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Specifications for the Function Quality Measures Adopted in the Inpatient Rehabilitation Facility Quality Reporting Program

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SPECIFICATIONS FOR THE FUNCTION QUALITY MEASURES ADOPTED IN THE
INPATIENT REHABILITATION FACILITY QUALITY REPORTING PROGRAM

RTI International

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SECTION 1 BACKGROUND

Section 3004(b) of the Affordable Care Act amended section 1886(j)(7) of the Social Security Act, requiring the Secretary to establish the Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP). This program applies to freestanding IRFs, as well as IRF units affiliated with either acute care facilities or critical access hospitals (CAHs).

Additionally, section 2(a) of the Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT Act) (Pub. L. 113-185, enacted on Oct. 6, 2014), amended title XVIII of the Act by adding section 1899B, titled “Standardized Post-Acute Care (PAC) Assessment Data for Quality, Payment and Discharge Planning.” Section 1899B(c)(1) requires that the Secretary specify not later than the applicable specified application date, as defined in section 1899B(a)(2)(E), quality measures on which IRF providers are required to submit standardized patient assessment data described in section 1899B(b)(1) and other necessary data specified by the Secretary. Section 1899B(c)(2)(A) requires, to the extent possible, the submission of the such quality measure data through the use of a PAC assessment instrument and the modification of such instrument as necessary to enable such use. For more information on the IMPACT Act is available at: <https://www.govtrack.us/congress/bills/113/hr4994>.

This document describes the specifications for the function quality measures adopted in the IRF QRP. The quality measures are:

1. Application of Percent of Long-Term Care Hospital Patients with an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631);
2. IRF Functional Outcome Measure: Change in Self-Care Score for Medical Rehabilitation Patients (NQF #2633);
3. IRF Functional Outcome Measure: Change in Mobility Score for Medical Rehabilitation Patients (NQF #2634);
4. IRF Functional Outcome Measure: Discharge Self-Care Score for Medical Rehabilitation Patients (NQF #2635); and
5. IRF Functional Outcome Measure: Discharge Mobility Score for Medical Rehabilitation Patients (NQF #2636).

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SECTION 2 QUALITY MEASURES

2.1 Cross-Setting Function Quality Measure: Application of Percent of Long-Term Care Hospital Patients with an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631)

2.1.1 Quality Measure Description

The cross-setting function quality measure is a process measure that is an application of the quality measure Percent of Long-Term Care Hospital Patients with an Admission and Discharge Functional Assessment and a Care Plan that Addresses Function (NQF #2631). This quality measure reports the percent of patients/residents with an admission and a discharge functional assessment and a treatment goal that addresses function. The treatment goal provides evidence that a care plan with a goal has been established for the patient/resident.

This process quality measure requires the collection of admission and discharge functional status data by clinicians using standardized patient assessment data elements or items that assess specific functional activities, that is, self-care and mobility activities. The self-care and mobility function items are coded using a 6-level rating scale that indicates the patient's/resident's level of independence with the activity. A higher score indicates greater independence. If an activity is not attempted, the reason that the activity did not occur is coded. For this quality measure, documentation of a goal for one of the function items reflects that the patient's/resident's care plan addresses function. The functional goal is recorded at admission for at least one of the standardized self-care or mobility function items.

This quality measure is calculated using data from the Minimum Data Set 3.0 (MDS 3.0) assessment instrument for Skilled Nursing Facility (SNF) residents, the Long-Term Care Hospital (LTCH) Continuity Assessment Record & Evaluation (CARE) Data Set for LTCH patients, the Outcome and Assessment Information Set (OASIS-D) for Home Health Agency (HHA) patients, and the Inpatient Rehabilitation Facility - Patient Assessment Instrument (IRF-PAI) for IRF patients. Table A-1 in Appendix A shows the standardized data elements that are included in each data set.

2.1.2 Purpose/Rationale for the Quality Measure

Section 1899B(c) (1) of the Act directs the Secretary to specify quality measures on which PAC providers are required under the applicable reporting provisions to submit standardized patient/resident assessment data and other necessary data specified by the Secretary with respect to five (5) quality domains, one of which is functional status, cognitive function, and changes in function and cognitive function. To satisfy these requirements, CMS adopted an application of the quality measure Percent of Long-Term Care Hospital Patients with an Admission and Discharge Functional Assessment and a Care Plan that Addresses Function (NQF #2631) as a cross-setting quality measure that addresses the domain of functional status, cognitive function, and changes in function and cognitive function. This quality measure reports the percent of patients/residents with an admission and a discharge functional assessment and a goal that addresses function.

The National Committee on Vital and Health Statistics, Subcommittee on Health¹, noted: “[i]nformation on functional status is becoming increasingly essential for fostering healthy people and a healthy population. Achieving optimal health and well-being for Americans requires an understanding across the life span of the effects of people's health conditions on their ability to do basic activities and participate in life situations, that is, their functional status.” This statement is supported by research showing that patient functioning is associated with important patient outcomes such as discharge destination and length of stay in inpatient settings² as well as risk of nursing home placement and hospitalization of older adults living in the community.³ Functioning is important to patients/residents and their family members.^{4,5,6}

The majority of patients/residents who receive PAC services, such as care provided by SNFs, LTCHs, HHAs, and IRFs, have functional limitations, and many of these patients/residents are at risk for further decline in function due to limited mobility.⁷ The patient/resident populations treated by SNFs, LTCHs, HHAs, and IRFs vary in terms of their functional abilities at the time of the PAC admission and their goals of care. For PAC patients/residents, treatment goals may include fostering the patient's/resident's ability to manage his or her daily activities so that the patient/resident can complete self-care and/or mobility activities as independently as possible, and if feasible, return to a safe, active, and productive life in a community-based setting. The clinical practice guideline *Assessment of Physical Function*⁸ recommends that clinicians should document functional status at baseline and over time to validate capacity, decline, or progress. Therefore, assessment of functional status at admission and discharge and establishing a functional goal for discharge as part of the care plan (i.e., treatment plan) is an important aspect of patient/resident care for all of these PAC providers.

The functional assessment items included in the functional status quality measure were originally developed and tested as part of the Post-Acute Care Payment Reform Demonstration (PAC PRD) version of the Continuity Assessment Record and Evaluation (CARE) Item Set, which was designed to standardize assessment of patient's/resident's status across acute and

¹ Subcommittee on Health National Committee on Vital and Health Statistics, "Classifying and Reporting Functional Status" (2001).

² Reistetter T. A., Graham J. E., Granger C. V., Deutsch A, Ottenbacher K. J. Utility of Functional Status for Classifying Community Versus Institutional Discharges after Inpatient Rehabilitation for Stroke. *Archives of Physical Medicine and Rehabilitation*, 2010; 91:345-350.

³ Miller E.A., Weissert W. G. Predicting Elderly People's Risk for Nursing Home Placement, Hospitalization, Functional Impairment, and Mortality: A Synthesis. *Medical Care Research and Review*, 57; 3: 259-297.

⁴ Kurz, A. E., Saint-Louis, N., Burke, J. P., & Stineman, M. G. (2008). Exploring the personal reality of disability and recovery: a tool for empowering the rehabilitation process. *Qual Health Res*, 18(1), 90-105.

⁵ Kramer, A. M. (1997). Rehabilitation care and outcomes from the patient's perspective. *Med Care*, 35(6 Suppl), JS48-57.

⁶ Stineman, M. G., Rist, P. M., Kurichi, J. E., & Maislin, G. (2009). Disability meanings according to patients and clinicians: imagined recovery choice pathways. *Quality of Life Research*, 18(3), 389-398.

⁷ Kortebein P, Ferrando A, Lombebeida J, Wolfe R, Evans WJ. Effect of 10 days of bed rest on skeletal muscle in health adults. *JAMA*; 297(16):1772-4.

⁸ Kresevic D. M. Assessment of physical function. In: Boltz M, Capezuti E, Fulmer T, Zwicker D, editor(s). Evidence-based geriatric nursing protocols for best practice. 4th ed. New York (NY): Springer Publishing Company; 2012. p. 89-103.

post-acute providers, including SNFs, HHAs, LTCHs, and IRFs. The functional status items in Section GG (previously the CARE Item Set) are daily activities that clinicians typically assess at the time of admission and/or discharge to determine patients'/residents' needs, evaluate patient/resident progress and prepare patients/residents and families for a transition to home or to another provider.

The development of Section GG data elements (previously the CARE Item Set Functional Status Items) and a description and rationale for each item is described in a report entitled "The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set: Volume 1 of 3."⁹ Reliability and validity testing were conducted as part of CMS' Post-Acute Care Payment Reform Demonstration, and we concluded that the functional status items have acceptable reliability and validity. A description of the testing methodology and results are available in several reports, including the report entitled "The Development and Testing of the Continuity Assessment Record And Evaluation (CARE) Item Set: Final Report On Reliability Testing: Volume 2 of 3"¹⁰ and the report entitled "The Development and Testing of The Continuity Assessment Record And Evaluation (CARE) Item Set: Final Report on Care Item Set and Current Assessment Comparisons: Volume 3 of 3."¹¹ The reports are available on CMS' Post-Acute Care Quality Initiatives webpage at: <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/CARE-Item-Set-and-B-CARE.html> .

2.1.3 Denominator

Specific denominator definitions for each setting are provided below. There are no denominator exclusion criteria for this measure.

SNF Denominator: The denominator is the number of Medicare Part A covered resident stays.

LTCH Denominator: The denominator is the number of LTCH patient stays.

IRF Denominator: The denominator is the number of Medicare (Part A and Medicare Advantage) patient stays.

HHA Denominator: Number of Medicare/Medicaid (including Advantage programs) covered home health episodes of care for patients who are at least 18 years of age.

⁹ Barbara Gage et al., "The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set" (RTI International, 2012).

¹⁰ Ibid.

¹¹ Ibid.

2.1.4 Numerator

The numerator for this quality measure is the number of patient/resident stays with functional assessment data for each self-care and mobility activity and at least one self-care or mobility goal.

To the extent that a patient/resident has an incomplete stay (for example, for the purpose of being admitted to an acute care facility), collection of discharge functional status data might not be feasible. Therefore, for patients/residents with incomplete stays, a valid score for admission functional status data and at least one treatment goal would be required and discharge functional status data would not be required to be reported.

Patients/residents with complete and incomplete stays are included in the numerator for this quality measure.

For patients or residents with complete stays:

All patients/residents not meeting the criteria for incomplete stays will be considered complete stays. For patients/residents with a complete stay, all three of the following criteria are required for the patient/resident to be counted in the numerator:

1. A valid numeric score indicating the patient's/resident's functional status, or a valid code indicating the activity was not attempted for each of the functional assessment items on the admission assessment;
2. A valid numeric score, which is a discharge goal indicating the patient's/resident's expected level of independence or a valid code indicating the activity would not be attempted, for at least one self-care or mobility item on the admission assessment; and
3. A valid numeric score indicating the patient's/resident's functional status, or a valid code indicating the activity was not attempted, for each of the functional assessment items on the discharge assessment.

For patients or residents with incomplete stays:

For patients/residents who have an incomplete stay, discharge data are not required to be reported. The following two criteria are required for the patients/residents who have an incomplete stay to be counted in the numerator:

1. A valid numeric score indicating the patient's/resident's functional status, or a valid code indicating the activity was not attempted for each of the functional assessment items on the admission assessment; and
2. A valid numeric score, which is a discharge goal indicating the patient's/resident's expected level of independence or a valid code indicating the activity was not attempted, for at least one self-care or mobility item on the admission assessment.

2.1.5 Items Included in the Quality Measure

An important consideration when measuring functional status is that certain activities may not be relevant or feasible to assess for all patients/residents in all types of settings. For example, walking may not occur on admission in a PAC setting because it is not safe for a patient/resident to ambulate. In this situation, a clinician would code that a functional activity was not attempted because it was not safe or feasible for the patient/resident to perform the activity.

The following admission and discharge functional status items are included in this measure:

Self-Care Items

Eating (GG0130A): The ability to use suitable utensils to bring food and/or liquid to the mouth and swallow food and/or liquid once the meal is placed before the patient.

Oral hygiene (GG0130B): The ability to use suitable items to clean teeth. Dentures (if applicable): The ability to insert and remove dentures into and from the mouth, and manage denture soaking and rinsing with use of equipment.

Toileting hygiene (GG0130C): The ability to maintain perineal hygiene, adjust clothes before and after voiding or having a bowel movement. If managing an ostomy, include wiping the opening but not managing equipment.

Mobility Items

Sit to lying (GG0170B): The ability to move from sitting on side of bed to lying flat on the bed.

Lying to sitting on side of bed (GG0170C): The ability to move from lying on the back to sitting on the side of the bed with feet flat on the floor, and with no back support.

Sit to stand (GG0170D): The ability to come to a standing position from sitting in a chair, wheelchair, or on the side of the bed.

Chair/bed-to-chair transfer (GG0170E): The ability to safely transfer to and from a bed to a chair (or wheelchair).

Toilet transfer (GG0170F): The ability to get on and off a toilet or commode.

Walk 10 feet (GG0170I): Once standing, the ability to walk at least 10 feet in a room, corridor or similar space.

For patients/residents who walk, as indicated by the response to Walk 10 Feet, complete the following items:

Walk 50 feet with two turns (GG0170J): Once standing, the ability to walk at least 50 feet and make two turns.

Walk 150 feet (GG0170K): Once standing, the ability to walk at least 150 feet in a corridor or similar space.

For patients/residents who use a wheelchair, complete the following items:

Wheel 50 feet with two turns (GG0170R): Once seated in wheelchair/scooter, the ability to wheel at least 50 feet and make two turns.

Indicate the type of wheelchair/scooter used (GG0170RR).

- 1. Manual**
- 2. Motorized**

Wheel 150 feet (GG0170S): Once seated in wheelchair/scooter, the ability to wheel at least 150 feet in a corridor or similar space.

Indicate the type of wheelchair/scooter used (GG0170SS).

- 1. Manual**
- 2. Motorized**

Goals: At least one goal must be coded for any of the Section GG self-care or mobility data elements included on the item set.

Self-Care and Mobility Rating Scale: Codes and Code Definitions

- 06. Independent**—Patient/resident completes the activity by him/herself with no assistance from a helper.
- 05. Setup or clean-up assistance**—helper sets up or cleans up; patient/resident completes activity. Helper assists only prior to or following the activity.
- 04. Supervision or touching assistance**—Helper provides verbal cues and/or touching and/or steadying and/or contact guard assistance as patient/resident completes activity. Assistance may be provided throughout the activity or intermittently.
- 03. Partial/moderate assistance**—Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports trunk or limbs, but provides less than half the effort.
- 02. Substantial/maximal assistance**—Helper does MORE THAN HALF the effort. Helper lifts, holds or supports trunk or limbs and provides more than half the effort.
- 01. Dependent**—Helper does ALL of the effort. Patient/resident does none of the effort to complete the activity. Or the assistance of 2 or more helpers is required for the patient/resident to complete the activity.

If activity was not attempted, code reason:

07. Patient/resident refused

09. Not applicable

10. Not attempted due to environmental limitations

88. Not attempted due to medical condition or safety concerns

(^) Skip pattern

2.1.6 Quality Measure Calculation Algorithm

1. For each provider, the stay records of patients/residents meeting the inclusion criteria (i.e., denominator) discharged during the 12-month target time period are identified and counted. This count is the denominator.
2. The records of patients/residents with complete stays are identified and the number of these patient/resident stays with complete admission functional assessment data (codes 01 through 06 or 07, 09, 10, 88, or “^”) AND at least one self-care or mobility goal (codes 01 through 06 or 07, 09, 10, or 88) AND complete discharge functional assessment data (codes 01 through 06 or 07, 09, 10, 88, or “^”) is counted.
3. The records of patients with incomplete stays are identified, and the number of these patient records with complete admission functional status data (codes 01 through 06 or 07, 09, 10, 88, or “^”) AND at least one self-care or mobility goal (codes 01 through 06 or 07, 09, 10, or 88) is counted.
4. The counts from step 2 (complete stays) and step 3 (incomplete stays) are summed. The sum is the numerator count.
5. The numerator count is divided by the denominator count to calculate this quality measure, and converted to a percent value by multiplying by 100.

2.1.7 Risk Adjustment

This quality measure is a process measure and is not risk adjusted. The Technical Expert Panel that reviewed this measure did not recommend that this measure be risk-adjusted, because completion of a functional assessment is not affected by the medical and functional complexity of the patient/resident. Rather, clinicians are able to report that an activity was not attempted due to a medical condition or a safety concern, and clinicians take this complexity into account when setting goals. Further, we are aware that patients/residents may have acute events that trigger unplanned discharges, and this measure does not require a functional assessment to be completed in these circumstances. Finally, we have included skip patterns on the assessment instrument that take into account patient/resident complexity. For example, we have a gateway item that asks if the patient/resident can walk 10 feet. If the patient/resident cannot walk 10 feet, then several items applicable to patients/residents who walk are skipped for this patient/resident on the assessment instrument. Therefore, risk adjustment of this quality measure is not warranted.

2.2 Quality Measure: IRF Functional Outcome Measure: Change in Self-Care Score for Medical Rehabilitation Patients (NQF #2633)

2.2.1 Quality Measure Description

This quality measure estimates the risk-adjusted mean change in self-care score between admission and discharge among IRF patients.

This outcome measure requires the collection of admission and discharge functional status data by clinicians using standardized clinical assessment items, or data elements that assess specific self-care activities (for example, eating and oral hygiene). The self-care function items are coded using a 6-level rating scale that indicates the patient's level of independence with the activity; higher scores indicate greater independence. In addition, this measure includes collection of risk adjustor data at the time of admission, such as patient functioning prior to the current illness, exacerbation, or injury; bladder continence; communication ability and cognitive function.

A summary of the measure specifications can be accessed on the NQF website: <http://www.qualityforum.org/qps/2633>. Detailed specifications for this quality measure can be accessed at: <http://www.qualityforum.org/ProjectTemplateDownload.aspx?SubmissionID=2633>.

2.2.2 Purpose/Rationale for Quality Measure

During an inpatient rehabilitation stay, treatment goals include fostering the patient's ability to manage his or her daily activities so that the patient can complete self-care and mobility activities as independently as possible and if feasible, return to a safe, active, and productive life in a community-based setting.

Given that the primary goal of rehabilitation is improvement in function, IRF clinicians have traditionally assessed and documented patients' functional status at admission and at discharge to evaluate the effectiveness of the rehabilitation care provided to individual patients, as well as the effectiveness of the rehabilitation unit or hospital overall.

Research has shown differences in IRF patients' functional outcomes by geographic region, insurance type, and race/ethnicity after adjusting for key patient demographic characteristics and admission clinical status, which supports the need to monitor IRF patients' functional outcomes. For example, Reistetter¹² examined discharge motor function and functional gain among IRF patients with stroke and found statistically significant differences in functional outcomes by U.S. geographic region, insurance type, and race ethnicity group after risk adjustment. O'Brien¹³ found differences in functional outcomes across race/ethnicity groups in her analysis of Medicare assessment data for patients with stroke after risk adjustment.

¹² Reistetter, T. A., Karmarkar, A. M., Graham, J. E., Eschbach, K., Kuo, Y. F., Granger, C. V., Ottenbacher, K. J. (2014). Regional variation in stroke rehabilitation outcomes. *Archives of Physical Medicine and Rehabilitation*, 95(1), 29-38.

¹³ O'Brien, S. R., Xue, Y., Ingersoll, G., & Kelly, A. (2013). Shorter length of stay is associated with worse functional outcomes for Medicare beneficiaries with stroke. *Physical Therapy*, 93(12), 1592-1602.

O'Brien¹⁴ also noted that the overall IRF length of stay decreased 1.8 days between 2002 and 2007, and that shorter IRF stays were associated with lower function at discharge.

In a patient-centered health care system, there is a need for standardized terminology and assessment items because patients often receive care from more than one provider. The use of standardized items and terminology facilitates clinicians speaking a common language that can be understood across clinical disciplines and practice settings. The Section GG functional assessment items on the IRF-PAI used to calculate the four IRF function quality measures are from the CARE Item Set, which was designed to standardize assessment of patients' status across acute and post-acute settings, including SNFs, IRFs, LTCHs, and HHAs. Section GG data elements (previously from the CARE Item Set) were developed and tested as part of the PAC-PRD. The functional status items on Section GG include daily activities that clinicians typically assess at the time of admission and/or at discharge to determine patient needs, evaluate patient progress, and prepare patients and families for a transition to home or another setting.

The development of Section GG (previously from the CARE Item Set) and a description and rationale for each item is described in a report titled *The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set: Volume 1 of 3*.¹⁵

Results of the reliability and validity testing conducted as part of the PAC-PRD found the functional status items to have acceptable reliability and validity in the acute and post-acute patient populations. A description of the testing methodology and results are available in several reports, including *The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set*. Volume 2 of the series is the *Final Report on Reliability Testing*¹⁶ and Volume 3 is the *Final Report on CARE Item Set and Current Assessment Comparisons*.¹⁷ These reports are available at: <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/CARE-Item-Set-and-B-CARE.html>. A summary of the reliability and validity testing of the functional status items is provided in **Appendix B** of this document.

2.2.3 Target Population

This measure includes IRF patients who are at least 21 years of age, Medicare beneficiaries, are not independent in all of the self-care activities at the time of admission, and have complete stays.

¹⁴ Ibid.

¹⁵ Gage B, Constantine R, Aggarwal J, et al. *The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on the Development of the CARE Item Set Volume 1 of 3*. RTI International; 2012.

¹⁶ Gage B, Smith L, Ross J, et al. *The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on Reliability Testing Volume 2 of 3*. RTI International; 2012.

¹⁷ Gage B, Deutsch A, Smith L, et al. *The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on CARE Item Set and Current Assessment Comparisons Volume 3 of 3*. RTI International; 2012.

This quality measure has 6 exclusion criteria:

1. Patients with incomplete stays.
Rationale: It can be challenging to gather accurate discharge functional status data for patients who experience incomplete stays. Patients with incomplete stays include patients who are unexpectedly discharged to an acute care setting (Short-term General Hospital, Critical Access Hospital, Inpatient Psychiatric Facility, or Long-term Care Hospital) because of a medical emergency; patients who die or leave an IRF against medical advice; patients discharged directly to another IRF; and patients with a length of stay less than 3 days.
2. Patients who are independent with all self-care activities at the time of admission.
Rationale: Patients who are independent with all self-care items at the time of admission are assigned the highest score on all self-care items, and thus, would not be able to show functional improvement on this same set of items at discharge.
3. Patients with the following medical conditions: coma; persistent vegetative state; complete tetraplegia; locked-in state; severe anoxic brain damage, cerebral edema, or compression of brain.
Rationale: These patients are excluded because they may have limited or less predictable improvement with the selected self-care items.
4. Patients younger than 21 years.
Rationale: There is only limited evidence published about functional outcomes for individuals younger than 21 years.
5. Patients discharged to hospice.
Rationale: Patient goals may change during the IRF stay.
6. Patients who are not Medicare beneficiaries.
Rationale: IRF-PAI data are submitted for Medicare beneficiaries only.

IRF patients excluded from this measure are identified based on the following data elements on the IRF-PAI v2.0:

1. Incomplete stays:

- a. **Medical emergency:** Patient's discharge destination. Item 44D: Short-term General Hospital (Item 44D = 02) or Long-term Care Hospital (Item 44D = 63) or Inpatient Psychiatric Facility (Item 44D = 65) or Critical Access Hospital (Item 44D = 66).
- b. **Discharged against medical advice:** Patient discharged against medical advice (Item 41 = 1).
- c. **Died while in IRF:** Was the patient discharged alive (Item 44C = 0).

- d. **Length of stay is less than 3 days:** Discharge Date (Item 40) *minus* Admission Date (Item 12) is less than 3 days.
 - e. **Patients discharged directly to another IRF:** Another Inpatient Rehabilitation Facility (Item 44D = 62).
- 2. Patients who are independent with all self-care activities at the time of admission.**
- a. Exclude if Eating (Item GG0130A1 = 06) and Oral hygiene (Item GG0130B1 = 06) and Toileting hygiene (Item GG0130C1 = 06) and Shower/bathe self (Item GG0130E1 = 06) and Upper body dressing (Item GG0130F1 = 06) and Lower body dressing (Item GG0130G1 = 06) and Putting on/taking off footwear (Item GG0130H1 = 06).
- 3. Patients with the following medical conditions:** coma; persistent vegetative state; complete tetraplegia; locked-in state; severe anoxic brain damage, cerebral edema, or compression of brain (Item 21A, Item 22, or Item 24).
- 4. Patients younger than 21 years** (Item 6 and Item 12).
- 5. Patients discharged to hospice** (Item 44D = 50 or 51).
- 6. Patients who are not Medicare beneficiaries** (Item 20A and 20B = 02 or 51).

2.2.4 Items Included in the Quality Measure

For the quality measure, the following functional activities are assessed and rated at the time of admission and discharge:

Self-Care Items

Eating (GG0130A): The ability to use suitable utensils to bring food and/or liquid to the mouth and swallow food and/or liquid once the meal is placed before the patient.

Oral hygiene (GG0130B): The ability to use suitable items to clean teeth. Dentures (if applicable): The ability to insert and remove dentures into and from the mouth, and manage denture soaking and rinsing with use of equipment.

Toileting hygiene (GG0130C): The ability to maintain perineal hygiene, adjust clothes before and after voiding or having a bowel movement. If managing an ostomy, include wiping the opening but not managing equipment.

Shower/bathe self (GG0130E): The ability to bathe self, including washing, rinsing, and drying self (excludes washing of back and hair). Does not include transferring in/out of tub/shower.

Upper body dressing (GG0130F): The ability to dress and undress above the waist; including fasteners, if applicable.

Lower body dressing (GG0130G): The ability to dress and undress below the waist, including fasteners; does not include footwear.

Putting on/taking off footwear (GG0130H): The ability to put on and take off socks and shoes or other footwear that is appropriate for safe mobility; including fasteners, if applicable.

Self-Care Rating Scale: Codes and Code Definitions

Activities may be completed with or without assistive devices.

- 06. Independent**—Patient/resident completes the activity by him/herself with no assistance from a helper.
- 05. Setup or clean-up assistance**—helper sets up or cleans up; patient/resident completes activity. Helper assists only prior to or following the activity.
- 04. Supervision or touching assistance**—Helper provides verbal cues and/or touching and/or steadying and/or contact guard assistance as patient/resident completes activity. Assistance may be provided throughout the activity or intermittently.
- 03. Partial/moderate assistance**—Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports trunk or limbs, but provides less than half the effort.
- 02. Substantial/maximal assistance**—Helper does MORE THAN HALF the effort. Helper lifts, holds or supports trunk or limbs and provides more than half the effort.
- 01. Dependent**—Helper does ALL of the effort. Patient/resident does none of the effort to complete the activity. Or the assistance of 2 or more helpers is required for the patient/resident to complete the activity.

If activity was not attempted, code reason:

- 07. Patient/resident refused**
- 09. Not applicable**
- 10. Not attempted due to environmental limitations**
- 88. Not attempted due to medical condition or safety concerns**

(^) Skip pattern

2.2.5 Risk Adjustment

Patients treated in IRFs vary in terms of primary diagnosis (i.e., impairment group), demographic characteristics, and co-existing conditions. Patients may have different expected improvement in function on the basis of these factors. Therefore, this outcome measure is risk adjusted. Risk adjustment controls for specific patient characteristics (e.g., age or diagnosis) that may affect patients' outcomes so that facility data may be compared.

Risk adjustment variables were selected for this quality measure on the basis of a review of the literature, empirical findings from the PAC-PRD analyses,¹⁸ and input from the function TEP convened by RTI. We also incorporated suggestions we received on risk adjustors as part of the public comment process. We conducted regression analyses using the PAC-PRD data to help identify the best set of risk adjustors on the basis of regression coefficients, statistical significance, sample sizes, and other indicators. Data on the reliability of CARE variables used for risk adjustment can be found in the report titled *The Development and Testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final Report on Reliability Testing: Volume 2 of 3*.¹⁹

The list of risk adjustment variables is outlined below. More detailed risk adjustment testing and selection information for this measure can be found on the NQF website at: <http://www.qualityforum.org/ProjectTemplateDownload.aspx?SubmissionID=2633>.

For many of the risk adjustors, values are assigned either '0' if the risk adjustor condition is not present or '1' if the risk adjustor condition is present, as reported on the admission assessment. For each IRF-PAI item we list the relevant items and codes that are used to indicate if a risk adjustor is present on admission (i.e., is equal to '1').

The risk adjustors used for this quality measure are the following:

- **Age group at IRF admission (Item 6 and Item 12)**
 - Younger than 35 years
 - 35 to 44 years
 - 45 to 54 years
 - 55 to 64 years
 - 65 to 74 years (reference category)
 - 75 to 84 years
 - 85 to 90 years
 - Older than 90 years

¹⁸ http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Reports/Research-Reports-Items/PAC_Payment_Reform_Demo_Final.html

¹⁹ <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/CARE-Item-Set-and-B-CARE.html>

- **Admission self-care score: continuous score** (All self-care items)
- **Admission self-care score: squared form** (All self-care items)
- **Primary IRF Diagnosis Groups:** (Item 21A. Impairment Group Code - Admission)
 - Stroke
 - Non-traumatic brain dysfunction
 - Traumatic brain dysfunction
 - Non-traumatic spinal cord dysfunction
 - Traumatic spinal cord dysfunction
 - Progressive neurological conditions
 - Other neurological conditions
 - Fractures and other multiple trauma
 - Amputation
 - Hip and knee replacements (reference category)
 - Other orthopedic conditions
 - Debility, Cardiorespiratory conditions
 - Medically complex conditions
- **Interaction of admission self-care score and primary diagnosis group** (See admission self-care and primary IRF diagnosis group)
- **Prior Surgery: Major surgery in the past 100 days** (J2000 = 1)
- **Prior Functioning: Self-care**
 - Dependent (GG0100A = 1) or Needed Some Help (GG0100A = 2)
- **Prior Functioning: Indoor Ambulation**
 - Dependent (GG0100B = 1) or Needed Some help (GG0100B = 2)
- **Prior Mobility Device/Aid** (used before current illness, exacerbation, or injury)
 - Manual wheelchair (GG0110A = 1) or Motorized wheelchair or scooter (GG0110B = 1)
 - Mechanical lift (GG0110C = 1)
 - Walker (GG0110D = 1)
 - Orthotics/Prosthetics (GG0110E = 1)
- **Communication Impairment:**
 - **Moderate to severe communication impairment:** Rarely/never understands (BB0800 = 1); or sometimes understands (BB0800=2); or rarely/never expresses

self or speech is very difficult to understand (BB0700 = 1); or frequently exhibits difficulty with expressing needs and ideas (BB0700 = 2)

- **Cognitive function: Brief Interview for Mental Status (BIMS) score**
 - **Severely impaired:** BIMS Summary Score ($C0500 \leq 7$) or Staff Assessment for Mental Status ($C0900Z = 1$) or ($[C0900A=1$ and $C0900B = 0$, and $C0900C = 0$, and $C0900E = 0]$ or $[C0900B=1$ and $C0900A = 0$, and $C0900C = 0$, and $C0900E = 0]$ or $[C0900C=1$ and $C0900A = 0$, and $C0900B = 0$, and $C0900E = 0]$ or $[C0900E=1$ and $C0900A = 0$, and $C0900B = 0$, and $C0900C = 0]$)
 - **Moderately impaired:** BIMS Summary Score ($C0500 = 8, 9, 10, 11, \text{ or } 12$) or Staff Assessment for Mental Status ($[C0900A = 1$ and $C0900B = 1]$ or $[C0900B = 1$ and $C0900C = 1]$ or $[C0900A = 1$ and $C0900C = 1]$) or $[C0900A = 1$ and $C0900E = 1]$ or $[C0900B = 1$ and $C0900E = 1]$ or $[C0900C = 1$ and $C0900E = 1]$)
- **Bladder incontinence**
 - Less than daily ($H0350 = 2$) or daily incontinence ($H0350 = 3$) or always incontinent ($H0350 = 4$)
 - Indwelling urinary catheter ($H0350 = 9$)
- **Bowel incontinence**
 - Always incontinent ($H0400 = 3$)
 - Less than daily incontinence ($H0400 = 1$) or Daily incontinence ($H0400 = 2$)
- **Presence of stage 2 pressure ulcer(s):** Stage 2 ($M0300B \geq 1$)
- **Presence of stage 3, 4 or unstageable pressure ulcer(s):** Stage 3 ($M0300C \geq 1$), Stage 4 ($M0300D \geq 1$), or Unstageable – Non-removable dressing/device ($M0300E \geq 1$), or Unstageable – Slough and/or eschar ($M0300F \geq 1$), or Unstageable – Deep tissue injury ($M0300G \geq 1$)
- **Swallowing ability**
 - Modified food consistency ($K0110B = 1$)
 - Tube or parenteral feeding ($K0110C = 1$)
- **Comorbidities** (hierarchical condition categories) (Item 21A. Impairment Group Codes, Item 22. Etiologic Diagnosis, or Item 24. Comorbid Conditions, ICD codes)
 - Major Infections: Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock; and Other Infectious Diseases
 - Central Nervous System Infections: Bacterial, Fungal, and Parasitic Central Nervous System Infections; Viral and Late Effects Central Nervous System Infections
 - Metastatic Cancer and Acute Leukemia
 - Diabetes: Diabetes with Chronic Complications; Diabetes without Complication; Type I Diabetes Mellitus

- Other Significant Endocrine and Metabolic Disorders
- Intestinal Obstruction/Perforation
- Delirium and Encephalopathy
- Dementia: Dementia with Complications; Dementia Without Complications
- Tetraplegia (excluding complete tetraplegia)
- Paraplegia
- Multiple Sclerosis
- Parkinson’s and Huntington’s Diseases
- Polyneuropathy, Mononeuropathy, Other Neurological Conditions/Injuries
- Angina Pectoris
- Coronary Atherosclerosis/Other Chronic Ischemic Heart Disease
- Hypertensive Heart Disease
- Hemiplegia/Other Late Effects of Cerebrovascular Accident:
Hemiplegia/Hemiparesis; Late Effects of Cerebrovascular Disease Except Paralysis
- Kidney Transplant Status
- Dialysis Status and Chronic Kidney Disease - Stage 5
- Urinary Obstruction and Retention
- Chronic Ulcer of Skin, Excluding Pressure Ulcer
- Amputations: Traumatic Amputations and Complications; Amputation Status, Lower Limb/Amputation Complications; Amputation Status, Upper Limb

2.2.6 Calculation Algorithm

The following steps are used to calculate the measure:

1. Sum the scores of the admission self-care items to create an admission self-care score for each patient stay, after ‘activity not attempted’, dashed (-), or missing values are recoded to 01 (score range: 7 to 42).
2. Sum the scores of the discharge self-care items to create a discharge self-care score for each patient stay, after ‘activity not attempted’, dashed (-), skipped (^), or missing values are recoded to 01 (score range: 7 to 42).
3. Identify records of patient stays that meet the exclusion criteria and exclude them from analyses.
4. Calculate the difference between the admission self-care score (from step 1) and the discharge self-care score (from step 2) for each patient stay to create an observed change in self-care score for each patient stay.

5. Calculate an expected change in self-care score for each patient stay using regression intercept and coefficients from national data and each patient's admission characteristics (risk adjustors).
6. Calculate an average observed change in self-care score for each IRF. This is the facility-level observed change in self-care score.
7. Calculate an average expected change in self-care score for each IRF. This is the facility-level expected change in self-care score.
8. Divide the facility-level observed change score by the facility-level expected change score to create an observed to expected ratio. A ratio value that is 1 indicates the observed and expected scores are equal. A ratio value that is higher than 1 indicates that the observed change scores are higher (better) than expected. A ratio value that is less than 1 indicates that the observed change scores are less (worse) than expected.
9. Multiply each IRF's ratio by the national average change in self-care score. This is the risk-adjusted mean change in self-care score.

2.3 Quality Measure: IRF Functional Outcome Measure: Change in Mobility Score for Medical Rehabilitation Patients (NQF #2634)

2.3.1 Quality Measure Description

This quality measure estimates the risk-adjusted mean change in mobility score between admission and discharge among IRF patients.

This outcome measure requires the collection of admission and discharge functional status data by clinicians using standardized clinical assessment items, or data elements that assess specific functional mobility activities (for example, toilet transfer and walking). The mobility function items are coded using a 6-level rating scale that indicates the patient's level of independence with the activity; higher scores indicate more independence. In addition, this measure includes the collection of risk adjustor data at the time of admission, such as patient functioning prior to the current illness, exacerbation, or injury; history of falls; bladder continence; communication ability and cognitive function.

Seven of the mobility items included in the cross-setting function quality measure, the application of the Percent of LTCH Patients with an Admission and Discharge Functional Assessment and a Care Plan that Addresses Function (NQF #2631), are included in this quality measure.

A summary of this quality measure can be accessed on the NQF website: <http://www.qualityforum.org/qps/2634>. More detailed specifications for this quality measure can be accessed at:

<http://www.qualityforum.org/ProjectTemplateDownload.aspx?SubmissionID=2634>.

2.3.2 Purpose/Rationale for Quality Measure

As noted in Section 2.2.2, IRFs provide intensive rehabilitation services to patients with a goal of improving patient functioning.

2.3.3 Population

This measure includes IRF patients who are at least 21 years of age, Medicare beneficiaries, are not independent in all of the mobility activities at the time of admission, and have complete stays.

This quality measure has 6 exclusion criteria:

1. Patients with incomplete stays.
Rationale: It can be challenging to gather accurate discharge functional status data for patients who experience incomplete stays. Patients with incomplete stays include patients who are unexpectedly discharged to an acute care setting (Short-term General Hospital, Critical Access Hospital, Inpatient Psychiatric Facility, or Long-term Care Hospital) because of a medical emergency; patients who die or leave an IRF against medical advice; patients discharged directly to another IRF; and patients with a length of stay less than 3 days.
2. Patients who are independent with all mobility activities at the time of admission.
Rationale: Patients who are independent with all mobility items at the time of admission are assigned the highest score on all the mobility items, and thus, would not be able to show functional improvement on this same set of items at discharge.
3. Patients with the following medical conditions: coma, persistent vegetative state; complete tetraplegia; locked-in state; severe anoxic brain damage, cerebral edema, or compression of brain.
Rationale: These patients are excluded because they may have limited or less predictable improvement with the selected mobility items.
4. Patients younger than 21 years.
Rationale: There is only limited evidence published about functional outcomes for individuals younger than 21.
5. Patients discharged to hospice.
Rationale: Patient goals may change during the IRF stay.
6. Patients not covered by the Medicare program.
Rationale: IRF-PAI data are submitted for Medicare beneficiaries.

IRF patients excluded from this measure are identified based on the following data elements on the IRF-PAI v2.0:

1. Incomplete stays:

- a. **Medical emergency:** Patient's discharge destination. Item 44D: Short-term General Hospital (Item 44D = 02) or Long-term Care Hospital (Item 44D = 63) or Inpatient Psychiatric Facility (Item 44D = 65) or Critical Access Hospital (Item 44D = 66).
- b. **Discharged against medical advice:** Patient discharged against medical advice (Item 41 = 1).
- c. **Died while in IRF:** Was the patient discharged alive (Item 44C = 0).
- d. **Length of stay is less than 3 days:** Discharge Date (Item 40) *minus* Admission Date (Item 12) is less than 3 days.
- e. **Patients discharged directly to another IRF:** Another Inpatient Rehabilitation Facility (Item 44D = 62).

2. Patients who are independent with all mobility activities at the time of admission.

- a. Exclude if Roll left and right (Item GG0170A1 = 06) and Sit to lying (Item GG0170B1 = 06) and Lying to sitting on side of bed (Item GG0170C1 = 06) and Sit to stand (Item GG0170D1 = 06) and Chair/bed-to-chair transfer (Item GG0170E1 = 06) and Toilet transfer (Item GG0170F1 = 06) and Car transfer (Item GG0170G1 = 06) and Walk 10 feet (Item GG0170I1 = 06) and Walk 50 feet with two turns (Item GG0170J1 = 06) and Walk 150 feet (Item GG0170K1 = 06) and Walking 10 feet on uneven surfaces (Item GG0170L1 = 06) and 1 step (curb) (Item GG0170M1 = 06) and 4 steps (Item GG0170N1 = 06) and 12 steps (Item GG0170O1 = 06) and Picking up object (Item GG0170P1 = 06).

3. Patients with the following medical conditions: coma; persistent vegetative state; complete tetraplegia; locked-in state; severe anoxic brain damage, cerebral edema, or compression of brain (Item 21A, Item 22, or Item 24).

4. Patients younger than 21 years (Item 6 and Item 12).

5. Patients discharged to hospice (Item 44D = 50 or 51).

6. Patients who are not Medicare beneficiaries (Item 20A and 20B = 02 or 51).

2.3.4 Items Included in the Quality Measure

For the quality measure, the following functional activities are assessed and rated at the time of admission and at discharge:

Mobility Items

Roll left and right (GG0170A): The ability to roll from lying on back to left and right side, and return to lying on back on the bed.

Sit to lying (GG0170B): The ability to move from sitting on side of bed to lying flat on the bed.

Lying to sitting on side of bed (GG0170C): The ability to move from lying on the back to sitting on the side of the bed with feet flat on the floor, and with no back support.

Sit to stand (GG0170D): The ability to come to a standing position from sitting in a chair, wheelchair, or on the side of the bed.

Chair/bed-to-chair transfer (GG0170E): The ability to transfer to and from a bed to a chair (or wheelchair).

Toilet transfer (GG0170F): The ability to get on and off a toilet or commode.

Car transfer (GG0170G): The ability to transfer in and out of a car or van on the passenger side. Does not include the ability to open/close door or fasten seat belt.

Walk 10 feet (GG0170I): Once standing, the ability to walk at least 10 feet in room, corridor, or similar space.

For patients who are walking, complete the following walking items:

Walk 50 feet with two turns (GG0170J): Once standing, the ability to walk at least 50 feet and make two turns.

Walk 150 feet (GG0170K): Once standing, the ability to walk at least 150 feet in a corridor or similar space.

Walking 10 feet on uneven surfaces (GG0170L): The ability to walk 10 feet on uneven or sloping surfaces (indoor or outdoor), such as turf or gravel.

1 step (curb) (GG0170M): The ability to step over a curb or up and down one step.

4 steps (GG0170N): The ability to go up and down four steps with or without a rail.

12 steps (GG0170O): The ability to go up and down 12 steps with or without a rail.

Picking up object (GG0170P): The ability to bend/stoop from a standing position to pick up a small object, such as a spoon, from the floor.

Mobility Rating Scale: Codes and Code Definitions

Activities may be completed with or without assistive devices.

- 06. Independent**—Patient completes the activity by him/herself with no assistance from a helper.
- 05. Setup or clean-up assistance**—helper sets up or cleans up; patient completes activity. Helper assists only prior to or following the activity.
- 04. Supervision or touching assistance**—Helper provides verbal cues and/or touching and/or steadying and/or contact guard assistance as patient completes activity. Assistance may be provided throughout the activity or intermittently.
- 03. Partial/moderate assistance**—Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports trunk or limbs, but provides less than half the effort.
- 02. Substantial/maximal assistance**—Helper does MORE THAN HALF the effort. Helper lifts, holds or supports trunk or limbs and provides more than half the effort.
- 01. Dependent**—Helper does ALL of the effort. Patient does none of the effort to complete the activity. Or the assistance of 2 or more helpers is required for the patient/resident to complete the activity.

If activity was not attempted, code reason:

- 07. Patient refused**
- 09. Not applicable**
- 10. Not attempted due to environmental limitations**
- 88. Not attempted due to medical condition or safety concerns**

(^) Skip pattern

2.3.5 Risk Adjustment

The rationale for risk adjustment and the methods used to select the risk adjustment variables are described in Section 2.2.5. The list of risk adjustment variables is outlined below. More detailed risk adjustment testing and selection information for this measure can be found on the NQF website at:

<http://www.qualityforum.org/ProjectTemplateDownload.aspx?SubmissionID=2634> 

For many of the risk adjustors, values are assigned either ‘0’ if the risk adjustor condition is not present or ‘1’ if the risk adjustor condition is present, as reported on the admission

assessment. For each IRF-PAI item we list the relevant items and codes that are used to indicate if a risk adjustor is present on admission (i.e., is equal to '1').

The risk adjustors used for this quality measure are the following:

- **Age group at IRF admission** (Item 6 and Item 12)
 - Younger than 35 years
 - 35 to 44 years
 - 45 to 54 years
 - 55 to 64 years
 - 65 to 74 years (reference category)
 - 75 to 84 years
 - 85 to 90 years
 - Older than 90 years
- **Admission mobility score: continuous score** (All the mobility items)
- **Admission mobility score: squared form** (All the mobility items)
- **Primary IRF Diagnosis Groups:** (Item 21A. Impairment Group Code - Admission)
 - Stroke
 - Non-traumatic brain dysfunction
 - Traumatic brain dysfunction
 - Non-traumatic spinal cord dysfunction
 - Traumatic spinal cord dysfunction
 - Progressive neurological conditions
 - Other neurological conditions
 - Fractures and other multiple trauma
 - Amputation
 - Hip and knee replacements (reference category)
 - Other orthopedic conditions
 - Debility, Cardiorespiratory conditions
 - Medically complex conditions
- **Interaction of admission mobility score and primary diagnosis group** (See admission mobility and primary IRF diagnosis group)
- **Prior Surgery: Major surgery in the past 100 days** (J2000 = 1)
- **Prior Functioning: Indoor ambulation.**

- Dependent (GG0100B = 1)
- Needed some help (GG0100B = 2)
- **Prior Functioning: Stair negotiation**
 - Dependent (GG0100C = 1)
 - Needed some help (GG0100C = 2)
- **Prior Functioning: Cognition**
 - Dependent (GG0100D = 1)
- **Prior Mobility Device/Aid** (used before current illness, exacerbation, or injury)
 - Manual wheelchair (GG0110A = 1) or Motorized wheelchair and/or scooter (GG0110B = 1)
 - Mechanical Lift (GG0110C = 1)
 - Walker (GG0110D = 1)
 - Orthotics/Prosthetics (GG0110E = 1)
- **Communication Impairment:**
 - **Moderate to severe communication impairment:** Rarely/never understands (BB0800 = 1); or sometimes understands (BB0800 = 2); or rarely/never expresses self (BB0700 = 1); or speech is very difficult to understand or frequently exhibits difficulty with expressing needs and ideas (BB0700 = 2)
 - **Mild communication impairment:** Usually understands (BB0800 = 3) or exhibits some difficulty with expressing needs and ideas (BB0700 = 3)
- **Cognitive function: Brief Interview for Mental Status (BIMS) score:**
 - **Severely impaired:** BIMS Summary Score (C0500 ≤ 7) or Staff Assessment for Mental Status (C0900Z = 1) or ([C0900A=1 and C0900B = 0, and C0900C = 0, and C0900E = 0] or [C0900B=1 and C0900A = 0, and C0900C = 0, and C0900E = 0] or [C0900C=1 and C0900A = 0, and C0900B = 0, and C0900E = 0] or [C0900E=1 and C0900A = 0, and C0900B = 0, and C0900C = 0])
 - **Moderately impaired:** BIMS Summary Score (C0500 = 8-12) or Staff Assessment for Mental Status ([C0900A = 1 and C0900B = 1] or [C0900B = 1 and C0900C = 1] or [C0900A = 1 and C0900C = 1] or [C0900A = 1 and C0900E = 1] or [C0900B = 1 and C0900E = 1] or [C0900C = 1 and C0900E = 1])
- **Bladder incontinence**
 - Less than daily (H0350 = 2) or daily incontinence (H0350 = 3), or always incontinent (H0350 = 4)
- **Bowel incontinence**
 - Always incontinent (H0400 = 3)

- Less than daily incontinence (H0400 = 1) or Daily incontinence (H0400 = 2)
- **Presence of stage 2 pressure ulcer(s):** Stage 2 (M0300B \geq 1)
- **Presence of 3, 4, or unstageable pressure ulcer(s):** Stage 3 (M0300C \geq 1), Stage 4 (M0300D \geq 1), or Unstageable – Non-removable dressing/device (M0300E \geq 1), or Unstageable – Slough and/or eschar (M0300F \geq 1), or Unstageable – Deep tissue injury (M0300G \geq 1)
- **Swallowing ability:**
 - Tube or parenteral feeding (K0110C = 1)
- **Total parenteral nutrition treatment** (O0100N = 1)
- **History of falls in the past year:** history of two or more falls or any fall with injury in the past year (J1750 = 1)
- **Comorbidities (hierarchical condition categories)** ((Item 21A. Impairment Group Codes, Item 22. Etiologic Diagnosis, or Item 24. Comorbid Conditions, ICD codes):
 - Major Infections: Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock
 - Other Infectious Diseases
 - Central nervous system (CNS) Infections: Bacterial, Fungal, and Parasitic Central Nervous System Infections; Viral and Late Effects Central Nervous System Infections
 - Metastatic Cancer and Acute Leukemia
 - Lung and Other Severe Cancers
 - Lymphoma and Other Cancers
 - Other Major Cancers: Colorectal, Bladder, and Other Cancers; Other Respiratory and Heart Neoplasms; Other Digestive and Urinary Neoplasms; Other Neoplasms
 - Diabetes: Diabetes with Chronic Complications; Diabetes without Complication; Type I Diabetes Mellitus
 - Severe Hematological Disorders
 - Delirium and Encephalopathy
 - Dementia: Dementia with Complications; Dementia Without Complications
 - Mental Health Disorders: Schizophrenia; Major Depressive, Bipolar, and Paranoid Disorders; Reactive and Unspecified Psychosis; Personality Disorders
 - Tetraplegia (excluding complete tetraplegia)
 - Paraplegia
 - Multiple Sclerosis
 - Polyneuropathy, Mononeuropathy, Other Neurological Conditions/Injuries

- Angina Pectoris
- Coronary Atherosclerosis/Other Chronic Ischemic Heart Disease
- Hypertensive Heart Disease
- Hemiplegia/Other Late Effects of Cerebrovascular Accident: Hemiplegia/Hemiparesis; Late Effects of Cerebrovascular Disease Except Paralysis
- Atherosclerosis of the Extremities with Ulceration or Gangrene
- Aspiration, Bacterial, and Other Pneumonias: Aspiration and Specified Bacterial Pneumonias; Pneumococcal Pneumonia, Empyema, Lung Abscess
- Legally Blind
- Dialysis Status and Chronic Kidney Disease - Stage 5
- Chronic Kidney Disease - Stages 1-4, Unspecified: Chronic Kidney Disease, Severe (Stage 4); Chronic Kidney Disease, Moderate (Stage 3); Chronic Kidney Disease, Mild or Unspecified (Stages 1-2 or Unspecified)
- Chronic Ulcer of Skin, Excluding Pressure Ulcer
- Hip Fracture/Dislocation
- Major Fracture, Except of Skull, Vertebrae, or Hip
- Amputations: Traumatic Amputations and Complications; Amputation Status, Lower Limb/Amputation Complications; Amputation Status, Upper Limb
- Transplant Status: Kidney Transplant Status; Major Organ Transplant or Replacement Status; Other Organ Transplant Status/Replacement

2.3.6 Calculation Algorithm

The following steps are used to calculate the measure:

1. Sum the scores of the admission mobility items to create an admission mobility score for each patient, after ‘activity not attempted’, dashed (-), skipped (^), or missing values are recoded to 01 (score range: 15 to 90).
2. Sum the scores of the discharge mobility items to create a discharge mobility score for each patient, after ‘activity not attempted’, dashed (-), skipped (^), or missing values are recoded to 01 (score range: 15 to 90).
3. Identify the records of patients who meet the exclusion criteria and exclude them from analyses.
4. Calculate the difference between the admission mobility score (from step 1) and the discharge mobility score (from step 2) for each patient to create a change in mobility score for each patient.

5. Calculate an expected change in mobility score for each patient using the regression intercept and coefficients from national data and each patient's admission characteristics (risk adjustors).
6. Calculate an average observed change in mobility score for each IRF (using the patient data calculated in step 4). This is the facility-level observed change in mobility score.
7. Calculate an average expected change in mobility score for each IRF (using the patient data from step 5). This is the facility-level expected change in mobility score.
8. Divide the facility-level observed change score by the facility-level expected change score to create an observed to expected ratio. A ratio value that is 1 indicates the observed and expected scores are equal. A ratio value that is higher than 1 indicates that the observed change scores are higher (better) than expected. A ratio value that is less than 1 indicates that the observed change scores are less (worse) than expected.
9. Multiply each IRF's ratio by the national average change in mobility score. This is the risk-adjusted mean change in mobility score.

2.4 IRF Functional Outcome Measure: Discharge Self-Care Score for Medical Rehabilitation Patients (NQF #2635)

2.4.1 Quality Measure Description

This quality measure estimates the percentage of IRF patients who meet or exceed an expected discharge self-care score.

This outcome measure requires the collection of admission and discharge functional status data by clinicians using standardized clinical assessment items, or data elements that assess specific self-care activities (that is, eating, oral hygiene, and dressing). The self-care function items are coded using a 6-level rating scale that indicates the patient's level of independence with the activity; higher scores indicate more independence. In addition, this measure requires the collection of risk factors data, such as patient functioning prior to the current illness, injury or exacerbation; bladder continence; communication ability and cognitive function, at the time of admission.

The data collection required for this measure is the same data required to the measure: IRF Functional Outcome Measure: Change in Self-Care Score for Medical Rehabilitation Patients (NQF #2633).

A summary of this quality measure can be accessed on the NQF website at <http://www.qualityforum.org/qps/2635>. More detailed specifications for the quality measure can be accessed at: <http://www.qualityforum.org/ProjectTemplateDownload.aspx?SubmissionID=2635>.

2.4.2 Purpose/Rationale for Quality Measure

As noted in Section 2.2.2, IRFs provide intensive rehabilitation services to patients with a goal of improving patient functioning.

2.4.3 Population

This measure includes IRF patients who are at least 21 years of age, Medicare beneficiaries and have complete stays.

This quality measure has 5 exclusion criteria:

1. Patients with incomplete stays.
Rationale: It can be challenging to gather accurate discharge functional status data for patients who experience incomplete stays. Patients with incomplete stays include patients who are unexpectedly discharged to an acute care setting (Short-term General Hospital, Critical Access Hospital, Inpatient Psychiatric Facility, or Long-term Care Hospital), because of a medical emergency; patients who die or leave an IRF against medical advice; patients discharged directly to another IRF and patients with a length of stay less than 3 days.
2. Patients with the following medical conditions: coma; persistent vegetative state; complete tetraplegia; locked-in state; or severe anoxic brain damage, cerebral edema, or compression of the brain.
Rationale: These patients are excluded because they may have limited or less predictable improvement with the selected self-care items.
3. Patients younger than age 21.
Rationale: There is only limited evidence published about functional outcomes for children.
4. Patients discharged to hospice.
Rationale: Patient goals may change during the IRF stay.
5. Patients not covered by the Medicare program.
Rationale: IRF-PAI data are submitted for Medicare Beneficiaries.

IRF patients excluded from this measure are identified based on the following data elements on the IRF-PAI v2.0.

1. Incomplete stays:

- a. **Medical emergency:** Patients discharge destination. Item 44D: Short-term General Hospital (Item 44D=02) or Long-term Care Hospital (Item 44D=63) or Inpatient Psychiatric Facility (Item 44D =65) or Critical Access Hospital (Item 44D=66).

- b. **Discharged against medical advice:** Patient discharged against medical advice (Item 41=1).
 - c. **Died while in IRF:** Was the patient discharged alive (Item 44C=0).
 - d. **Length of stay is less than 3 days:** Discharge Date (Item 40) *minus* Admission Date (Item 12) is less than 3 days.
 - e. **Patients discharged directly to another IRF:** Another Inpatient Rehabilitation Facility (Item 44D = 62).
2. **Patients with the following medical conditions:** coma; persistent vegetative state; complete tetraplegia; locked-in state; severe anoxic brain damage, cerebral edema, or compression of brain (Item 21A, Item 22, or Item 24).
 3. **Patients younger than 21 years** (Item 6 and Item 12).
 4. **Patients discharged to hospice** (Item 44D = 50 or 51).
 5. **Patients who are not Medicare beneficiaries** (Item 20A and 20B = 02 or 51).

2.4.4 Items Included in the Quality Measure

For this quality measure, the following functional activities are assessed and rated at the time of admission and at discharge:

Self-Care Items

Eating (GG0130A): The ability to use suitable utensils to bring food and/or liquid to the mouth and swallow food and/or liquid once the meal is placed before the patient.

Oral hygiene (GG0130B): The ability to use suitable items to clean teeth. Dentures (if applicable): The ability to insert and remove dentures into and from the mouth, and manage denture soaking and rinsing with use of equipment.

Toileting hygiene (GG0130C): The ability to maintain perineal hygiene, adjust clothes before and after voiding or having a bowel movement. If managing an ostomy, include wiping the opening but not managing equipment.

Shower/bathe self (GG0130E): The ability to bathe self, including washing, rinsing, and drying self (excludes washing of back and hair). Does not include transferring in/out of tub/shower.

Upper body dressing (GG0130F): The ability to dress and undress above the waist; including fasteners, if applicable.

Lower body dressing (GG0130G): The ability to dress and undress below the waist, including fasteners; does not include footwear.

Putting on/taking off footwear (GG0130H): The ability to put on and take off socks and shoes or other footwear that is appropriate for safe mobility; including fasteners, if applicable.

Self-Care Rating Scale: Codes and Code Definitions

Activities may be completed with or without assistive devices.

- 06. Independent**—Patient completes the activity by him/herself with no assistance from a helper.
- 05. Setup or clean-up assistance**—helper sets up or cleans up; patient completes activity. Helper assists only prior to or following the activity.
- 04. Supervision or touching assistance**—Helper provides verbal cues and/or touching and/or steadying and/or contact guard assistance as patient completes activity. Assistance may be provided throughout the activity or intermittently.
- 03. Partial/moderate assistance**—Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports trunk or limbs, but provides less than half the effort.
- 02. Substantial/maximal assistance**—Helper does MORE THAN HALF the effort. Helper lifts, holds or supports trunk or limbs and provides more than half the effort.
- 01. Dependent**—Helper does ALL of the effort. Patient does none of the effort to complete the activity. Or the assistance of 2 or more helpers is required for the patient/resident to complete the activity.

If activity was not attempted, code reason:

- 07. Patient refused**
- 09. Not applicable**
- 10. Not attempted due to environmental limitations**
- 88. Not attempted due to medical condition or safety concerns**

(^) Skip pattern

2.4.5 Risk Adjustment

The rationale for risk adjustment and the methods used to select the risk adjustment variables are described in Section 2.2.5. The current list of risk adjustment variables is outlined below. More detailed risk adjustment testing and selection information for this measure can be found on the NQF website:

<http://www.qualityforum.org/ProjectTemplateDownload.aspx?SubmissionID=2635> 

For the many of the risk adjustors, values are assigned, either ‘0’ if the risk adjustor condition is not present or ‘1’ if the risk adjustor condition is present, as reported on the admission assessment. For each IRF-PAI item we list the relevant items and codes that are used to indicate if a risk adjustor is present on admission (i.e., is equal to ‘1’).

The risk adjustors used for this quality measure are the following:

- **Age group at IRF admission (Item 6 and Item 12)**
 - Younger than 35 years
 - 35 to 44 years
 - 45 to 54 years
 - 55 to 64 years
 - 65 to 74 years (reference category)
 - 75 to 84 years
 - 85 to 90 years
 - Older than 90 years
- **Admission self-care score: continuous score** (All the self-care items)
- **Admission self-care score: squared form** (All the self-care items)
- **Primary IRF Diagnosis Groups:** (Item 21A. Impairment Group Code - Admission)
 - Stroke
 - Non-traumatic brain dysfunction
 - Traumatic brain dysfunction
 - Non-traumatic spinal cord dysfunction
 - Traumatic spinal cord dysfunction
 - Progressive neurological conditions
 - Other neurological conditions
 - Fractures and other multiple trauma
 - Amputation
 - Hip and knee replacements (reference category)
 - Other orthopedic conditions
 - Debility, Cardiorespiratory conditions
 - Medically complex conditions
- **Interaction of admission self-care score and primary diagnosis group** (See admission self-care and primary IRF diagnosis group)

- **Prior Surgery: Major surgery in the past 100 days** (J2000 = 1)
- **Prior Functioning: Self-care**
 - Dependent (GG0100A = 1) or Needed Some Help (GG0100A = 2)
- **Prior Functioning: Indoor Ambulation**
 - Dependent (GG0100B = 1) or Needed Some Help (GG0100B = 2)
- **Prior Mobility Device/Aid** (used before current illness, exacerbation, or injury)
 - Manual wheelchair (GG0110A = 1) or Motorized wheelchair or scooter (GG0110B = 1)
 - Mechanical Lift (GG0110C = 1)
 - Walker (GG0110D = 1)
 - Orthotics/Prosthetics (GG0110E = 1)
- **Communication Impairment:**
 - **Moderate to severe communication impairment:** Rarely/never understands (BB0800 = 1); or sometimes understands (BB0800 = 2); or rarely/never expresses self or speech is very difficult to understand (BB0700 = 1); or frequently exhibits difficulty with expressing needs and ideas (BB0700 = 2)
- **Cognitive function: Brief Interview for Mental Status (BIMS) score**
 - **Severely impaired:** BIMS Summary Score (C0500 ≤ 7) or Staff Assessment for Mental Status (C0900Z = 1) or ([C0900A=1 and C0900B = 0, and C0900C = 0, and C0900E = 0] or [C0900B=1 and C0900A = 0, and C0900C = 0, and C0900E = 0] or [C0900C=1 and C0900A = 0, and C0900B = 0, and C0900E = 0] or [C0900E=1 and C0900A = 0, and C0900B = 0, and C0900C = 0])
 - **Moderately impaired:** BIMS Summary Score (C0500 = 8-12) or Staff Assessment for Mental Status ([C0900A = 1 and C0900B = 1] or [C0900B = 1 and C0900C = 1] or [C0900A = 1 and C0900C = 1] or [C0900A = 1 and C0900E = 1] or [C0900B = 1 and C0900E = 1] or [C0900C = 1 and C0900E = 1])
- **Bladder incontinence**
 - Less than daily (H0350 = 2) or daily incontinence (H0350=3) or always incontinent (H0350 = 4)
 - Indwelling urinary catheter (H0350 = 9)
- **Bowel incontinence**
 - Always incontinent (H0400 = 3)
 - Less than daily incontinence (H0400 = 1) or Daily incontinence (H0400 = 2)
- **Presence of stage 2 pressure ulcer(s):** Stage 2 (M0300B ≥ 1)

- **Presence of stage 3, 4, or unstageable pressure ulcer(s):** Stage 3 (M0300C \geq 1), Stage 4 (M0300D \geq 1), or Unstageable – Non-removable dressing/device (M0300E \geq 1), or Unstageable – Slough and/or eschar (M0300F \geq 1), or Unstageable – Deep tissue injury (M0300G \geq 1)
- **Swallowing ability**
 - Modified food consistency (K0110B = 1)
 - Tube or parenteral feeding (K0110C = 1)
- **Comorbidities** (hierarchical condition categories) (Item 21A. Impairment Group Codes, Item 22. Etiologic Diagnosis, or Item 24. Comorbid Conditions, ICD codes)
 - Major Infections: Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock; and Other Infectious Diseases
 - Central Nervous System Infections: Bacterial, Fungal, and Parasitic Central Nervous System Infections; Viral and Late Effects Central Nervous System Infections
 - Metastatic Cancer and Acute Leukemia
 - Diabetes: Diabetes with Chronic Complications; Diabetes without Complication; Type I Diabetes Mellitus
 - Other Significant Endocrine and Metabolic Disorders
 - Intestinal Obstruction/Perforation
 - Delirium and Encephalopathy
 - Dementia: Dementia with Complications; Dementia Without Complications
 - Tetraplegia (excluding complete tetraplegia)
 - Paraplegia
 - Multiple Sclerosis
 - Parkinson’s and Huntington’s Diseases
 - Polyneuropathy, Mononeuropathy, Other Neurological Conditions/Injuries
 - Angina Pectoris
 - Coronary Atherosclerosis/Other Chronic Ischemic Heart Disease
 - Hypertensive Heart Disease
 - Hemiplegia/Other Late Effects of Cerebrovascular Accident: Hemiplegia/Hemiparesis; Late Effects of Cerebrovascular Disease Except Paralysis
 - Kidney Transplant status
 - Dialysis Status and Chronic Kidney Disease - Stage 5
 - Urinary Obstruction and Retention
 - Chronic Ulcer of Skin, Excluding Pressure Ulcer

- Amputations: Traumatic Amputations and Complications; Amputation Status, Lower Limb/Amputation Complications; Amputation Status, Upper Limb

2.4.6 Calculation Algorithm

The following steps are used to calculate the measure:

1. Sum the scores of the discharge self-care items to create a discharge self-care score for each patient, after ‘activity not attempted’, dashed (-), skipped (^), or missing values codes are recoded to 01 (score range: 7 to 42). This is the patient’s observed discharge score.
2. Calculate an expected discharge self-care score for each IRF patient using the intercept and coefficients that estimate the average effect of the risk adjustors (patient’s demographic and admission clinical characteristics) across all IRFs.
3. Identify the records of patients who meet the exclusion criteria and exclude them from analyses.
4. Compare each patient’s observed and expected discharge self-care score and classify the difference as:
 - a. Observed discharge score is equal to or higher than the expected discharge score, or
 - b. Observed discharge score is lower than the expected discharge score.
5. Sum the number of patients whose observed discharge score is the same as or higher than the expected discharge score. This is the numerator.
6. The denominator is the total number of patients in the IRF who do not meet the exclusion criteria.
7. The percent is calculated as the numerator divided by the denominator and then multiplied by 100.

2.5 IRF Functional Outcome Measure: Discharge Mobility Score for Medical Rehabilitation Patients (NQF #2636)

2.5.1 Quality Measure Description

This quality measure estimates the percentage of IRF patients who meet or exceed an expected discharge mobility score.

This outcome measure requires the collection of admission and discharge functional status data by trained clinicians using standardized clinical assessment items, or data elements that assess specific functional mobility activities (that is, bed mobility and walking). The mobility function items are coded using a 6-level rating scale that indicates the patient’s level of independence with the activity; higher scores indicate more independence. In addition, this

measure requires the collection of risk factors data, such as patient functioning prior to the current illness, injury or exacerbation; history of falls; bladder continence; communication ability and cognitive function.

The data collection required for this measure is the same data required to the measure: IRF Functional Outcome Measure: Change in Mobility Score for Medical Rehabilitation Patients (NQF #2634).

A summary of this quality measure can be accessed on the NQF website: <http://www.qualityforum.org/qps/2636>. More detailed specifications for this quality measure can be accessed at: <http://www.qualityforum.org/ProjectTemplateDownload.aspx?SubmissionID=2636>.

2.5.2 Purpose/Rationale for Quality Measure

As noted in Section 2.2.2, IRFs provide intensive rehabilitation services to patients with a goal of improving patient functioning.

2.5.3 Population

This measure includes IRF patients who are at least 21 years of age, Medicare beneficiaries and have complete stays.

This quality measure has 5 exclusion criteria:

1. Patients with incomplete stays.
Rationale: It can be challenging to gather accurate discharge functional status data for patients who experience incomplete stays. Patients with incomplete stays include patients who are unexpectedly discharged to an acute care setting (Short-term General Hospital, Critical Access Hospital, Inpatient Psychiatric Facility, or Long-term Care Hospital) because of a medical emergency; patients who die; patients who leave an IRF against medical advice; patients discharged directly to another IRF; and patients with a length of stay less than 3 days.
2. Patients with the following medical conditions on admission: coma; persistent vegetative state; complete tetraplegia; locked-in state; or severe anoxic brain damage, cerebral edema, or compression of brain.
Rationale: These patients are excluded because they may have limited or less predictable improvement with the selected mobility items.
3. Patients younger than 21 years.
Rationale: There is only limited evidence published about functional outcomes for individuals younger than 21.
4. Patients discharged to hospice.
Rationale: Patient goals may change during the IRF stay.
5. Patients who are not Medicare beneficiaries.

Rationale: IRF-PAI data are submitted for Medicare beneficiaries.

IRF patients excluded from this measure are identified based on the following data elements on the IRF-PAI v2.0.

1. Incomplete stays:

- a. **Medical emergency:** Patients discharge destination. Item 44D: Short-term General Hospital (Item 44D = 02) or Long-term Care Hospital (Item 44D = 63) or Inpatient Psychiatric Facility (Item 44D = 65) or Critical Access Hospital (Item 44D = 66).
- b. **Discharged against medical advice:** Patient discharged against medical advice (Item 41 = 1).
- c. **Died while in IRF:** Was the patient discharged alive (Item 44C = 0).
- d. **Length of stay is less than 3 days:** Discharge Date (Item 40) *minus* Admission Date (Item 12) is less than 3 days.
- e. **Patients discharged directly to another IRF:** Another Inpatient Rehabilitation Facility (Item 44D = 62).

2. Patients with the following medical conditions: coma; persistent vegetative state; complete tetraplegia; locked-in syndrome; severe anoxic brain damage, cerebral edema, or compression of brain (Item 21A, Item 22, or Item 24).

3. Patients younger than 21 years (Item 6 and Item 12).

4. Patients discharged to hospice (Item 44D = 50 or 51).

5. Patients who are not Medicare beneficiaries. (Item 20A and 20B = 02 or 51).

2.5.4 Items Included in the Quality Measure

For this quality measure, the following functional activities are assessed and rated at the time of admission and at discharge:

Mobility Items

Roll left and right (GG0170A): The ability to roll from lying on back to left and right side, and return to lying on back on the bed.

Sit to lying (GG0170B): The ability to move from sitting on side of bed to lying flat on the bed.

Lying to sitting on side of bed (GG0170C): The ability to move from lying on the back to sitting on the side of the bed with feet flat on the floor, and with no back support.

Sit to stand (GG0170D): The ability to come to a standing position from sitting in a chair, wheelchair, or on the side of the bed.

Chair/bed-to-chair transfer (GG0170E): The ability to transfer to and from a bed to a chair (or wheelchair).

Toilet transfer (GG0170F): The ability to get on and off a toilet or commode.

Car transfer (GG0170G): The ability to transfer in and out of a car or van on the passenger side. Does not include the ability to open/close door or fasten seat belt.

Walk 10 feet (GG0170I): Once standing, the ability to walk at least 10 feet in room, corridor, or similar space.

For patients who are walking, complete the following items:

Walk 50 feet with two turns (GG0170J): Once standing, the ability to walk at least 50 feet and make two turns.

Walk 150 feet (GG0170K): Once standing, the ability to walk at least 150 feet in a corridor or similar space.

Walking 10 feet on uneven surfaces (GG0170L): The ability to walk 10 feet on uneven or sloping surfaces (indoor or outdoor), such as turf or gravel.

1 step (curb) (GG0170M): The ability to step over a curb or up and down one step.

4 steps (GG0170N): The ability to go up and down four steps with or without a rail.

12 steps (GG0170O): The ability to go up and down 12 steps with or without a rail.

Picking up object (GG0170P): The ability to bend/stoop from a standing position to pick up a small object, such as a spoon, from the floor.

Mobility Rating Scale: Codes and Code Definitions

Activities may be completed with or without assistive devices.

06. Independent—Patient completes the activity by him/herself with no assistance from a helper.

05. Setup or clean-up assistance—helper sets up or cleans up; patient completes activity. Helper assists only prior to or following the activity.

04. Supervision or touching assistance—Helper provides verbal cues and/or touching and/or steadying and/or contact guard assistance as patient completes activity. Assistance may be provided throughout the activity or intermittently.

- 03. Partial/moderate assistance**—Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports trunk or limbs, but provides less than half the effort.
- 02. Substantial/maximal assistance**—Helper does MORE THAN HALF the effort. Helper lifts, holds or supports trunk or limbs and provides more than half the effort.
- 01. Dependent**—Helper does ALL of the effort. Patient does none of the effort to complete the activity. Or the assistance of 2 or more helpers is required for the patient/resident to complete the activity.

If activity was not attempted, code reason:

- 07. Patient refused**
- 09. Not applicable**
- 10. Not attempted due to environmental limitations**
- 88. Not attempted due to medical condition or safety concerns**
- (^) Skip pattern

2.5.5 Risk Adjustment

The rationale for risk adjustment and the methods used to select the risk adjustment variables are described in Section 2.2.5. The list of risk adjustment variables is outlined below. More detailed risk adjustment testing and selection information for this measure can be found on the NQF website:

<http://www.qualityforum.org/ProjectTemplateDownload.aspx?SubmissionID=2636> 

For the many of the risk adjustors, values are assigned, either ‘0’ if the risk adjustor condition is not present or ‘1’ if the risk adjustor condition is present, as reported on the admission assessment. For each IRF-PAI item we list the relevant items and codes that are used to indicate if a risk adjustor is present on admission (i.e., is equal to ‘1’).

The risk adjustors used for this quality measure are the following:

- **Age group at IRF admission (Item 6 and Item 12)**
 - Younger than 35 years
 - 35 to 44 years
 - 45 to 54 years
 - 55 to 64 years
 - 65 to 74 years (reference category)
 - 75 to 84 years

- 85 to 90 years
- Older than 90 years
- **Admission mobility score: continuous score** (All mobility items)
- **Admission mobility score: squared form** (All mobility items)
- **Primary IRF Diagnosis Groups:** (Item 21A. Impairment Group Code - Admission)
 - Stroke
 - Non-traumatic brain dysfunction
 - Traumatic brain dysfunction
 - Non-traumatic spinal cord dysfunction
 - Traumatic spinal cord dysfunction
 - Progressive neurological conditions
 - Other neurological conditions
 - Fractures and other multiple trauma
 - Amputation
 - Hip and knee replacements (reference category)
 - Other orthopedic conditions
 - Debility, Cardiorespiratory conditions
 - Medically complex conditions
- **Interaction of admission mobility score and primary diagnosis group** (See admission mobility and primary IRF diagnosis group)
- **Prior Surgery: Major surgery in the past 100 days** (J2000 = 1)
- **Prior Functioning: Indoor ambulation**
 - Dependent (GG0100B = 1)
 - Needed some help (GG0100B=2)
- **Prior Functioning: Stair negotiation**
 - Dependent (GG0100C = 1)
 - Needed some help (GG0100C = 2)
- **Prior Functioning: Cognition**
 - Dependent (GG0100D = 1)

- **Prior Mobility Device/Aid** (used before current illness, exacerbation, or injury)
 - Manual wheelchair (GG0110A = 1) or Motorized wheelchair and/or scooter (GG0110B = 1)
 - Mechanical lift (GG0110C = 1)
 - Walker (GG0110D = 1)
 - Orthotics/Prosthetics (GG0110E = 1)
- **Communication Impairment:**
 - **Moderate to severe communication impairment:** Rarely/never understands (BB0800 = 1); or sometimes understands (BB0800 = 2); or rarely/never expresses self or speech is very difficult to understand (BB0700 = 1); or frequently exhibits difficulty with expressing needs and ideas (BB0700 = 2)
 - **Mild communication impairment:** Usually understands (BB0800 = 3); or Exhibits some difficulty with expression (BB0700 = 3)
- **Cognitive function: Brief Interview for Mental Status (BIMS) score**
 - **Severely impaired:** BIMS Summary Score (C0500 = ≤ 7) or Staff Assessment for Mental Status (C0900Z = 1) or [(C0900A=1 and C0900B = 0, and C0900C = 0, and C0900E = 0) or [C0900B=1 and C0900A = 0, and C0900C = 0, and C0900E = 0] or [C0900C=1 and C0900A = 0, and C0900B = 0, and C0900E = 0] or [C0900E=1 and C0900A = 0, and C0900B = 0, and C0900C = 0])
 - **Moderately impaired:** BIMS Summary Score (C0500 = 8-12) or Staff Assessment for Mental Status ([C0900A = 1 and C0900B = 1] or [C0900B = 1 and C0900C = 1] or [C0900A = 1 and C0900C = 1] or [C0900A = 1 and C0900E = 1] or [C0900B = 1 and C0900E = 1] or [C0900C = 1 and C0900E = 1])
- **Bladder incontinence**
 - Less than daily (H0350 = 2) or daily incontinence (H0350 = 3), or always incontinent (H0350 = 4)
- **Bowel incontinence**
 - Always incontinent (H0400 = 3)
 - Less than daily incontinence (H0400 = 1) or Daily incontinence (H0400 = 2)
- **Presence of stage 2 pressure ulcer(s):** Stage 2 (M0300B ≥ 1)
- **Presence of 3, 4, or unstageable pressure ulcer(s):** Stage 3 (M0300C ≥ 1), Stage 4 (M0300D ≥ 1), or Unstageable – Non-removable dressing/device (M0300E ≥ 1), or Unstageable – Slough and/or eschar (M0300F ≥ 1), or Unstageable – Deep tissue injury (M0300G ≥ 1)
- **Swallowing ability: Tube or parenteral feeding** (K0110C = 1)
- **Total parenteral nutrition treatment** (O0100N = 1)

- **History of falls in the past year:** history of two or more falls or any fall with injury in the past year (J1750 = 1)
- **Comorbidities (hierarchical condition categories):** (Item 21A. Impairment Group Codes, Item 22. Etiologic Diagnosis, or Item 24. Comorbid Conditions, ICD codes)
 - Major Infections: Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock
 - Central nervous system (CNS) Infections: Bacterial, Fungal, and Parasitic Central Nervous System Infections; Viral and Late Effects Central Nervous System Infections
 - Other Infectious Diseases
 - Metastatic Cancer and Acute Leukemia
 - Lung and Other Severe Cancers
 - Lymphoma and Other Cancers
 - Other Major Cancers: Colorectal, Bladder, and Other Cancers; Other Respiratory and Heart Neoplasms; Other Digestive and Urinary Neoplasms; Other Neoplasms
 - Diabetes: Diabetes with Chronic Complications; Diabetes without Complication; Type I Diabetes Mellitus
 - Severe Hematological Disorders
 - Delirium and Encephalopathy
 - Dementia: Dementia with Complications; Dementia Without Complications
 - Mental Health Disorders: Schizophrenia; Major Depressive, Bipolar, and Paranoid Disorders; Reactive and Unspecified Psychosis; Personality Disorders
 - Tetraplegia (excluding complete tetraplegia)
 - Paraplegia
 - Multiple Sclerosis
 - Polyneuropathy, Mononeuropathy, Other Neurological Conditions/Injuries
 - Angina Pectoris
 - Coronary Atherosclerosis/Other Chronic Ischemic Heart Disease
 - Hypertensive Heart Disease
 - Hemiplegia/Other Late Effects of Cerebrovascular Accident: Hemiplegia/Hemiparesis; Late Effects of Cerebrovascular Disease Except Paralysis
 - Atherosclerosis of the Extremities with Ulceration or Gangrene
 - Aspiration, Bacterial, and Other Pneumonias: Aspiration and Specified Bacterial Pneumonias; Pneumococcal Pneumonia, Empyema, Lung Abscess
 - Legally Blind

- Dialysis Status and Chronic Kidney Disease - Stage 5
- Chronic Kidney Disease - Stages 1-4, Unspecified: Chronic Kidney Disease, Severe (Stage 4); Chronic Kidney Disease, Moderate (Stage 3); Chronic Kidney Disease, Mild or Unspecified (Stages 1-2 or Unspecified)
- Chronic Ulcer of Skin, Excluding Pressure Ulcer
- Hip Fracture/Dislocation
- Major Fracture, Except of Skull, Vertebrae, or Hip
- Amputations: Traumatic Amputations and Complications; Amputation Status, Lower Limb/Amputation Complications; Amputation Status, Upper Limb
- Transplant Status: Kidney Transplant Status; Major Organ Transplant or Replacement Status; Other Organ Transplant Status/Replacement

2.5.6 Calculation Algorithm

The following steps are used to calculate the measure:

1. Sum the scores of the discharge mobility items to create a discharge mobility score for each patient, after ‘activity not attempted’, dashed (-), skipped (^), or missing values codes values are recoded to 01 (score range: 15 to 90). This is the patient’s observed discharge score.
2. Calculate an expected discharge mobility score for each IRF patient using the intercept and coefficients that estimates the average effect of the risk adjustors (patient demographic and admission clinical characteristics) across all IRFs.
3. Identify the records of patients who meet the exclusion criteria and exclude them from analyses.
4. Compare each patient’s observed and expected discharge mobility score and classify the difference as:
 - a. Observed discharge score is equal to or higher than the expected discharge score, or
 - b. Observed discharge score is lower than the expected discharge score.
5. Sum the number of patients whose observed discharge score is the same as or higher than the expected discharge score. This is the numerator.
6. The denominator is the total number of patients in the IRF who do not meet the exclusion criteria.
7. The percent is calculated as the numerator divided by the denominator and then multiplied by 100.

**APPENDIX A:
SELF-CARE AND MOBILITY ITEMS INCLUDED IN SECTION GG OF THE IRF-PAI,
MDS 3.0, LTCH CARE DATA SET, OASIS-D**

Table A-1 lists the function items included in Section GG of the IRF-PAI version 2.0 (effective October 1, 2018), MDS 3.0 Version 1.16.0 (effective Oct 1, 2018), LTCH CARE Data Set version 4.00 (effective July 1, 2018), and OASIS-D (effective January 1, 2019).

**Table A-1
Self-Care and Mobility Data Elements Included in Section GG of the Post-Acute Care Item
Sets (2018/2019)**

Data Element Identifier	Data Element Label	Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) Version 2.0 Oct 2018	Minimum Data Set (MDS) 3.0 Version 1.16.0 Oct 2018	Long-Term Care Hospital CARE Data Set Version 4.00 July 2018	Outcome and Assessment Information Set (OASIS-D) Jan 2019
SELF-CARE GG0130					
GG0130A*	Eating	✓	✓	✓	✓
GG0130B*	Oral hygiene	✓	✓	✓	✓
GG0130C*	Toileting hygiene	✓	✓	✓	✓
GG0130D	Wash upper body	—	—	✓	—
GG0130E	Shower/bathe self	✓	✓	—	✓
GG0130F	Upper body dressing	✓	✓	—	✓
GG0130G	Lower body dressing	✓	✓	—	✓
GG0130H	Putting on/taking off footwear	✓	✓	—	✓
MOBILITY GG0170					
GG0170A	Roll left and right	✓	✓	✓	✓
GG0170B*	Sit to lying	✓	✓	✓	✓
GG0170C*	Lying to sitting on side of bed	✓	✓	✓	✓
GG0170D*	Sit to stand	✓	✓	✓	✓
GG0170E*	Chair/bed-to-chair transfer	✓	✓	✓	✓
GG0170F*	Toilet transfer	✓	✓	✓	✓
GG0170G	Car transfer	✓	✓	—	✓

(continued)

Table A-1 (continued)
Self-Care and Mobility Data Elements Included in Section GG of the Post-Acute Care Item Sets (2018/2019)

Data Element Identifier	Data Element Label	Inpatient Rehabilitation Facility Patient			
		Assessment Instrument (IRF-PAI) Version 2.0 Oct 2018	Minimum Data Set (MDS) 3.0 Version 1.16.0 Oct 2018	Long-Term Care Hospital CARE Data Set Version 4.00 July 2018	Outcome and Assessment Information Set (OASIS-D) Jan 2019
GG0170I*	Walk 10 feet	✓	✓	✓	✓
GG0170J*	Walk 50 feet with two turns	✓	✓	✓	✓
GG0170K*	Walk 150 feet	✓	✓	✓	✓
GG0170L	Walking 10 feet on uneven surface	✓	✓	—	✓
GG0170M	1 step (curb)	✓	✓	—	✓
GG0170N	4 steps	✓	✓	—	✓
GG0170O	12 steps	✓	✓	—	✓
GG0170P	Picking up object	✓	✓	—	✓
GG0170Q	Does the patient/resident use a wheelchair and/or scooter?	✓	✓	✓	✓
GG0170R*	Wheel 50 feet with two turns	✓	✓	✓	✓
GG0170RR*	Indicate the type of wheelchair or scooter used.	✓	✓	✓	✓
GG0170S*	Wheel 150 feet	✓	✓	✓	✓
GG0170SS*	Indicate the type of wheelchair or scooter used.	✓	✓	✓	✓

Notes:

✓ = Data element is included in the item set.

— = Data element is not included in the item set

* Data elements included in the cross-setting function quality measure, Application of Percent of Long-Term Care Hospital Patients with an Admission and Discharge Functional Assessment and a Care Plan that Addresses Function (NQF #2631)

APPENDIX B: RELIABILITY AND VALIDITY TESTING

B.1 Overview of Reliability and Validity Testing

The functional assessment items used in the functional status quality measures are from the Continuity Assessment Record and Evaluation (CARE) Item Set. The CARE Item Set, now called Section GG on the assessments instruments, was designed to standardize assessment of patients' status across acute and post-acute settings, including Inpatient Rehabilitation Facilities (IRFs), Long-Term Care Hospitals (LTCHs), Skilled Nursing Facilities (SNFs), and Home Health Agencies (HHAs). The functional status items on Section GG are daily activities that clinicians assess at the time of admission and/or at discharge to determine patients' needs, evaluate progress, and prepare for a transition home or another setting.

The goal of reliability testing is to ensure that items on an assessment obtain consistent results when administered or used by different clinicians. Validity testing examines whether an item or scale measures what it is intended to measure. The functional status items underwent reliability testing at the item- and scale-level in multiple types of providers in conjunction with the Post-Acute Care Payment Reform Demonstration. Item-level testing included inter-rater reliability testing within facilities and the use of videotaped standardized patients for inter-rater reliability testing across facilities/care settings. Additional testing focused on the items and scales and included internal consistency, factor analysis, and Rasch analysis. A brief summary of this testing is provided below; full reports describing the testing are available at <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/CARE-Item-Set-and-B-CARE.html>.

B.2 Traditional Inter-rater Reliability Study

The reliability of the functional items was tested in a subset of 34 providers from each of the five levels of care (acute hospitals, HHAs, IRFs, LTCHs, and SNFs) distributed across 11 geographic areas. Each provider completed a duplicate CARE Item Set (admission or discharge assessment) on 15–20 patients included in the Post-Acute Care Payment Reform Demonstration (10–15 patients in the home health setting), in accordance with the guidelines and protocols.

Providers were asked to enroll a convenience sample of a set number of Medicare patients each month, representing a range of function and acuity. The overall patient sample size for each of the functional items was 450 for self-care items and 449 for mobility items (448 for transfers). After exclusions for missing data (unknown/not attempted/inapplicable), the effective sample sizes for the reliability testing were as follows:

- Eating: 401
- Oral hygiene: 414
- Toilet hygiene: 416
- Upper body dressing: 420
- Lower body dressing: 413
- Lying to sitting on the side of the bed: 412

- Sitting to standing: 387
- Chair/bed to chair transfer: 392
- Toilet transfer: 361
- Walk 150 feet: 68
- Walk once standing: 52
- Wheel in room: 46

The inter-rater reliability study included patients who were assessed by two different clinicians (raters), and the agreement of the clinicians' rating was calculated. Clinicians were instructed to have pairs of raters complete both patient assessments at the same time. Responses to items were obtained by direct observation of the patient by the clinician, and occasionally, supplemented by one or more of the following predetermined, matched methods: patient interviews (with each team member taking turns conducting and observing patient interviews); interviews with relatives/caregivers of the patient for certain items; and/or interviews with staff caring for the patient and/or chart review. Rater pairs were instructed to determine in advance which methods would be used to score the particular CARE items and to have both raters use the same methods. Raters were encouraged to divide hands-on assistance to the patient as evenly as possible for items that required hands-on assistance. Raters were instructed not to discuss item scoring during the assessment, nor to share item scores until the data were entered into the study database and finalized. Providers submitted data via the online CARE application for both assessments in each pair.

For categorical items, kappa statistics (kappa) indicate the level of agreement between raters using ordinal data, taking into account the role of chance agreement. The ranges commonly used to judge reliability based on kappa are as follows: ≤ 0 = poor; 0.01–0.20 = slight; 0.21–0.40 = fair; 0.41–0.60 = moderate; 0.61–0.80 = substantial; and 0.81–1.00 = almost perfect.

For categorical items with only two responses available, RTI International calculated only unweighted kappas. For items with more than two responses, RTI calculated both weighted and unweighted kappas. Unweighted kappa assumes the same "distance" between every one-unit difference in response across an ordinal scale. RTI used Fleiss-Cohen weights, or quadratic weights, which approximate the intra-class correlation coefficient and are commonly used for calculating weighted kappas. This choice of weighting is consistent with prior analyses of assessment reliability, where the method for developing weights was specified.^{1,2} Fleiss-Cohen weights put lower emphasis on disagreements between responses that fall near each other on an item scale. It should also be noted that the value of kappa can be influenced by the prevalence of the outcome or characteristic being measured. If the outcome or characteristic is rare, the kappa will be low because kappa attributes the majority of agreement among raters to chance. Kappa is also influenced by bias, and if the effective sample size is small, variation may play a role in the

¹ Hirdes JP, Smith TF, Rabinowitz T, et al. The Resident Assessment Instrument-Mental Health (RAI-MH): inter-rater reliability and convergent validity. *J Behav Health Serv Res.* 29(4):419-432, 2002

² Streiner DL, Norman GR. Health measurement scales: a practical guide to their development and use. *Oxford University Press*, 1995.

results. Hence, we report both weighted and unweighted kappas to give the range of agreement found under the two sets of assumptions.

Additionally, RTI calculated a separate set of kappa statistics (unweighted and weighted, where applicable) for items where additional responses outside of an ordinal scale were available (letter codes) and were set to missing.

For the traditional reliability study, kappa statistics indicated substantial agreement among raters. The weighted kappa values for the self-care items range between 0.798 for eating to 0.869 for upper-body dressing. Unweighted kappas ranged from 0.598 for oral hygiene to 0.634 for upper-body dressing. Provider-specific analyses of core self-care items show similar agreement to the overall estimates. The lower-body dressing item had the highest overall weighted kappa (0.855), whereas the eating item had the lowest (0.798). Unweighted overall kappas ranged from 0.636 (toileting) to 0.598 (oral hygiene). Acute hospitals had the highest weighted kappas across all self-care items.

The weighted kappa values for the mobility items ranged between 0.558 for walk 150 feet to 0.901 for sitting to standing and chair/bed to chair transfer. Unweighted kappas ranged from 0.667 for walk once standing to 0.762 for sit to stand. Provider-specific analyses of core mobility items show similar agreement to the overall estimates. The sit-to-stand and chair transfer items both had a weighted kappa of 0.901, whereas the lying to sitting item had a weighted kappa of 0.855. Unweighted overall kappas ranged from 0.693 (lying to sitting) to 0.762 (sitting to standing).

B.3 Videotaped Standardized Patients Reliability Study

For the video reliability study, which was designed to examine the level of clinician agreement across care settings, clinicians in each setting were asked to assess “standardized” patients presented through a videotape of a patient assessment. This ensured that the same information was presented to each clinician and allowed examination of differences in scoring effects among different clinicians examining the “same” patient.

The patient “case studies” in each of the videos varied in terms of medical complexity, functional abilities, and cognitive impairments. The nine videos included patients classified as high, medium, or low ability/complexity for each of these three areas. Each facility or agency received three videos, one of which demonstrated one of the following elements: cognitive impairments, skin integrity problems, a wheelchair-dependent patient, and a variety of mid-level functional activities. The mid-level functional activities were considered to be the most challenging for clinicians to score and are thus of particular interest in establishing reliability. Each clinician involved in the video study watched three videos and assessed the patients according to the study guidelines and protocols. Each video was approximately 20 minutes long and had a corresponding item set arranged in the sequence in which the items appeared in the video.

The sample included 28 providers (550 assessments), which included 3 acute hospitals (15 assessments [3%]); 9 HHAs (118 assessments [22%]); 8 IRFs (237 assessments [43%]); 3 LTCHs (114 assessments [21%]); and 5 SNFs (66 assessments [12%]). Participating providers included case managers (6% of assessments), occupational therapists (14% of assessments),

physical therapists (21% of assessments), registered nurses (47% of assessments), speech therapists (5% of assessments), and others, mostly licensed practical nurses (LPNs; 8% of assessments).

Two main analytic approaches were used for assessing the video reliability of the CARE items, adhering closely to the methods used by Fricke et al.³ in their video reliability study of the FIM^{®4} instrument. First, percent agreement with the mode response was calculated for each CARE item included in at least one of the nine videos. Unlike the approach used by Fricke et al., RTI did not consider agreement at one response level above and below the mode, and instead used a stricter approach looking at direct modal agreement only. In the second approach, percent agreement with the internal clinical team's consensus response was also calculated. This second measure not only gives an indication of item reliability, but also reflects training consistency for the providers.

The video reliability study indicated substantial agreement with the mode and clinical team among all items, typically upwards of 70%. The notable exception to this trend exists among the clinicians in the "Other" category (mostly LPNs); they consistently had the lowest levels of agreement among all core self-care items, ranging from 50 to 72%. For the toileting and dressing items, the agreement with the clinical team was lower than with the mode. This occurred because the clinical team response differed from the mode for these three items in either one or two videos. Nonetheless, because the clinical team response and mode were identical on most of the videos, agreement was still quite high for these items. In general, study clinicians had responses on average that agreed with the expert clinical team or were slightly lower.

The video reliability study indicated substantial agreement with the mode and clinical team for the lying-to-sitting, sit-to-stand, chair/bed to chair transfer, and toilet transfer items (greater than 76%). Although rates of agreement with the mode and clinical team response were generally identical, for the toilet transfer item, the clinical team agreement is slightly lower. The items for walking and wheeling distances showed more variable levels of agreement across disciplines, with overall agreement generally in the moderate range (50–78%). For the Walk In Room item, there was a notable decrease in the agreement with the clinical team compared to agreement with the mode. This occurred because in two of the four videos where this item was assessed, the clinical team response differed from the mode.

B.4 Scale-level Reliability Results: Internal Consistency

In addition to item-level reliability testing, we examined internal consistency, which provides a general assessment of how well the items interrelate within a domain or subscale. Internal consistency is assessed using the Cronbach's alpha coefficient, which is the average correlation of all possible half-scale divisions. Cronbach's alpha is a statistic frequently assessed when instrument or scale psychometrics are published. The Cronbach's alpha reliability estimate ranges from zero to one, with an estimate of zero indicating that there is no consistency of measurement among the items, and one indicating perfect consistency. Many cutoff criteria exist

³ Fricke J, Unsworth C, Worrell D. Reliability of the Functional Independence Measure with Occupational Therapists. *Australian Occupational Therapy Journal* 40(1):7-15, 1993.

⁴ FIM[®] is a trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.

to determine whether or not a scale shows good consistency or whether the items “hang together” well. General consensus is that Cronbach’s alpha should be at least 0.70 for an adequate scale for group-level decisions, and alphas closer to 1 indicate a good scale.⁵

Assessments of individual self-care and mobility subscales at both admission and discharge tend to show good reliability statistics (Cronbach’s Alpha of at least 0.80) within their specified subscales. Reliability estimates by provider type show that the functional status items maintain a very high internal consistency. In addition, no one provider type appears to have reliability estimates higher or lower than the rest, indicating similarity of CARE usage with respect to internal consistency.

The following table shows the findings from the Cronbach’s alpha internal consistency evaluation mentioned above.

Table B-1
CARE functional status internal consistency reliability summary by provider type

CARE analytic set	Overall alpha	HHA alpha	SNF alpha	IRF alpha	LTCH alpha
Self-Care	0.96	0.94	0.95	0.95	0.96
Mobility	0.96	0.94	0.95	0.96	0.97

B.5 Scale-level Reliability and Validity Testing: Rasch Analysis

Because we are measuring a latent trait—a concept that is not measured directly, but that relies on activities that can be directly observed—we used the one-parameter Rasch model to gain a better understanding of the functional status activities. More specifically, we examined the order of functional status items (from least challenging to most challenging) that characterize the concepts of the self-care and mobility.

Rasch analysis uses the scores from the functional assessment items to create the equivalent of a functional status “ruler” (i.e., scale). Rasch analysis uses the available data to estimate a person’s location along the “ruler;” therefore, analyses can be conducted if some data are missing. Rasch analysis can also inform the optimal selection of key items in order to construct functional status scales that sufficiently span an entire range of patient functioning, so that both the least able and most able (lowest- and highest-functioning) patients are adequately measured. In addition, Rasch analysis can indicate where items overlap or are redundant in terms of the level of function they capture.

⁵ Aron A, Aron EN *Statistics for Psychology*. 2nd ed. Upper Saddle River, NJ: Prentice Hall, 1999.

Rasch analysis has been used to examine the FIM[®] instrument,^{6,7,8,9} the Minimum Data Set (MDS),¹⁰ and the Outcome and Assessment Information Set (OASIS).¹¹ Rasch analysis has also been used to examine the extent to which existing functional assessment instruments (e.g., the FIM[®] instrument, MDS 2.0) capture the same construct.¹²

Rasch measurement is based on a probabilistic model that describes the association between a person's underlying ability level and probability of a particular item response, and summarizes a patient's position along a "ruler" that represents a latent trait or concept (e.g., self-care or mobility).¹³ In essence, the Rasch analysis creates a ruler based on the domain measured (e.g., mobility) that can be used to assess the abilities of the patients. The analysis also provides information on the hierarchy of item difficulty (from easy to hard) that can be used to evaluate the construct validity of a set of items. In addition, the Rasch analysis provides information about the level of challenge associated with each item rating scale ("dependent" through "independent"). For example, an item with a low difficulty estimate (e.g., eating) would be more likely to be completed with little or no help by patient's items that are more challenging (e.g., 12 steps), where most patients would find completing this activity challenging. Finally, the Rasch analysis can provide information on items that do not fit into the single theorized concept through "item misfit" statistics, which may indicate that the item needs further evaluation before it is included on future administrations of the subscale. The infit mean square is an indicator of the degree to which patient responses are similar to what would be expected (i.e., predicted) by the measurement model. The acceptable range is generally 0.6 to 1.4. If the item values are above this range, it reflects that person response patterns are erratic, generally suggesting that the item is not measuring the same construct as other items. Infit mean squares above 1.4 are considered to be unacceptably unexpected¹⁴ and indicate that the item most likely does not reflect the same construct as the other items included in the scale; for example, a need for assistance with self-care.

⁶ Granger CV, Hamilton BB, Linacre JM, et al. Performance profiles of the functional independence measure. *Am J Phys Med Rehabil.* 72(2):84-89, 1993.

⁷ Linacre JM, Heinemann AW, Wright BD, et al. The structure and stability of the Functional Independence Measure. *Archives of Physical Medicine & Rehabilitation.* 75(2):127-132, 1994

⁸ Wright BD, Linacre JM, Smith RM, et al. FIM measurement properties and Rasch model details. *Scandinavian Journal of Rehabilitation Medicine,* 29(4):267-272, Dec. 1997.

⁹ Heinemann AW, Linacre JM, Wright BD, et al. Relationships between impairment and physical disability as measured by the functional independence measure. *Arch Phys Med Rehabil.* 74(6):566-573, 1993.

¹⁰ Wang YC, Byers KL, Velozo CA. Rasch analysis of Minimum Data Set mandated in skilled nursing facilities. *J Rehabil Res Dev.* 45(9):1385-1399, 2008.

¹¹ Fortinsky RH, Garcia RI, Joseph Sheehan T, et al. Measuring disability in Medicare home care patients: application of Rasch modeling to the outcome and assessment information set. *Med Care.* 41(5):601-615, 2001.

¹² Velozo CA, Byers KL, Wang YC, et al. Translating measures across the continuum of care: using Rasch analysis to create a crosswalk between the Functional Independence Measure and the Minimum Data Set. *J Rehabil Res Dev.* 44(3):467-478, 2007.

¹³ Wright BD, Stone MH. *Best Test Design.* Rasch Measurement. 1979.

¹⁴ Wright BD, Linacre JM, Gustafson J, et al. Reasonable mean-square fit values. *Rasch Measurement Transactions.* 8(3):370, 1994.

RTI used Rasch analysis to examine the extent to which the items worked together to define a coherent concept. This was conducted separately for the self-care and mobility items. Item fit statistics were examined as an indication of how well all items work together to describe the overall construct (self-care or mobility). The Rasch analysis provides insight into how the items work together as a subscale, including the hierarchy of item difficulty (ordering from easy to difficult) and item fit to the model.

Examinations of these Rasch analysis results reveal that the mobility and self-care item hierarchies make sense clinically and that the operational definitions of the constructs maintain general stability from admission to discharge. Some items have fit statistics outside the acceptable range (e.g., pick up object from floor), but members of the Technical Expert Panel noted that this is an important assessment given the risk of falls.

RTI examined how well the items selected measure the persons in the data set for both self-care and mobility items. RTI examined the extent to which person response patterns fit the assumptions of the measurement model using the same range of infit statistics identified above. RTI examined the extent to which persons are effectively measured (ceiling and floor effects) in each setting overall and for admission and discharge time points. The mobility and self-care items were found to be well targeted to the range of patient ability sampled within this post-acute care population.

RTI established that the six steps of the CARE rating scale are operating as intended, both overall and for individual items on the self-care and mobility subscales. The probability that a person will be scored on a particular rating scale step varies depending on the functional ability of the person. That is, very able people will be more likely to be scored as '5' and '6' than as '1' and '2.' Looking empirically at these distributions, one should see the transitions from one step to the next (called thresholds) proceed monotonically and distinctly across the range of person abilities. In other words, there should always be some point along the range at which each rating-scale step is more probable than another step. When a rating-scale step is not more probable at any point, it suggests that raters are not able to use that step to consistently distinguish patient ability at that level.