items for which we calculated percentages of potentially inconsistent records. These models attempt to explain to what extent being in a specific VISN, a particular RUG category or a particular year accounts for a record being flagged as potentially inconsistent. Thus, we are able to obtain an unbiased estimate of the effect of being in a particular VISN on the probability of having a record coded as potentially inconsistent compared to the omitted VISN, while controlling for both RUG category and fiscal year.

We constructed four logistic regression models of the following form:

Pr (Flagged) = F (VISN, RUG, FY) + ε

where:
Pr (Flagged) refers to the probability of a record of being flagged as potentially inconsistent

and, where:
-   VISN is a set of 21 indicator variables, one for each of VA's 21 VISNs
-   RUG is a set of 8 RUG category variables
-   FY is a set of 4 fiscal year variables
-   ε is a random disturbance term

Based upon previous analysis, the omitted variables for VISN and RUG were chosen so the percentage of potentially inconsistent records in the omitted group approximated the

nationwide percentage. The omitted variable for FY was FY2001 for all four models because this was the first year in our sample.

Model #1 estimates the probability of a record indicating that the patient was both bedfast and able to walk as a function of which VISN the record was in, which RUG category the patient was assigned and which year the assessment was administered.

Model #2 estimates the probability of a record indicating that the patient was both bedfast and able to locomote as a function of which VISN the record was in, which RUG category the patient was assigned and which year the assessment was administered.

Model #3 estimates the probability of an item being coded as improved over time for the Making Self Understood item as a function of which VISN the record was in, which RUG category the patient was assigned and which year the assessment was administered.

Model #4 estimates the probability of an item being coded as improved over time for the Ability to Understand Others item as a function of which VISN the record was in, which RUG category the patient was assigned and which year the assessment was administered.

3.1 Results - Different data elements on same assessment

Nationwide
Table 3.1.1 shows the percentage of records coded as potentially inconsistent for items bedfast and walk. For all years combined, 3% of records are coded as potentially inconsistent. From FY2001 to FY2003, Table 3.1.1 shows the percentage decreasing over time; however in FY2004, the percentage has once again increased to the level of FY2001.

Table 3.1.1: Percentage of Consistent/Potentially Inconsistent Records by FY
Bedfast vs. Walk
Consistent = Patients recorded as bedfast recorded and not able to walk
Potentially Inconsistent = Patients recorded as bedfast and able to walk

	FY2001	**FY2002**	**FY2003**	**FY2004**	**Total FY2001-2004**
Total Records	6,451	7,135	7,240	4,058	24,844
Bedfast, not able to walk (consistent)	96.8	97.0	97.3	96.9	97.0
Bedfast, able to walk (potentially inconsistent)	3.2	3.0	2.7	3.2	3.0

Table 3.1.2 shows the percentage of records coded as potentially inconsistent for items bedfast and locomotion. For all years combined, 6.7% of records are coded as potentially inconsistent. FY2001 to FY2004, the percentage decreases though there is a slight increase from FY2001 to FY2002. The fact that more than twice as many records were flagged as potentially inconsistent for bedfast vs. locomotion as compared to bedfast vs. walk reflects the fact that the category of locomotion includes both patients who use a wheelchair and who can walk whereas the category of walk excludes people who use a

wheelchair. Therefore the possible number of potentially inconsistent records must be greater for the locomotion category than it is for the walk category.

Table 3.1.2: Percentage of Consistent/Potentially Inconsistent Records by FY
Bedfast vs. Locomotion
Consistent = Patients recorded as bedfast and not able to locomote
Potentially Inconsistent = Patients recorded as bedfast and able to locomote

	2001	**2002**	**2003**	**2004**	**Total FY2001-2004**
Total Records	6,451	7,135	7,240	4,058	24,844
Bedfast; no locomotion	93.1	93.1	93.3	94.1	93.3
Bedfast; able to locomote	6.9	7.0	6.8	5.9	6.7

By VISN

Table 3.1.3 examines whether or not the difference in the percentage of records coded as potentially inconsistent for Bedfast vs. Walk varies by VISN. Overall, it is difficult to discern any patterns or trends over time. Looking at VISNs individually, 9 of 21 VISNs showed a decrease in the percentage of records coded as potentially inconsistent over time and 12 showed an increase. In FY2001, 13 VISNs had percentages greater than average compared to twelve in FY2002, nine in FY2003, and twelve in FY2004.

By comparing the 95% confidence intervals of each VISN's total FY2001-2004 percentage of potentially inconsistent records to the confidence interval of the nationwide figure of 3.0%, we were able to identify those VISNs that had percentages significantly different from the national average. Five VISNs had percentages of potentially inconsistent records that were significantly below the national average, potentially indicating very good data quality. Four VISNs had percentages of potentially inconsistent records that were significantly above the national average indicating possible issues with data quality.

Table 3.1.3: Percentage of Potentially Inconsistent Records – Bedfast vs. Walk
By VISN by Fiscal Year
Potentially Inconsistent = Patients recorded as bedfast and able to walk

VISN	2001	2002	2003	2004	Total FY2001-2004
Total All VISNs	3.2	3.0	2.7	3.2	3.0%
1	4.3	3.8	3.0	4.8	3.8
2	6.1	4.9	3.4	3.2	4.4
3	5.1	5.6	1.6	0.6	3.5
4	1.0	2.1	1.5	2.5	1.7[b]
5	4.0	4.3	4.5	4.9	4.4[a]
6	3.0	0.6	2.4	3.8	2.3
7	2.3	1.9	1.8	2.2	2.0[b]
8	4.2	3.0	4.4	5.1	4.0
9	2.1	2.1	1.7	1.4	1.9[b]
10	2.7	2.5.	1.0	4.1	2.4
11	1.5	4.5	1.8	0.6	2.3
12	1.7	1.5	2.6	4.8	2.4
15	4.2	8.7	4.1	6.6	5.8[a]
16	1.7	0.7	1.0	2.2	1.3[b]
17	3.2	3.2	2.7	4.5	3.2
18	4.6	5.8	4.4	3.3	4.7[a]
19	3.6	4.4	na	1.8	2.5
20	4.7	6.4	4.9	4.8	5.2[a]
21	5.4	3.8	3.8	0.6	3.7
22	1.8	1.3	2.5	2.0	1.8[b]
23	5.5	3.1	3.9	3.3	4.0

[a] Average was significantly above the national average of 3.0%.

[b] Average was significantly below the national average of 3.0%.

Table 3.1.4 examines whether or not the difference in the percentage of records coded as potentially inconsistent for Bedfast vs. Locomotion varies by VISN. Again, as with table 3.1.3, it is difficult to discern any patterns or trends over time. Looking at VISNs individually, 13 of 21 VISNs showed a decrease in the percentage of records coded as potentially inconsistent over time and 9 showed an increase. In FY2001, FY2002 and FY2004, 10 VISNs had percentages greater than average. In FY2003, 9 VISNs had percentages greater than average.

By comparing the 95% confidence intervals of each VISN's total FY2001-2004 percentage of potentially inconsistent records to the confidence interval of the nationwide figure of 6.7%, we were able to identify those VISNs that had percentages significantly different from the national average. Seven VISNs had percentages of potentially inconsistent records that were significantly below the national average, potentially indicating very good data quality. Four VISNs had percentages of potentially inconsistent records that were significantly above the national average indicating possible issues with data quality.

Table 3.1.4: Percentage of Potentially Inconsistent Responses - Bedfast vs. Locomotion
By VISN by Fiscal Year
Potentially Inconsistant = Patients recorded as bedfast and able to locomote

VISN	2001	2002	2003	2004	Total FY2001-2004
Total All VISNs	6.9	7.0	6.8	5.9	6.7
1	8.2	10.1	7.9	4.2	8.0
2	10.9	10.5	5.8	6.5	8.4
3	6.4	4.8	3.7	2.8	5.0
4	5.1	6.4	3.7	2.8	4.7[b]
5	4.3	5.3	6.7	7.2	5.9[b]
6	5.1	2.6	3.7	6.8	4.3[b]
7	4.0	5.6	5.3	2.2	4.5[b]
8	7.2	7.4	10.8	11.7	8.9[a]
9	2.7	3.2	6.4	3.6	4.0[b]
10	4.6	5.2	4.4	4.6	4.7[b]
11	5.4	8.8	7.3	4.6	6.8
12	6.5	4.5	6.1	9.6	6.2
15	5.9	8.7	6.5	8.2	7.2
16	5.7	3.3	5.4	5.2	4.8[b]
17	9.0	8.3	5.9	6.4	7.5
18	11.8	10.0	7.8	4.6	9.0[a]
19	14.3	16.5	16.7	3.6	13.7
20	7.8	6.4	7.8	8.0	7.4
21	11.3	11.4	9.7	8.1	10.3[a]
22	7.5	5.4	9.5	5.3	7.0
23	13.7	12.6	11.7	9.3	12.2[a]

[a] Average was significantly above the national average of 6.7%.

[b] Average was significantly below the national average of 6.7%.

By RUG Category

Tables 3.1.5 and 3.1.6 examine whether the percentage of records coded as potentially inconsistent varies by RUG category and fiscal year for the walk and locomotion items.

For both items, three groups stand out initially as having relatively higher percentages of records coded as potentially inconsistent. These are the clinically complex group with ADL index less than or equal to 11, the cognitively impaired category and the behavior problems category. Across fiscal years the percentage of potentially inconsistent records appears relatively stable with the exception of the cognitively impaired and behavior problems categories. Over time the percentage of potentially inconsistent records for these two categories increases considerably.

By comparing the 95% confidence intervals of each RUG category's total FY2001-2004 percentage of potentially inconsistent records to the confidence interval of the nationwide

figures of 3.0% (Bedfast vs. Walk) and 6.7% (Bedfast vs. Locomotion), we were able to conclude that with the exception of one RUG category (physical function – bedfast vs. walk), all RUG categories had percentages significantly different from the national average.

Strong RUG category effects are consistent with our concept that some records flagged as potentially inconsistent are in fact legitimately coded in this way. For example, the strong effect we see in the Clinically Complex (ADL index <= 11) category may be interpreted to mean that a person could be recorded within a particular 7 day time period as both being able to walk at some point and also being bedfast during that same time period due possibly to the use of a respirator on to the effects of chemotherapy. Both conditions could be true during the same time period and legitimately coded as such. For purposes of our analysis however this record is coded as potentially inconsistent. The fact that the percentages are so high in the Clinically Complex category ADL Index = 11 or less makes sense because of where this category falls in the hierarchical organization of the RUG classification system. By definition patients coded in the higher ranked categories have more dependencies in activities of daily living, including walking and locomotion, thus making it very unlikely that a record may be legitimately coded as potentially inconsistent (if they can't walk, then they can't be coded as bedfast and walking). A similar rationale explains why the reduced physical functions category has very low percentages of potentially inconsistent records. The remaining categories, cognitively impaired and behavior problems, have high percentages. However, each of these categories has a relatively small number of records available for analysis.

Table 3.1.5: Percentage of Potentially Inconsistent Records - Bedfast vs. Walk
RUG Category by Fiscal Year
Potentially Inconsistent = Patients recorded as bedfast and able to walk

RUG Category	2001	2002	2003	2004	Total FY2001 -2004	Total Records
Total - All RUG Categories	3.2	3.0	2.7	3.2	3.0	28,884
Rehabilitation	4.2	4.9	3.7	4.9	4.4	2,010
Extensive Care	0.5	0.9	0.5	0.5	0.6	5,474
Special Care	1.9	1.5	1.7	1.9	1.7	6,819
Clinically Complex (*ADL index =12 or more, less independent*)	0.2	0.1	0.3	0.1	0.2	5,307
Clinically Complex (*ADL Index =11 or less, more independent*)	27.7	29.1	29.4	27.1	28.4	1,206
Cognitively Impaired	28.9	33.3	52.9	69.2	39.3	107
Behavior Problems	12.5	25.0	33.3	50.0	23.5	17
Reduced Physical Functions	2.9	2.3	2.5	3.4	2.7	3,944

Table 3.1.6: Percentage of Inconsistent Responses - Bedfast vs. Locomotion
RUG Category by Fiscal Year

Potentially Inconsistent = Patients recorded as bedfast and able to locomote

RUG Category	2001	2002	2003	2004	Total FY2001-2004	Total Records
Total – All RUG Categories	6.9	7.0	6.8	5.9	6.7	28,884
Rehabilitation	10.7	11.4	10.4	11.1	10.9	2,010
Extensive Care	3.3	2.7	2.8	3.3	3.0	5,474
Special Care	7.4	8.3	8.3	6.3	7.7	6,819
Clinically Complex (*ADL index =12 or more, less independent*)	3.6	2.5	2.8	1.5	2.7	5,307
Clinically Complex (*ADL Index =11 or less, more independent*)	25.7	29.4	33.1	26.1	28.7	1,206
Cognitively Impaired	31.6	30.8	76.5	69.2	43.0	107
Behavior Problems	25.0	25.0	33.3	50.0	29.4	17
Reduced Physical Functions	5.3	6.3	5.8	4.9	5.7	3,944

Odds Ratios

Table 3.1.7 shows the results of two logistic regression models. Model #1 investigates which factors explain the probability of a record being coded as potentially inconsistent when looking at bedfast vs. walk and model #2 investigates which factors explain the probability of a record being coded as potentially inconsistent when looking at bedfast vs. locomotion. These models allow us to obtain unbiased estimates of the effect of being in a particular VISN on the probability of having a record coded as potentially inconsistent compared to the omitted VISN, while controlling for both RUG category and fiscal year.

The results are reported as odds ratios. An odds ratio of 1 means that the odds of a record being coded as potentially inconsistent in a particular VISN is the same as the odds of it being coded as potentially inconsistent in the omitted VISN. In other words there is no difference between the two VISNs. An odds ratio of greater than one means that the odds of a record being coded as potentially inconsistent in a particular VISN is more likely. For example in model #1, the odds ratio of 2.4 for VISN 2 means that it is 2.4 times more likely for records to be coded as potentially inconsistent in VISN 2 than in the omitted VISN 17. An odds ratio of less than one means that the odds of a record being coded as potentially inconsistent is less likely. For example in model #2, an odds ratio of 0.70 in VISN 16 means that the odds of a record being coded as potentially inconsistent in VISN 16 is 70% of the odds of the in the omitted VISN 11. However, just because an odds ratio is greater than or less than one does not mean it is significantly different from one. In order to assess significance we look to see whether the 95% confidence intervals of each VISN's odds ratio includes the value of 1. Confidence intervals that include 1 are considered insignificant; those that do not include 1 are considered significant.

Model #1 results show that in 6 of 20 VISNs the odds of records being coded as potentially inconsistent are more likely (odds ratios = 1.5 to 2.5) and for one VISN the odds of records being coded as potentially inconsistent are less likely (odds ratio = 0.5).

Model #2 results show that in 3 of 20 VISNs the odds of records being coded as potentially inconsistent are more likely (odds ratios = 1.4 to 2.0) and for 7 VISNS the odds of records being coded as potentially inconsistent are less likely (odds ratios = 0.6 to 0.7).

Table 3.1.7: Odds Ratios: Bedfast vs. Walk and Bedfast vs. Locomotion

	Model #1 Bedfast vs. Walk	Model #2 Bedfast vs. Locomotion
Omitted Variables	**V 17** **Physical function** **FY01**	**V11** **Special Care** **FY01**
Variable	**Odds Ratio**	**Odds Ratio**
V1	1.6	1.1
V2	2.4*	1.4
V3	1.6	0.7
V4	0.8	0.7*
V5	1.6*	0.8
V6	1.1	0.7*
V7	1.0	0.7*
V8	1.5*	1.3
V9	0.7	0.6*
V10	0.9	0.6*
V11	1.0	Omitted
V12	1.0	1.0
V15	2.5*	1.0
V16	0.5*	0.7*
V17	Omitted	1.0
V18	1.6*	1.3
V19	0.7	2.0*
V20	2.0*	1.0
V21	1.1	1.4*
V22	0.6	1.0
V23	1.5	2.0*
Rehabilitation	1.5*	1.5*
Extensive Care	0.2*	0.3*
Special Care	0.6*	
Clinically Complex (less independent)	0.1*	0.3*
Clinically Complex (more independent)	14.6*	4.7*
Cognitively Impaired	22.2*	9.1*
Behavior Problems	11.2*	5.5*
Reduced Physical Functions		0.8*
FY02	1.0	1.0
FY03	1.0	1.1
FY04	1.1	1.0

* Indicates significance at 0.05 level.

Note also that the magnitude of the odds ratios for RUG categories are consistent with the percentages reported in Tables 3.1.5 and 3.1.6. The odds ratios for the fiscal years show that fiscal year effects are not significant.

Results – Analyzing potential inconsistencies in degrees of difficulty recorded for different items

Certain items on the MDS record the degree of difficulty a patient has in performing a particular task. A reasonable assumption is that the degree of difficulty recorded for more difficult tasks of a specific type should not be coded as less than the degree of difficulty recorded for an easier task of the same type.

We chose to look at the degree of difficulty for two related items – walk in corridor vs. walk in room. We assumed that it is more difficult to walk in the corridor than in the room. Therefore, the degree of difficulty recorded for walking in the corridor should be either equal to or greater than the degree of difficulty recorded for walking in the room.

Data analysis showed that this coding was very consistent within each assessment. For 240,193 assessments analyzed for FYs 2001-2004, 98.5% were coded consistently. Given the very high consistency rate for this comparison, we did not pursue additional analyses in this area.

3.2 Results - Same data element over time (sequential assessments)

National Level
Table 3.2.1 shows the percentage of records coded as potentially inconsistent for the item – Making Self Understood. For all years combined, 3% of records are coded as potentially inconsistent. From FY2001 to FY2003, Table 3.2.1 shows that the percentage remains relatively stable across the years. In FY2004, the percentage increases to 3.7%.

Table 3.2.1: Percentage of Consistent/ Potentially Inconsistent Records - Making Self Understood
Consistent = functional ability remained the same or declined
Potentially inconsistent =functional ability improved

	2001	**2002**	**2003**	**2004**	**Total FY2001-2004**
Total Records	20,207	31,468	36,088	22,853	110,616
Improved = Potentially Inconsistent	2.9	2.7	2.9	3.7	3.0
Stayed Same	93.2	93.5	93.0	92.0	93.0
Declined	3.9	3.9	4.1	4.3	4.1

Table 3.2.2 shows the percentage of records coded as potentially inconsistent for the item – Ability to Understand Others. For all years combined, 3.3% of records are coded as potentially inconsistent. From FY2001 to FY2003, Table 3.2.2 shows that the percentage

remains relatively stable across the years. Again, as in Table 3.2.1, the percentage increases in FY2004.

Table 3.2.2: Percentage of Consistent/Potentially Inconsistent Responses - Ability to understand others
Consistent = ability remained the same or declined
Potentially inconsistent = functional ability improved

	2001	2002	2003	2004	Total FY2001-2004
Total Records	20,228	31,499	36,103	22,867	110,697
Improved=Potentially Inconsistent	3.2	2.9	3.2	3.9	3.3
Stayed Same	93.0	93.2	92.7	91.4	92.6
Declined	3.8	3.9	4.2	4.7	4.1

By VISN
Table 3.2.3 examines whether or not the percentage of records coded as potentially inconsistent for the item Making Self Understood varies by VISN. Overall, it is difficult to discern any patterns or trends over time. In FY2001, 6 VISNs had percentages greater than average compared to 7 in FY2002, 8 in FY2003, and 10 in FY2004.

By comparing the 95% confidence interval of each VISN's total FY2001-2004 percentage of potentially inconsistent records to the confidence interval of the nationwide figure of 3.0%, we were able to identify those VISNs that had percentages significantly different from the national average. Ten VISNs had percentages of potentially inconsistent records that were significantly below the national average potentially indicating very good data quality. Six VISNs had percentages of potentially inconsistent records that were significantly above the national average indicating possible issues with data quality.

Table 3.2.3: Percent Potentially Inconsistent Records – Making Self Understood
By VISN by Fiscal Year
Potentially inconsistent = functional ability improved

VISN	2001	2002	2003	2004	Total FY2001-2004
Total All VISNs	2.9	2.7	2.9	3.7	3.0
1	2.0	1.0	1.2	2.2	1.5[b]
2	1.1	1.2	1.0	1.1	1.1 [b]
3	2.2	1.5	1.3	1.3	1.5 [b]
4	1.9	1.7	3.4	4.7	3.0
5	2.4	3.5	8.7	7.0	5.7[a]
6	4.4	4.7	3.0	4.1	3.9 [a]
7	1.8	2.1	5.4	8.4	4.4 [a]
8	2.5	2.7	3.2	4.0	3.1
9	2.3	2.5	1.4	5.6	2.9
10	7.7	8.6	5.4	4.3	6.6 [a]
11	4.3	4.4	4.3	4.6	4.4 [a]
12	1.5	1.6	2.0	1.2	1.6 [b]
15	8.2	9.9	7.3	5.5	7.7 [a]
16	1.7	1.4	0.7	3.3	1.6 [b]
17	4.4	3.7	2.9	2.0	3.4
18	2.7	1.4	2.0	5.7	2.7
19	1.3	0.3	0.8	0.2	0.7 [b]
20	1.6	1.8	1.3	2.4	1.7 [b]
21	3.6	1.6	1.0	2.3	1.7 [b]
22	1.3	0.4	1.5	0.8	1.0 [b]
23	2.1	1.6	1.8	3.2	2.1 [b]

[a] Average was significantly above the national average of 3.0%.

[b] Average was significantly below the national average of 3.0%.

Table 3.2.4 examines whether or not the difference in the percentage of records coded as potentially inconsistent for the item Ability to Understand Others varies by VISN. Overall, it is difficult to discern any patterns or trends over time. In FY2001, 7 VISNs had percentages greater than average compared to 8 in FY2002, 6 in FY2003, and 13 in 2004.

By comparing the 95% confidence interval of each VISN's total FY2001-2004 percentage of potentially inconsistent records to the confidence interval of the nationwide figure of 3.3%, we were able to identify those VISNs that had percentages significantly different from the national average. Eight VISNs had percentages of potentially inconsistent records that were significantly below the national average, potentially indicating very good data quality. Six VISNs had percentages of potentially inconsistent records that were significantly above the national average indicating possible issues with data quality.

Table 3.2.4: Percent Inconsistent Records – Ability to Understand Others
        By VISN by FY
        Potentially inconsistent = functional ability improved

VISN	2001	2002	2003	2004	Total FY2001-2004
Total All VISNs	3.2	2.9	3.2	3.9	3.3
1	2.1	1.1	1.3	2.0	1.5[b]
2	1.8	1.7	2.3	1.4	1.9[b]
3	2.7	1.4	1.4	1.2	1.5[b]
4	1.8	2.1	3.4	4.4	3.0
5	1.9	3.7	9.3	8.3	6.1[a]
6	5.5	4.8	3.7	4.8	4.6[a]
7	1.7	2.2	5.3	9.5	4.6[a]
8	2.5	3.0	3.2	4.9	3.4
9	2.3	3.2	1.3	4.6	2.8
10	7.8	8.9	5.5	5.8	7.1[a]
11	5.6	5.8	5.7	4.9	5.5[a]
12	2.1	1.2	2.0	1.2	1.6[b]
15	8.0	10.6	7.2	5.9	7.9[a]
16	1.4	1.0	1.0	2.9	1.5[b]
17	5.4	4.2	2.7	1.9	3.7
18	3.6	1.6	2.0	4.9	2.8
19	0.8	1.4	0.7	1.4	1.0[b]
20	2.2	2.0	2.1	1.6	2.0
21	3.4	2.1	1.1	2.6	2.0
22	1.0	0.7	1.5	0.8	1.0[b]
23	2.4	1.8	2.4	3.6	2.5[b]

[a] Average was significantly above the national average of 3.3%.

[b] Average was significantly below the national average of 3.3%.

By RUG Category
Tables 3.2.5 and 3.2.6 examine whether or not the percentage of records coded as potentially inconsistent varies by RUG category and fiscal year for the Making Self Understood and Ability to Understand items.

By comparing the 95% confidence interval of each RUG category's total FY2001-2004 percentage of potentially inconsistent records to the confidence interval of the nationwide figures of 3.0% (Making Self Understood) and 3.3% (Ability to Understand), we were able to conclude that:

- For the Making Self Understood item, four RUG categories had percentages significantly different from the national average. These were extensive care, both clinically complex categories and the cognitively impaired category.
- For Ability to Understand Others item, three RUG categories had percentages significantly different from the national average. These were both clinically complex categories and the cognitively impaired category.

As in the previous results section we see RUG category effects (though not nearly as strong as for bedfast vs. walk and bedfast vs. locomote). These effects are consistent with our concept that some records flagged as potentially inconsistent are in fact legitimately coded in this way and speculate, as before, that there are clinically valid reasons for this.

Table 3.2.5: Percent of Potentially Inconsistent Responses– Making Self Understood
By RUG Category by FY
Potentially inconsistent = functional ability improved

RUG Category	2001	2002	2003	2004	Total FY2001-2004	Total Records
Total – All RUG Categories	2.9	2.7	2.9	3.7	3.0	110,616
Rehabilitation	3.6	2.9	3.0	2.9	3.1	12,213
Extensive Care	4.5	4.0	4.4	5.7	4.5	4,726
Special Care	2.8	2.6	2.6	3.6	2.8	13,447
Clinically Complex (*ADL index =12 or more, less independent*)	3.5	3.6	3.6	4.7	3.8	20,858
Clinically Complex (*ADL Index =11 or less, more independent*)	2.5	2.1	1.8	2.1	2.1	11,784
Cognitively Impaired	3.7	2.9	3.3	4.0	3.4	15,032
Behavior Problems	1.7	2.3	3.2	3.1	2.7	2,859
Reduced Physical Functions	1.9	2.3	3.0	4.2	2.9	29,697

Table 3.2.6: Percent Inconsistent Records – Ability to Understand Others
By RUG Category by FY
Potentially inconsistent = functional ability improved

RUG Category	2001	2002	2003	2004	Total FY2001-2004	Total Records
Total – All RUG Categories	3.2	2.9	3.2	3.9	3.3	110,687
Rehabilitation	3.8	2.7	2.7	3.2	3.1	12,218
Extensive Care	4.1	3.5	2.9	4.5	3.6	4,766
Special Care	2.4	2.6	2.6	4.0	2.9	13,463
Clinically Complex (*ADL index =12 or more, less independent*)	4.8	4.1	3.7	5.1	4.3	20,860
Clinically Complex (*ADL Index =11 or less, more independent*)	2.6	2.7	2.3	2.7	2.5	11,786
Cognitively Impaired	3.9	3.3	3.7	4.5	3.8	15,029
Behavior Problems	2.2	2.9	3.1	3.1	2.9	2,858
Reduced Physical Functions	2.5	2.6	3.6	4.3	3.3	29,717

Odds Ratios

Table 3.2.7 shows the results of two logistic regression models. Model #3 investigates which factors explain the probability of a record being coded as potentially inconsistent when looking at the Making Self Understood item and Model #4 investigates which factors explain the probability of a record being coded as potentially inconsistent when

looking at the Ability to Understand Others item (see methods section for more detailed discussion of the model). These models allow us to obtain precise estimates of the effect of being in a particular VISN on the probability of having a record coded as potentially inconsistent compared to the omitted VISN, while controlling for both RUG category and fiscal year.

The results are reported as odds ratios. An odds ratio of 1 means that the odds of a record being coded as potentially inconsistent in a particular VISN is the same as the odds of it being coded as potentially inconsistent in the omitted VISN. In other words there is no difference between the two VISNs. An odds ratio of greater than one means that the odds of a record being coded as potentially inconsistent in a particular VISN is more likely. For example in model #3, the odds ratio of 1.4 for VISN 7 means that it is 1.4 times more likely for records to be coded as potentially inconsistent in VISN 2 than in VISN 4 (the omitted VISN). An odds ratio of less than one means that the odds of a record being coded as potentially inconsistent in less likely. For example in model #4, an odds ratio of 0.44 in VISN 1 means that the odds of a record being coded as potentially inconsistent in VISN 1 is 44% of the odds in the omitted VISN 8. However, just because an odds ratio is greater than or less than one does not mean it is significantly different from the one. In order to assess significance we look to see whether the 95% confidence intervals of each VISN's odds ratio includes the value of 1. Confidence intervals that include 1 are considered insignificant; those that do not include 1 are considered significant.

Model #3 results show that for 7 of 21 VISNs the odds of records being coded as potentially inconsistent are more likely (odds ratios = 1.2 to 2.8) and for 10 VISNs the odds of records being coded as potentially inconsistent are less likely (odds ratios = 0.2 to 0.7)

Model #4 results show that for 6 of 21 VISNs the odds of records being coded as potentially inconsistent are more likely (odds ratios = 1.4 to 2.5) and for 10 VISNS the odds of records being coded as potentially inconsistent are less likely (odds ratios = 0.3 to 0.7)

Note also that the magnitude of the odds ratios for RUGs categories are consistent with the percentages reported in Tables 3.2.5 and 3.2.6. The odds ratios for the fiscal years show that in one instance (Model #4) having the assessment filled out in FY04 has a moderate effect.

Table 3.2.7: Odds Ratio – Model #3 Making Self Understood and
Model #4 Ability to Understand Others

| Omitted Variables	Model #3 Making Self Understood	Model #4 Ability to Understand Others
	V4 Physical Function FY01	V8 Physical Function FY01
Variable	Odds Ratio	Odds Ratio
V1	0.5*	0.4*
V2	0.4*	0.6*
V3	0.5*	0.5*
V4		0.9
V5	2.0*	1.9*
V6	1.4*	1.4*
V7	1.5*	1.4*
V8	1.1	
V9	1.0	0.8
V10	2.5*	2.3*
V11	1.5*	1.7*
V12	0.6*	0.5*
V15	2.8*	2.5*
V16	0.5*	0.4*
V17	1.2*	1.1
V18	1.0	0.8
V19	0.2*	0.3*
V20	0.6*	0.6*
V21	0.6*	0.6*
V22	0.3*	0.3*
V23	0.7*	0.7*
Rehabilitation	1.1	0.9
Extensive Care	1.6*	1.0
Special Care	1.0	0.9
Clinically Complex (less independent)	1.3*	1.3*
Clinically Complex (more independent)	0.7*	0.8*
Cognitively Impaired	1.2*	1.2*
Behavior Problems	0.9	0.9
FY02	1.0	0.9
FY03	1.0	1.0
FY04	1.4	1.3*

* Indicates significance at 0.05 level.

4.0 Discussion

Overall, we conclude that the quality of the MDS data is very good. First, the overall percentage of records flagged as potentially inconsistent is very low for all comparisons. Those cases where the percentages appear high are most likely overstated because clinically valid reasons exist for coding the records in a seemingly contradictory manner. The best example of this is that of the Clinically Complex (ADL index =11 or less) RUG category where a patient might legitimately be coded as bedfast and unable to walk during the same period of time. Second, casemix effects are very strong. Once casemix is controlled for, only a very few VISNs consistently appear to differ significantly from the national average. If there were true problems with data quality we would expect to see the same VISNs significantly differing from the national average on different measures. The data show that only VISNs 5 and 15 were significantly likely to have elevated inconsistency rates on as many as 3 of 4 measures. By contrast, VISN 16 stood out with significantly low rates on all 4 measures. Third, no apparent trends exist in the data across time. If there had been serious data quality issues we would have expected to observe trends that indicated improvement over time. Lack of this type of trend is consistent with good data quality.

Given these results, we conclude that VA MDS data quality is good enough to support its use in casemix adjustment (e.g., through RUG-III), care planning, and quality monitoring. Much research remains to be done, particularly in the development of risk-adjusted quality measures, but the underlying data appears to be reliable enough for this work to proceed.

APPENDIX 1 - List of Veterans Integrated Service Networks (VISNs)
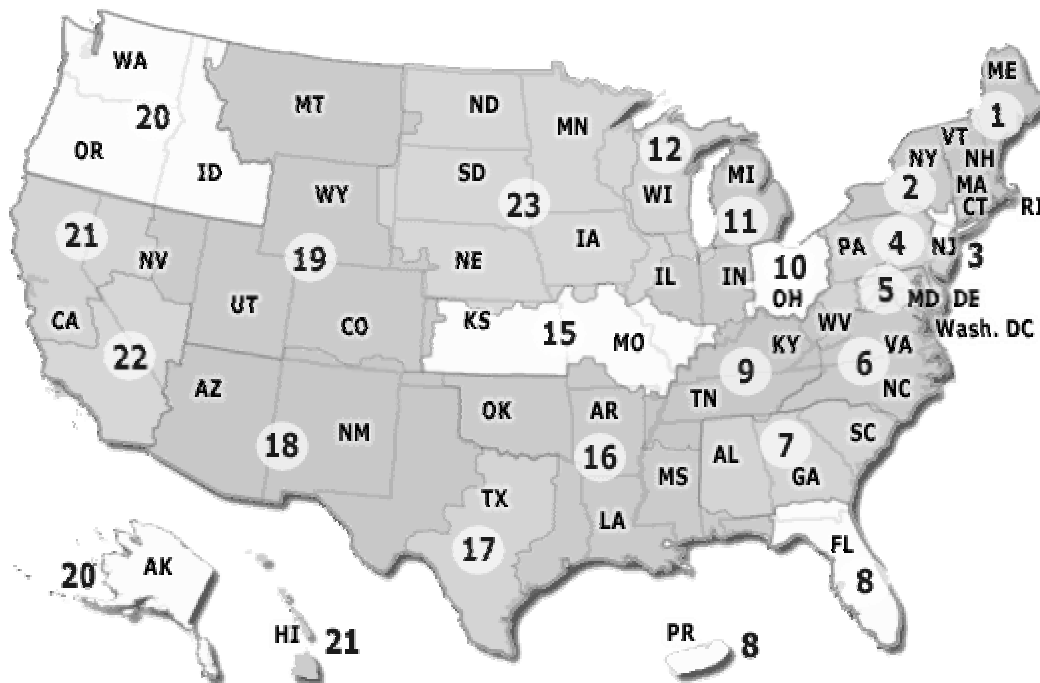
VISN 1: VA New England Healthcare System
VISN 2: VA Healthcare Network Upstate New York
VISN 3: VA NY/NJ Veterans Healthcare Network
VISN 4: VA Stars & Stripes Healthcare Network
VISN 5: VA Capitol Health Care Network
VISN 6: VA Mid-Atlantic Health Care Network
VISN7: VA Southeast Network
VISN 8: VA Sunshine Healthcare Network
VISN 9: VA Mid South Healthcare Network
VISN 10: VA Healthcare System of Ohio
VISN 11: Veterans In Partnership
VISN 12: The Great Lakes Health Care System
VISN 15: VA Heartland Network
VISN 16: South Central VA Health Care Network
VISN 17: VA Heart of Texas Health Care Network
VISN 18: VA Southwest Health Care Network
VISN 19: Rocky Mountain Network
VISN 20: Northwest Network
VISN 21: Sierra Pacific Network
VISN 22: Desert Pacific Healthcare Network
VISN 23: VA Midwest Health Care Network

From: Department of Veterans Affairs Facility Directory: Veterans Health Administration
http://www1.va.gov/directory/guide/division.asp?divisionId=1

APPENDIX 2 - RUG Categories

1. Rehabilitation (14 subgroups based on level of rehabilitation and ADL index)

> Ultra high rehabilitation - At least 720 minutes of therapy received per week with 5 or more days for one type of therapy and at least 3 days for a second type
> Very high rehabilitation - At least 500 minutes of therapy received per week with 5 or more days for one type of therapy
> High rehabilitation - At least 325 minutes of therapy received per week with 5 or more days per week for one type of therapy
> Medium rehabilitation - At least 150 minutes of therapy received per week with 5 or more days of some type of therapy
> Low rehabilitation - At least 45 minutes of therapy received per week with 3 or more days of some type of therapy and 2 or more nursing rehabilitation activities at least 6 days per week each.

2. Extensive Services (3 subgroups based on number of clinical indicators)

> Resident qualifies for extensive services on the basis of clinical indicators. Qualifications include receipt of parenteral/IV feeding, IV medication, the special care category, the clinically complex category, and the impaired cognitition category. ADL index* score must be 7 or higher– otherwise classify resident into special care

3. Special Care (3 subgroups based on ADL index)

> Resident qualifies for extensive services on the basis of clinical indicators. Qualifications include an ADL score of 7 or more plus any of the following:
>
> > • Two or more ulcers of any type or a stage 3 or 4 pressure ulcer and two or more selected skin care treatments;
> > • Feeding tube with parenteral/enteral intake and aphasia;
> > • Surgical wounds or open lesions other than ulcers, rashes, or cuts and surgical wound care or application of dressings or ointments;
> > • Respiratory therapy for 7 days;
> > • Cerebral palsy and an ADL score of 10 or more;
> > • Fever and vomiting or weight loss or tube feeding with high; parenteral/enteral intake, pneumonia, or dehydration;
> > • Multiple sclerosis and an ADL score of 10 or more;
> > • Quadriplegia and an ADL score of 10 or more; and
> > • Radiation therapy

4. Clinically Complex (6 subgroups based on ADL index and indicator for depression)

> Resident qualifies for extensive services on the basis of clinical indicators. Qualifications include any of the following: feeding tube with high parenteral/enteral intake; comatose and not awake and ADL dependent; septicemia; second or third degree burns; dehydration; hemiplegia/hemiparesis and an ADL score of ten or more; internal bleeding; pneumonia; end stage disease; chemotherapy; dialysis; physician order changes on 4 or more days and physicians visits on 1 or more day; physician order changes on 2 or more days and physician visits on 7 days; diabetes and injections on 7 days and physician order changes on 2 or more days; transfusions; oxygen therapy; application of dressing to foot and injection on foot or open lesion on foot

5. Impaired Cognition (4 subgroups based on ADL index and nursing rehabilitation index)

> Resident must have an ADL index of ten or less and a Cognitive Performance Scale of 3 or more, indicating moderate, moderately severe, severe, or very severe impairment

6. Behavior Problems (4 subgroups based on ADL index and nursing rehabilitation index)

> Resident must have an ADL index of 10 or less and the presence of delusions, hallucinations, or one of more of the following 4 or more days per week: wandering, verbally abusive behavior, physically abusive behavior, socially inappropriate/disruptive behavior, resisting care.

7. Physical Functioning Reduced (10 subgroups based on nursing rehabilitation index and ADL index)
   Split into physical functioning groups is based on the ADL index and whether the number of nursing rehab activities is 2 or more

*The ADL index is based on the amount of support required for the following ADL activities: bed mobility, transferring, toilet use, and eating. It ranges from 4 (fully independent) to 18 (totally dependent, needs two-person assistance where applicable).

From: Description of the RUG-III Classification System
        http: www.cms.hhs.gov/medicaid/reports/rp1201-g.pdf

References

Frederiksen, K., P. Tariot, and E. DeJonghe, *Minimum Data Set Plus (MDS+) scores compared with scores from five rating scales*. Journal of the American Geriatrics Society, 1996. 44(3): p. 305-309.

Fries, B.E., et al., *Pain in U.S. Nursing Homes: Validating a Pain Scale for the Minimum Data Set.* The Gerontologist, 2001. 41(2): p. 173-179.

Gambassi, G., et al., *Validity of diagnostic and drug data in standardized nursing home resident assessments: potential for geriatric pharmacoepidemiology*. Medical Care, 1998. 36(2): p. 167-179.

Gruber-Baldini, A.L., et al., *The Validity of the Minimum Data Set in Measuring the Cognitive Impairment of Persons Admitted to Nursing Homes.* Journal of the American Geriatrics Society, 2000. 48: p. 1601-1606.

Hartmaier, S.L., et al., *The MDS cognition scale: a valid instrument for identifying and staging nursing home residents with dementia using the Minimum Data Set*. Journal of the American Geriatrics Society, 1994. 42(11): p. 1173-1179.

Hawes, C., et al., *Reliability estimates for the minimum data set for nursing home resident assessment and care screening*. Gerontologist, 1995. 35(2): p. 172-178.

Hawes, C., et al., *Development of the Nursing Home Resident Assessment Instrument in the USA*. Age and Aging, 1997. 26(S2): p. 19-25.

Herr, K.A. and P.R. Mobily, *Comparison of Selected Pain Assessment Tools for Use with the Elderly.* Applied Nursing Research, 1993. 6: p. 39-46.

Morris, J.N., et al., *Designing the national resident assessment instrument for nursing homes*. The Gerontologist, 1990. 30(3): p. 293-302.

Morris, J.N., et al., *MDS cognitive performance scale*. Journal of Gerontology, 1994. 49(4): p. M174-182.

Morris, J.N., et al., *A commitment to change: revision of CMS's RAI*. Journal of the American Geriatrics Society, 1997. 45(8): p. 1011-1016.

Snowden, M., et al., *Validity and Responsiveness of the Minimum Data Set.* Journal of the American Geriatrics Society, 1999. 41: p.1000-1004.

Stineman, G.G. and G. Maislin, *Clinical, epidemiological, and policy implications of minimum data set validity*. Journal of the American Geriatrics Society, 2000. 48: p. 1734-1746.