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Draft Specifications for the Functional Status Quality Measures for Skilled Nursing Facilities

Public Comment Document

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DRAFT SPECIFICATIONS FOR THE FUNCTIONAL STATUS QUALITY MEASURES FOR SKILLED NURSING FACILITIES: PUBLIC COMMENT DOCUMENT

RTI International

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Function Definition:

The World Health Organization's International Classification of Functioning, Disability and Health (ICF) describes the term "function" as an umbrella term that encompasses all body structures and functions, activities, and participation in daily life.[1] Examples of functioning within the components of body structures and functions include swallowing and bladder and bowel continence. Examples of functioning status within the area of activities include eating, bathing, and dressing; in the area of participation, examples include working and participating in recreational activities. As noted above, functioning is a broad term that covers various components and several levels (e.g., body, person, society).

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SECTION 1
BACKGROUND

This document describes draft specifications for four functional status quality measures for skilled nursing facilities (SNFs). The Centers for Medicare & Medicaid Services (CMS) solicits public comments on these quality measure specifications to inform ongoing quality measure development and implementation for the CMS SNF Quality Reporting Program.

SNFs provide skilled services, such as skilled nursing and therapy services. Residents receiving care in SNFs include those whose illness, injury, or condition has resulted in a loss of function, and for whom rehabilitative care is expected to help regain that function. Treatment goals may include fostering residents' ability to manage their daily activities so that they 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 many SNF stays is improvement in function, SNF clinicians assess and document residents' functional status at admission and at discharge to evaluate not only the effectiveness of the rehabilitation care provided to individual residents but also the effectiveness of the SNF.

Examination of SNF data shows that SNF care practices directly influence resident outcomes. For example, the number of hours of therapy services provided to SNF residents (i.e., therapy intensity) has been found to be positively correlated with the functional improvement that SNF residents achieve (i.e., functional outcomes).[2] Several studies found that a higher intensity of physical and occupational therapy was associated with significantly greater odds of improving mobility and self-care functional independence,[3] shorter length of stay,[4] and a greater likelihood of discharge to community.[5] Furthermore, Jung et al.[6] found that an additional hour of therapy per week was associated with approximately a 3.1 percentage-point increase in the likelihood of returning to the community among residents with hip fracture. Achieving these targeted resident outcomes, including improved self-care and mobility functional independence, reduced length of stay, and increased discharges to the community, is a core goal of SNFs.

Among SNF residents receiving rehabilitation services, the amount of therapy received can vary widely. For example, the amount of therapy provided varies by type (i.e., for-profit versus not-for-profit) and location (i.e., urban versus rural) of facility.[4, 7] Measuring residents' functional improvement across all SNFs on an ongoing basis would permit identification of SNF characteristics, such as ownership types or locations, associated with better or worse resident outcomes and thus help SNFs optimally target quality improvement efforts.

In describing the importance of functional status, the National Committee on Vital and Health Statistics, Subcommittee on Health, [8] noted,

> "Information 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, in other words, their functional status."

Rehabilitation programs have traditionally conceptualized functional status in terms of the need for assistance from another person. This is the conceptual basis for the Minimum Data Set (MDS) function items (used in nursing homes), the FIM® instrument (used in IRFs) and the Outcome and Assessment Information Set (OASIS) function items (used in home health). In a patient-centered health care system, there is a need for standardized terminology and assessment items because patients/residents 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 functional assessment items used to calculate the four quality measures are from the Continuity Assessment Record and Evaluation (CARE) Item Set, which was designed to standardize assessment of patients'/residents' status across acute and post-acute settings, including inpatient rehabilitation facilities (IRFs), long-term care hospitals (LTCHs), SNFs, and home health agencies (HHAs). The CARE Item Set was developed and tested as part of the Post-Acute Care Payment Reform Demonstration. The functional status items on the CARE Item Set are daily activities that clinicians typically assess at the time of admission and/or at discharge to determine patients'/residents' needs, evaluate patient/resident progress, and prepare patients/residents and families for a transition to home or to another setting.

The development of the CARE Item Set 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]

Results of the reliability and validity testing conducted as part of the Post-Acute Care Payment Reform Demonstration found the functional status items to have acceptable reliability and validity in the acute and post-acute patient/resident populations. 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] 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 CARE functional status items is provided in **Appendix A** of this document.

The quality measures described in this document focus on self-care and mobility activities. We recognize that inpatient rehabilitation programs focus on recovery across many areas of function at the level of body structure and function, activities, and participation; however, additional research is needed to develop quality measures for other areas of function status.

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SECTION 2
QUALITY MEASURES

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

2.1.1 Summary Description

This measure estimates the risk-adjusted mean change in *self-care* score between admission and discharge for residents discharged from SNFs.

2.1.2 Purpose/Rationale for Quality Measure

Functional improvement is the goal for many residents during a SNF stay, therefore, SNF clinicians often assess and document residents' functional status at admission and at discharge to evaluate the effectiveness of the rehabilitation care provided to individual residents, as well as the effectiveness of the SNF overall.

Studies have shown differences in SNF residents' functional outcomes by geographic region and facility type, after adjusting for key resident demographic characteristics, which supports the need to monitor SNF residents' functional outcomes.

As previously stated, the quality measures described in this document focus on self-care and mobility activities. We recognize that SNFs can focus on recovery across many areas of function at the level of body structure and function, activities, and participation. Additional research is needed to develop quality measures for other areas of functioning.

2.1.3 Population

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

Exclusion Criteria
Quality Measure Exclusions: This quality measure has 8 exclusion criteria:

1. Residents with incomplete stays.
   Rationale: It can be challenging to gather accurate discharge functional status data for residents who experience incomplete stays. Residents with incomplete stays include residents who are unexpectedly discharged to an acute care setting (Short-stay Acute Hospital, Critical Access Hospital, Inpatient Psychiatric Facility, or Long-term Care Hospital), because of a medical emergency; residents who die or leave a SNF against medical advice; residents discharged directly to another SNF; and residents with a length of stay of less than 3 days.
2. Residents who are independent with all self-care activities at the time of admission.
   Rationale: Residents 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. Residents with the following medical conditions: coma; persistent vegetative state; complete tetraplegia; locked-in syndrome; severe anoxic brain damage, cerebral edema, or compression of brain.
   Rationale: These residents are excluded because they may have limited or less predictable improvement with the selected self-care items.
4. Residents younger than 21 years.
   Rationale: There is only limited evidence published about functional outcomes for individuals younger than 21 years.
5. Residents discharged to hospice.
   Rationale: Resident goals may change during the SNF stay.
6. Residents who are not Medicare fee-for-services beneficiaries.
   Rationale: MDS data are submitted for Medicare fee-for-service beneficiaries.
7. Residents in swing beds in critical access hospitals.
   Rationale: MDS data are not submitted for residents in swing beds in critical access hospitals.
8. Residents who do not have an expectation of functional improvement.
   Rationale: The focus of this measure is functional improvement for residents admitted to the SNF with an expectation of functional improvement.

2.1.4 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: The ability to use suitable utensils to bring food to the mouth and swallow food once the meal is presented on a table/tray. Includes modified food consistency.

Oral hygiene: The ability to use suitable items to clean teeth.

Toilet hygiene: The ability to maintain perineal hygiene; ability to adjust clothes before and after using toilet, commode, bedpan, or urinal.

Shower/bathe self: The ability to bathe self in shower or tub, including washing, rinsing, and drying self. Does not include transferring in/out of tub/shower.

Upper body dressing: The ability to put on and remove shirt or pajama top; includes buttoning, if applicable.

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

Putting on/taking off footwear: The ability to put on and take off socks and shoes or other footwear that is appropriate for safe mobility.

Self-Care Rating Scale: Codes and Code Definitions

6. **Independent** – Resident completes the activity by himself/herself with no assistance from a helper.

5. **Setup or clean-up assistance** – Helper SETS UP or CLEANS UP; resident completes activity. Helper assists only prior to or following the activity.
4. **Supervision or touching assistance** – Helper provides VERBAL CUES or TOUCHING/ STEADYING assistance as resident completes activity. Assistance may be provided throughout the activity or intermittently.
3. **Partial/moderate assistance** – Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports resident's trunk or limbs, but provides less than half the effort.
2. **Substantial/maximal assistance** – Helper does MORE THAN HALF the effort. Helper lifts or holds resident's trunk or limbs and provides more than half the effort.
1. **Dependent** – Helper does ALL of the effort. Resident does none of the effort to complete the task. Or, the assistance of 2 or more helpers is required for the resident to complete the activity.

If the activity did not occur, code one of the following:

88. Not attempted due to medical condition or safety concerns

09. Not applicable

07. Resident refused

2.1.5 Risk Adjustment

Residents treated in SNFs vary in terms of primary diagnosis (i.e., impairment group), demographic characteristics, and co-existing conditions. Residents may also have different expected improvement in function on the basis of these factors. Therefore, this outcome measure is risk adjusted. Risk adjustment controls for specific resident characteristics (e.g., age or diagnosis) that may affect residents' outcomes when comparing facilities.

An initial, extensive set of risk adjustment variables was selected on the basis of a review of the literature and empirical findings from the PAC PRD analyses[12] as well as input from TEPs convened by RTI.[13] Using this initial set of risk adjustment variables, we have been conducting 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.*[10]

The current list of risk adjustment variables is outlined below. This list will be updated, as appropriate, on the basis of further analyses. The risk adjustors used for this quality measure are the following:

- **Age group at SNF admission**
  - 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
  - > 90 years of age and older
- **Admission self-care function score: continuous form**
- **Admission self-care function score: squared form**
- **Primary rehabilitation diagnosis**
  - 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 replacement (reference category)
  - Other orthopedic conditions
  - Cardiac conditions, pulmonary conditions, and debility
  - Medically complex conditions
  - Conditions requiring invasive mechanical ventilation
- **Interactions between primary diagnosis and SNF admission functional status**
- **Prior Surgery: Major surgery in the past 100 days**
- **Prior Functioning: self-care**
  - Dependent
  - Some help
  - Independent, or unknown (reference category)
- **Prior Functioning: indoor ambulation**
  - Dependent or some help
  - Independent, or unknown (reference category)

- **Prior Device Use: Walker use**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Wheelchair/scooter**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Mechanical lift**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Orthotics/prosthetics**
  - Yes
  - No, or unknown (reference category)
- **Presence of severe pressure ulcer at admission** (Stage 2 pressure ulcer)
- **Presence of severe pressure ulcer at admission** (Stage 3, Stage 4 or Unstageable pressure ulcer)
- **Cognitive abilities: Brief Interview for Mental Status (BIMS) score**
  - Severely impaired
  - Moderately impaired
  - Intact (reference category)
- **Communication: Understanding verbal content *and* expression of ideas and wants**
  - Moderate to severe communication limitations: Rarely/never understands; or sometimes understands; or rarely/never expresses self; or speech is very difficult to understand; or frequently exhibits difficulty with expression
  - Mild to no communication limitations: Usually understands or understands; or some difficulty with expression; or expression without difficulty; or unable to assess or unknown (reference category)
- **Bladder incontinence**
  - Less than daily or daily incontinence or always incontinent
  - Indwelling bladder catheter
  - Continent or stress incontinence only or no urine output (reference category)
- **Bowel incontinence**
  - Always incontinent

- Less than daily, Daily
- Continent (reference category)

- **Swallowing ability**
  - Tube/Parenteral feeding
  - Modified food consistency/supervision
  - Regular food/liquids (reference category)

- **Comorbidities (hierarchical condition categories):**
  - 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
  - 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

2.1.6 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 resident, after 'activity not attempted' values are recoded to 1 (score range: 7 to 42).

2. Sum the scores of the discharge self-care items to create a discharge self-care score for each resident, after 'activity not attempted' values are recoded to 1 (score range: 7 to 42).

3. Using stay-level records, identify the stay-level records of residents who 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 resident to create a change in self-care score for each resident.

5. Calculate an expected change in self-care score for each resident using regression coefficients from national data and each resident's admission characteristics (risk adjustors).

6. Calculate an average observed change in self-care score for each SNF. This is the facility-level observed change in self-care score.

7. Calculate an average expected change in self-care score for each SNF. 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 SNF´s ratio by the national average change in self-care score. This is the risk-adjusted mean self-care score.

2.2 Quality Measure: An Application of the IRF Functional Outcome Measure: Change in Mobility Score for Medical Rehabilitation Patients (NQF #2634)

2.2.1 Summary Description

This quality measure estimates the average risk-adjusted mean change in *mobility score* between admission and discharge for residents discharged from an SNF.

2.2.2 Purpose/Rationale for Quality Measure

As noted above in Section 2.1.2, SNFs provide rehabilitation services to many residents with a goal of improving resident functioning.

2.2.3 Population

This measure includes SNF residents who are at least 21 years of age, Medicare fee-for-service beneficiaries, are not independent in all of the mobility activities at the time of admission, and have complete stays.

Exclusion Criteria

Quality Measure Exclusions: This quality measure has 8 exclusion criteria:

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

5. Residents discharged to hospice.
   Rationale: Resident goals may change during the SNF stay.
6. Residents who are not Medicare fee-for-services beneficiaries.
   Rationale: MDS data are submitted for Medicare fee-for-service beneficiaries.
7. Residents in swing beds in critical access hospitals.
   Rationale: MDS data are not submitted for residents in swing beds in critical access hospitals.
8. Residents who do not have an expectation of functional improvement.
   Rationale: The focus of this measure is functional improvement for residents admitted to the SNF with an expectation of functional improvement.

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:

Mobility Items

Roll left and right: The ability to roll from lying on back to left and right side, and roll back to back.

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

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

Sit to stand: The ability to safely come to a standing position from a position of sitting in a chair or on the side of the bed.

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

Toilet transfer: The ability to safely get on and off a toilet or commode.

Car transfer: 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.

For residents who are walking, complete the following items:

Walk 10 feet: Once standing, the ability to walk at least 10 feet (3 meters) in room, corridor, or similar space.

Walk 50 feet with two turns: Once standing, the ability to walk 50 feet and make two turns.

Walk 150 feet: Once standing, the ability to walk at least150 feet (45 meters) in corridor or similar space.

Walking 10 feet on uneven surfaces: The ability to walk 10 feet on uneven or sloping surfaces, such as grass or gravel.

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

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

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

Picking up object: 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

6. **Independent** – Resident completes the activity by himself/herself with no assistance from a helper.
5. **Setup or clean-up assistance** – Helper SETS UP or CLEANS UP; resident completes activity. Helper assists only prior to or following the activity.
4. **Supervision or touching assistance** – Helper provides VERBAL CUES or TOUCHING/ STEADYING assistance as resident completes activity. Assistance may be provided throughout the activity or intermittently.
3. **Partial/moderate assistance** – Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports resident's trunk or limbs, but provides less than half the effort.
2. **Substantial/maximal assistance** – Helper does MORE THAN HALF the effort. Helper lifts or holds resident's trunk or limbs and provides more than half the effort.
1. **Dependent** – Helper does ALL of the effort. Resident does none of the effort to complete the task. Or, the assistance of 2 or more helpers is required for the resident to complete the activity.

If the activity did not occur, code one of the following:

88. Not attempted due to medical condition or safety concerns

09. Not applicable

07. Resident refused

2.2.5 Risk Adjustment

Residents treated in SNFs vary in terms of primary diagnosis (i.e., impairment group), demographic characteristics, and co-existing conditions. Residents may also have different expected improvement in function on the basis of these factors. Therefore, this outcome measure is risk adjusted. Risk adjustment controls for specific resident characteristics (e.g., age or diagnosis) that may affect residents' outcomes when comparing facilities.

An initial, extensive set of risk adjustment variables was selected on the basis of a review of the literature and empirical findings from the PAC PRD analyses[12] as well as input from TEPs convened by RTI.[13] Using this initial set of risk adjustment variables, we have been conducting 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.*[10]

The current list of risk adjustment variables is outlined below. This list will be updated, as appropriate, on the basis of further analyses. The risk adjustors used for this quality measure are the following:

- **Age group at SNF admission**
  - 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
  - 90 years or older
- **Admission mobility function score: continuous score**
- **Admission mobility function score: squared form**
- **Primary SNF rehabilitation diagnosis**
  - 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
  - Cardiac conditions, respiratory conditions and debility
  - Medically complex conditions
  - Conditions requiring invasive ventilation
- **Interaction of admission mobility score and primary diagnosis group**
- **Prior Surgery: Major surgery in the past 100 days**

- **Prior Functioning: Indoor Mobility (ambulation)**
  - Dependent
  - Some help
  - Independent, or unknown (reference category)
- **Prior Functioning: Stairs**
  - Dependent
  - Some help
  - Independent, or unknown (reference category)
- **Prior Functioning: Functional Cognition**
  - Dependent
  - Independent, some help, or unknown (reference category)
- **Prior Device Use: Walker**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Wheelchair/scooter**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Mechanical lift**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Orthotics/prosthetics**
  - Yes
  - No, or unknown (reference category)
- **Communication Impairment:** Expression of ideas and wants *and* Understanding verbal content
  - Moderate to severe communication impairment: Rarely/never understands; or sometimes understands; or rarely/never expresses self; or speech is very difficult to understand or frequently exhibits difficulty with expressing needs and ideas.
  - Mild communication impairment: Usually understands or exhibits some difficulty with expressing needs and ideas
  - No communication impairment (reference category)
- **Cognitive abilities: Brief Interview for Mental Status (BIMS) score:**
  - Severely impaired

  - Moderately impaired
  - Intact (reference category)
- **Bladder incontinence**
  - Less than daily or daily incontinence, or always incontinent
  - Continent or stress incontinence only or no urine output or not applicable (reference category)
- **Bowel incontinence**
  - Always incontinent
  - Less than daily, Daily
  - Continent (reference category)
- **Presence of stage 2 pressure ulcer at admission**
- **Presence of severe pressure ulcer at admission** (Stage 3, Stage 4, or Unstageable pressure ulcer)
- **Swallowing ability:**
  - Tube or parenteral feeding
- **Total parenteral nutrition treatment**
- **History of falls in the past year:** history of two or more falls or any fall with injury in the past year
- **Comorbidities (hierarchical condition categories)**
  - 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
- 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

2.2.6 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 resident, after ‘activity not attempted’ values are recoded to 1 (score range: 15 to 90).

2. Sum the scores of the discharge mobility items to create a discharge mobility score for each resident, after 'activity not attempted' values are recoded to 1 (score range: 15 to 90).

3. Using SNF stay records, identify the records of residents 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 resident to create a change in mobility score for each resident.

5. Calculate an expected change in mobility score for each resident using regression coefficients from national data and each resident's admission characteristics (risk adjustors).

6. Calculate an average observed change in mobility score for each SNF (using the resident 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 SNF (using the resident 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 SNF´s ratio by the national average change in mobility score. This is the risk-adjusted mean mobility score.

2.3 Quality Measure: An Application of the IRF Functional Outcome Measure: Discharge Self-Care Score for Medical Rehabilitation Patients (NQF #2635)

2.3.1 Summary Description

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

2.3.2 Purpose/Rationale for Quality Measure

As noted above in Section 2.1.2, SNFs provide rehabilitation services to many residents with a goal of improving resident functioning.

2.3.3 Population

This measure includes SNF residents who are at least 21 years of age, Medicare fee-for-service beneficiaries and have complete stays.

Exclusion Criteria
Quality Measure Exclusions: This quality measure has 7 exclusion criteria:

1. Residents with incomplete stays.

   Rationale: It can be challenging to gather accurate discharge functional status data for residents who experience incomplete stays. Residents with incomplete stays include residents who are unexpectedly discharged to an acute care setting (Short-stay Acute Hospital, Critical Access Hospital, Inpatient Psychiatric Facility, or Long-term Care Hospital), because of a medical emergency; residents who die or leave a SNF against medical advice; residents discharged directly to another SNF; and residents with a length of stay of less than 3 days.

2. Residents with the following medical conditions: coma; persistent vegetative state; complete tetraplegia; locked-in syndrome; severe anoxic brain damage, cerebral edema, or compression of brain.

   Rationale: These residents are excluded because they may have limited or less predictable improvement with the selected self-care items.

3. Residents younger than 21 years.

   Rationale: There is only limited evidence published about functional outcomes for individuals younger than 21 years.

4. Residents discharged to hospice.

   Rationale: Resident goals may change during the SNF stay.

5. Residents who are not Medicare fee-for-services beneficiaries.

   Rationale: MDS data are submitted for Medicare fee-for-service beneficiaries.

6. Residents in swing beds in critical access hospitals.

   Rationale: MDS data are not submitted for residents in swing beds in critical access hospitals.

7. Residents who do not have an expectation of functional improvement.

   Rationale: The focus of this measure is functional improvement for residents admitted to the SNF with an expectation of functional improvement.

2.3.4 Items Included in the Quality Measure

The following functional activities are assessed and rated at the time of admission and discharge:

Self-Care Items

Eating: The ability to use suitable utensils to bring food to the mouth and swallow food once the meal is presented on a table/tray. Includes modified food consistency.

Oral hygiene: The ability to use suitable items to clean teeth.

Toilet hygiene: The ability to maintain perineal hygiene; ability to adjust clothes before and after using toilet, commode, bedpan, or urinal.

Shower/bathe self: The ability to bathe self in shower or tub, including washing, rinsing, and drying self. Does not include transferring in or out of tub/shower.

Upper body dressing: The ability to put on and remove shirt or pajama top. Includes buttoning, if applicable.

Lower body dressing: The ability to dress and undress below the waist, including fasteners. Does not include footwear.

Putting on/taking off footwear: The ability to put on and take off socks and shoes or other footwear that are appropriate for safe mobility.

Self-Care Rating Scale: Codes and Code Definitions

6. **Independent** – Resident completes the activity by himself/herself with no assistance from a helper.
5. **Setup or clean-up assistance** – Helper SETS UP or CLEANS UP; resident completes activity. Helper assists only prior to or following the activity.
4. **Supervision or touching assistance** – Helper provides VERBAL CUES or TOUCHING/ STEADYING assistance as resident completes activity. Assistance may be provided throughout the activity or intermittently.
3. **Partial/moderate assistance** – Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports resident's trunk or limbs, but provides less than half the effort.
2. **Substantial/maximal assistance** – Helper does MORE THAN HALF the effort. Helper lifts or holds resident's trunk or limbs and provides more than half the effort.
1. **Dependent** – Helper does ALL of the effort. Resident does none of the effort to complete the task. Or, the assistance of 2 or more helpers is required for the resident to complete the activity.

If the activity did not occur, code one of the following:

88. Not attempted due to medical condition or safety concerns

09. Not applicable

07. Resident refused

2.3.5 Risk Adjustment

Residents treated in SNFs vary in terms of primary diagnosis (i.e., impairment group), demographic characteristics, and co-existing conditions. Residents may also have different

expected improvement in function on the basis of these factors. Therefore, this outcome measure is risk adjusted. Risk adjustment controls for specific resident characteristics (e.g., age or diagnosis) that may affect residents' outcomes when comparing facilities.

An initial, extensive set of risk adjustment variables was selected on the basis of a review of the literature and empirical findings from the PAC PRD analyses[12] as well as input from TEPs convened by RTI.[13] Using this initial set of risk adjustment variables, we have been conducting 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.*[10]

The current list of risk adjustment variables is outlined below. This list will be updated, as appropriate, on the basis of further analyses. The risk adjustors used for this quality measure are the following:

- **Age group at SNF admission**
  - 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
  - > 90 years of age and older
- **Admission self-care function score: continuous form**
- **Admission self-care function score: squared form**
- **Primary rehabilitation diagnosis**
  - 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 replacement (reference category)
  - Other orthopedic conditions
  - Cardiac conditions, pulmonary conditions, and debility
  - Medically complex conditions
  - Conditions requiring invasive mechanical ventilation
- **Interactions between primary diagnosis and SNF admission functional status**
- **Prior Surgery: Major surgery in the past 100 days**
- **Prior Functioning: self-care**
  - Dependent
  - Some help
  - Independent, or unknown (reference category)
- **Prior Functioning: indoor ambulation**
  - Dependent or some help
  - Independent, or unknown (reference category)
- **Prior Device Use: Walker**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Wheelchair/scooter**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Mechanical lift**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Orthotics/prosthetics**
  - Yes
  - No, or unknown (reference category)
- **Presence of stage 2 pressure ulcer at admission**
- **Presence of severe pressure ulcer at admission** (Stage 3, Stage 4, or Unstageable pressure ulcer)
- **Cognitive abilities: Brief Interview for Mental Status (BIMS) score**
  - Severely impaired
  - Moderately impaired

- Intact (reference category)

- **Communication: Understanding verbal content *and* expression of ideas and wants**
  - Moderate to severe communication limitations: Rarely/never understands; or sometimes understands; or rarely/never expresses self; or speech is very difficult to understand; or frequently exhibits difficulty with expression
  - Mild to no communication limitations: Usually understands or understands; or some difficulty with expression; or expression without difficulty; or unable to assess or unknown (reference category)

- **Bladder incontinence**
  - Less than daily or daily incontinence or always incontinent
  - Indwelling bladder catheter
  - Continent or stress incontinence only or no urine output (reference category)

- **Bowel incontinence**
  - Always incontinent
  - Less than daily, Daily
  - Continent (reference category)

- **Swallowing ability**
  - Tube/Parenteral feeding
  - Modified food consistency/supervision
  - Regular food/liquids (reference category)

- **Comorbidities** (hierarchical condition categories):
  - 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
- 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

2.3.6 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 resident, after 'activity not attempted' codes are recoded to 1 (score range: 7 to 42). This is the resident's observed discharge score.
2. Calculate an expected discharge self-care score for each SNF resident using a statistical model that estimates the average effect of the risk adjustors (resident demographic and admission clinical characteristics) across all SNFs.
3. Identify the stay-level records of residents who meet the exclusion criteria and exclude them from analyses.

4. Compare each resident'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 residents 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 residents in the SNF who do not meet the exclusion criteria.

7. The percent is calculated as the numerator divided by the denominator and then multiplied by 100.

2.4 Quality Measure: An Application of the IRF Functional Outcome Measure: Discharge Mobility Score for Medical Rehabilitation Patients (NQF #2636)

2.4.1 Summary Description

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

2.4.2 Purpose/Rationale for Quality Measure

As noted above in Section 2.1.2, SNFs provide rehabilitation services to many residents with a goal of improving resident functioning.

2.4.3 Population

This measure includes SNF residents who are at least 21 years of age, Medicare fee-for-service beneficiaries and have complete stays.

Exclusion Criteria
Quality Measure Exclusions: This quality measure has 7 exclusion criteria:

1. Residents with incomplete stays.
   Rationale: It can be challenging to gather accurate discharge functional status data for residents who experience incomplete stays. Residents with incomplete stays include residents who are unexpectedly discharged to an acute care setting (Short-stay Acute Hospital, Critical Access Hospital, Inpatient Psychiatric Facility, or Long-term Care Hospital), because of a medical emergency; residents who die or leave a SNF against medical advice; residents discharged directly to another SNF; and residents with a length of stay of less than 3 days.

2. Residents with the following medical conditions: coma; persistent vegetative state; complete tetraplegia; locked-in syndrome; severe anoxic brain damage, cerebral edema, or compression of brain.
   Rationale: These residents are excluded because they may have limited or less predictable improvement with the selected mobility items.
3. Residents younger than 21 years.
   Rationale: There is only limited evidence published about functional outcomes for individuals younger than 21 years.
4. Residents discharged to hospice.
   Rationale: Resident goals may change during the IRF stay.
5. Residents who are not Medicare fee-for-services beneficiaries.
   Rationale: MDS data are submitted for Medicare fee-for-service beneficiaries.
6. Residents in swing beds in critical access hospitals.
   Rationale: MDS data are not submitted for residents in swing beds in critical access hospitals.
7. Residents who do not have an expectation of functional improvement.
   Rationale: The focus of this measure is functional improvement for residents admitted to the SNF with an expectation of functional improvement.

2.4.4 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:

Mobility Items

Roll left and right: The ability to roll from lying on back to left and right side, and roll back to back.

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

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

Sit to stand: The ability to safely come to a standing position from sitting in a chair or on the side of the bed.

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

Toilet transfer: The ability to safely get on and off a toilet or commode.

Car transfer: 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.

For residents who are walking, complete the following items:

Walk 10 feet: Once standing, the ability to walk at least 10 feet (3 meters) in room, corridor, or similar space.

Walk 50 feet with two turns: The ability to walk 50 feet and make two turns.

Walk 150 feet (45 m): Once standing, the ability to walk at least150 feet (45 meters) in corridor or similar space.

Walking 10 feet on uneven surfaces: The ability to walk 10 feet on uneven or sloping surfaces, such as grass or gravel.

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

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

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

Picking up object: 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

6. **Independent** – Resident completes the activity by himself/herself with no assistance from a helper.
5. **Setup or clean-up assistance** – Helper SETS UP or CLEANS UP; resident completes activity. Helper assists only prior to or following the activity.
4. **Supervision or touching assistance** – Helper provides VERBAL CUES or TOUCHING/ STEADYING assistance as resident completes activity. Assistance may be provided throughout the activity or intermittently.
3. **Partial/moderate assistance** – Helper does LESS THAN HALF the effort. Helper lifts, holds, or supports resident's trunk or limbs, but provides less than half the effort.
2. **Substantial/maximal assistance** – Helper does MORE THAN HALF the effort. Helper lifts or holds resident's trunk or limbs and provides more than half the effort.
1. **Dependent** – Helper does ALL of the effort. Resident does none of the effort to complete the task. Or, the assistance of 2 or more helpers is required for the resident to complete the activity.

If the activity did not occur, code one of the following:

88. Not attempted due to medical condition or safety concerns

09. Not applicable

07. Resident refused

2.4.5 Risk Adjustment

Residents treated in SNFs vary in terms of primary diagnosis (i.e., impairment group), demographic characteristics, and co-existing conditions. Residents may also have different expected improvement in function on the basis of these factors. Therefore, this outcome measure is risk adjusted. Risk adjustment controls for specific resident characteristics (e.g., age or diagnosis) that may affect residents' outcomes when comparing facilities.

An initial, extensive set of risk adjustment variables was selected on the basis of a review of the literature and empirical findings from the PAC PRD analyses[12] as well as input from TEPs convened by RTI.[13] Using this initial set of risk adjustment variables, we have been conducting 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.*[10]

The current list of risk adjustment variables is outlined below. This list will be updated, as appropriate, on the basis of further analyses.

- **Age group at SNF admission**
  - 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
  - 90 years or older
- **Admission mobility function score: continuous score**
- **Admission mobility function score: squared form**
- **Primary SNF Diagnosis Groups:**
  - 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

  - Cardiac conditions, respiratory conditions and debility Medically complex conditions
  - Conditions requiring invasive ventilation
- **Interaction of admission mobility score and primary diagnosis group**
- **Prior Surgery: Major surgery in the past 100 days**
- **Prior Functioning: Indoor Mobility (ambulation)**
  - Dependent
  - Some help
  - Independent, or unknown (reference category)
- **Prior Functioning: Stairs**
  - Dependent
  - Some help
  - Independent, or unknown (reference category)
- **Prior Functioning: Functional Cognition**
  - Dependent
  - Independent, some help, or unknown (reference category)
- **Prior Device Use: Walker**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Wheelchair/scooter**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Mechanical lift**
  - Yes
  - No, or unknown (reference category)
- **Prior Device Use: Orthotics/prosthetics**
  - Yes
  - No, or unknown (reference category)
- **Communication Impairment: Understanding verbal content *and* expression of ideas and wants**
  - Moderate to severe communication impairment: Rarely/never understands; or sometimes understands; or rarely/never expresses self or speech is very difficult to understand; or frequently exhibits difficulty with expressing needs and ideas.

- Mild communication impairment: Usually understands; or Exhibits some difficulty with expression.
- No communication impairment (reference category)

- **Cognitive abilities: Brief Interview for Mental Status (BIMS) score**
  - Severely impaired
  - Moderately impaired
  - Intact (reference category)
- **Bladder incontinence**
  - Less than daily (H0350 = 2) or daily incontinence, or always incontinent
  - Continent or stress incontinence only or no urine output or not applicable (reference category)
- **Bowel incontinence**
  - Always incontinent
  - Less than daily, Daily
  - Continent (reference category)
- **Presence of stage 2 pressure ulcer at admission**
- **Presence of severe pressure ulcer at admission** (Stage 3, Stage 4, or Unstageable pressure ulcer)
- **Swallowing ability:**
  - Tube or parenteral feeding
- **Total parenteral nutrition treatment**
- **History of falls in the past year:** history of two or more falls or any fall with injury in the past year
- **Comorbidities (hierarchical condition categories)**:
  - 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
- 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

2.4.6 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 resident, after 'activity not attempted' values are recoded to 1 (score range: 15 to 90). This is the resident's observed discharge score.

2. Calculate an expected discharge mobility score for each SNF resident using a statistical model that estimates the average effect of the risk adjustors (resident demographic and admission clinical characteristics) across all SNFs.

3. Identify the stay-level records of residents who meet the exclusion criteria and exclude them from analyses.

4. Compare each resident'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 residents 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 residents in the SNF who do not meet the exclusion criteria.

7. The percent is calculated as the numerator divided by the denominator and then multiplied by 100.

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APPENDIX A:
RELIABILITY AND VALIDITY TESTING

A.1 Overview of Reliability and Validity Testing

The functional assessment items used in the four skilled nursing facility (SNF) functional status quality measures are from the Continuity Assessment Record and Evaluation (CARE) Item Set. The CARE Item Set was designed to standardize assessment of patients'/residents' 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 the CARE Item Set are daily activities that clinicians assess at the time of admission and/or at discharge to determine patients'/residents' 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 CARE 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 (PAC PRD). 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.

A.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/residents included in the PAC PRD (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/residents each month, representing a range of function and acuity. The overall patient/resident 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/residents 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/resident assessments at the same time. Responses to items were obtained by direct observation of the patient/resident 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/resident 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/ residents 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 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).

A.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. in their video reliability study of the

FIM® instrument.[3] 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.

A.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 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.[4]

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

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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 A-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

A.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/resident functioning, so that both the least able and most able (lowest- and highest-functioning) patients/residents are adequately measured. In addition, Rasch analysis can indicate where items overlap or are redundant in terms of the level of function they capture.

Rasch analysis has been used to examine the FIM® instrument,[5-8] the Minimum Data Set (MDS),[9] and the Outcome and Assessment Information Set (OASIS).[10] 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.[11]

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/resident's position along a "ruler" that represents a latent trait or concept (e.g., self-care or mobility).[12] 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/residents. 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 patients/residents items that are more challenging (e.g., 12 step), where most patients/residents 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 being included on future administrations of the subscale. The infit mean square is an indicator of the degree to which patient/resident 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 unexpected[13] 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.

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 the Technical Expert Panel members notes 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/resident ability sampled within this PAC 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, we 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/resident ability at that level.

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