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Specifications for the Function Quality Measures Adopted in the Long-Term Care Hospital Quality Reporting Program

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Development and Maintenance of Symptom Management Measures

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LONG-TERM CARE HOSPITAL QUALITY REPORTING PROGRAM

RTI International

CMS Contract No. HHSM-500-2013-13015I (HHSM-500-T0001)

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SECTION 1 BACKGROUND

Section 3004(a) of the Affordable Care Act amended section 1886(j)(7) of the Social Security Act, requiring the Secretary to establish the Long-Term Care Hospital (LTCH) Quality Reporting Program (QRP).

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 LTCH 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 LTCH QRP. The quality measures are:

1. Percent of Long-Term Care Hospital Patients with an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631);
2. 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);
3. Long-Term Care Hospital Patients (LTCH) Functional Outcome Measure: Change in Mobility Among Patients Requiring Ventilator Support (NQF #2632)

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SECTION 2 QUALITY MEASURES

2.1 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

This quality measure reports the percentage of LTCH patients with an admission and discharge functional assessment and a care plan that addresses function. Many LTCH patients have functional limitations and are at high risk for functional decline during the hospital stay.

This measure addresses the assessment of functional status on admission and discharge and the inclusion of function in the patient's care plan, as evidenced by a goal for at least one of the self-care or mobility function assessment items.

This process measure requires the collection of admission and discharge functional status data by trained clinicians using standardized clinical assessment items (also known as data elements) that assess specific areas of function (i.e., self-care, mobility, cognition, communication, and bladder continence). The self-care and mobility items are coded based on a 6-level rating scale (for the list of items and the rating scale, see *Section 2.1.6, Items Included in the Quality Measure*). For this quality measure, inclusion of function in the patient's care plan is determined based on whether a functional goal is recorded at admission for at least one of the standardized self-care or mobility function items using the 6-level rating scale.

This quality measure addresses the importance of 1) conducting a comprehensive functional assessment at the time of admission addressing self-care, mobility, cognition and communication skills, and bladder continence; 2) incorporating the admission functional assessment findings into the patients' care plan and setting discharge functional status goals; and 3) conducting a comprehensive functional assessment at the time of discharge addressing self-care, mobility, cognition, communication, and bladder continence. An increasing body of evidence has reported on the safety and feasibility of early mobilization and rehabilitation of critically ill but stable patients, with minimal adverse events and risk to the patient.^{1,2,3,4,5,6} Early mobility and rehabilitation in these settings have been associated with improved patient outcomes.

¹ Adler J, Malone D. Early mobilization in the intensive care unit: a systematic review. *Cardiopulmonary Physical Therapy Journal*. Mar 2012;23(1):5-13.

² Kress JP. Clinical trials of early mobilization of critically ill patients. *Critical Care Medicine*. 2009;37(10 Suppl).

³ Schweickert WD, Kress JP. Implementing early mobilization interventions in mechanically ventilated patients in the ICU. *Chest*. Dec 2011;140(6):1612-1617.

⁴ Schweickert WD, Pohlman MC, Pohlman AS, et al. Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial. *Lancet*. May 30 2009;373(9678):1874-1882.

⁵ Zanni JM, Korupolu R, Fan E, et al. Rehabilitation therapy and outcomes in acute respiratory failure: an observational pilot project. *Journal of Critical Care*. Jun 2010;25(2):254-262.

⁶ Drolet A, DeJulio P, Harkless S, et al. Move to improve: the feasibility of using an early mobility protocol to increase ambulation in the intensive and intermediate care settings. *Physical Therapy*. 2013;93(2):197-207.

2.1.2 Purpose/Rationale for Quality Measure

Limitations in functioning after critical illness are becoming increasingly prevalent as a result of improving critical care medicine and survival rates.¹ Short- and long-term adverse consequences among critically and chronically ill patients in LTCH and Intensive Care Unit (ICU) settings include severe weakness,^{1-7,8,9} muscle atrophy,⁵ connective-tissue shortening,⁵ loss of bone mass,⁸ increased risk for blood clots,⁸ increased risk for pressure ulcers,⁸ deconditioning,^{3,5} deficits in self-care and ambulation,¹ functional impairment,⁹ fatigue,⁷ and cognitive impairment including profound and persistent deficits in memory, attention/concentration, and executive function,^{7,10,11} and the inability to return to work 1 year after hospital discharge.^{8,12} Cognitive impairment in survivors of critical illness has been associated with anxiety and depression, inability to return to work, and the inability of older persons to return home.¹⁰ In recent years, to mitigate these adverse consequences, traditional practices of bed rest and immobility have been challenged and early mobility and rehabilitation have been increasingly recognized as important to improve patients' long-term functional outcomes,^{6,8,13} with recovery of function being described as both desirable and possible.¹⁴ The lack of early mobility initiation in ICU settings has also been described as a strong predictor of adverse patient outcomes.⁸

The clinical practice guideline *Rehabilitation after Critical Illness*⁷ from the National Institute for Health and Clinical Excellence (NICE) recommends performing timely clinical assessments to identify current rehabilitation needs for patients at risk of morbidity, to determine the patient's risk of developing physical and non-physical morbidity during the critical-care phase, to establish short- and medium-term rehabilitation goals based on the clinical assessment, to initiate an individualized structured rehabilitation program, and to perform a clinical reassessment before discharge.

The importance of standardized functional assessment in LTCH settings is also supported by the high prevalence of therapy services provided in this setting, and the need for care coordination for patients returning home and receiving follow-up care in the community, as well

⁷ Centre for Clinical Practice at NICE (UK). Rehabilitation after critical illness [Internet]. 2009; (NICE Clinical Guidelines; No. 83):91. Available at: <http://www.nice.org.uk/nicemedia/live/12137/43564/43564.pdf>. Accessed January 23, 2014.

⁸ Dang SL. ABCDEs of ICU: Early mobility. *Critical Care Nursing Quarterly*. 2013;36(2):163-168.

⁹ Skinner EH, Berney S, Warrillow S, Denehy L. Development of a physical function outcome measure (PFIT) and a pilot exercise training protocol for use in intensive care. *Critical care and resuscitation : journal of the Australasian Academy of Critical Care Medicine*. Jun 2009;11(2):110-115.

¹⁰ Wilcox ME, Brummel NE, Archer K, Ely EW, Jackson JC, Hopkins RO. Cognitive dysfunction in ICU patients: risk factors, predictors, and rehabilitation interventions. *Critical Care Medicine*. 2013;41(9 Suppl 1).

¹¹ Brummel NE, Jackson JC, Girard TD, et al. A combined early cognitive and physical rehabilitation program for people who are critically ill: the activity and cognitive therapy in the intensive care unit (ACT-ICU) trial. *Physical Therapy*. 2012;92(12):1580-1592.

¹² Engel HJ, Needham DM, Morris PE, Gropper MA. ICU early mobilization: from recommendation to implementation at three medical centers. *Critical Care Medicine*. Sep 2013;41(9 Suppl 1):S69-80.

¹³ Li Z, Peng X, Zhu B, Zhang Y, Xi X. Active mobilization for mechanically ventilated patients: a systematic review. *Archives of Physical Medicine and Rehabilitation*. 2013;94(3):551-561.

¹⁴ Rochester CL. Rehabilitation in the intensive care unit. *Seminars in Respiratory and Critical Care Medicine*. Dec 2009;30(6):656-669.

as for those patients receiving additional institutional healthcare services after discharge from an LTCH. A study¹⁵ of 1,419 ventilator-dependent patients from 23 LTCHs reported that physical, occupational, and speech therapy were the most commonly provided services among a comprehensive list of 34 procedures, services, and treatments provided during the LTCH stay. The authors concluded that the very high frequency of physical (84.8%), occupational (81.5%), and speech (79.7%) therapy reflects use of the rehabilitative model of care adopted by many post-ICU weaning programs, which is important in restoration of function. This high utilization of therapy services supports the need for standardized functional assessment at admission in order to document functional status, identify the need for therapy, set functional status goals, and assist with discharge planning and care coordination.

Whether an LTCH patient is discharged home or to another care setting for continuing healthcare, the patient's functional status is an important aspect of a person's health status to document at the time of transition. The study¹⁵ of 23 LTCHs also reported that 28.8% of patients were discharged directly home or to assisted living, further supporting the importance of functional assessment and early rehabilitation to facilitate discharge planning and home discharge when possible. In another study of 101 LTCH patients, discharge functional status scores significantly discriminated across five different discharge destinations, including home, IRF, SNF, nursing facility /hospice/expired, and short-stay acute-care hospital transfer,¹⁶ highlighting the association of functional status with discharge setting.

An increasing body of evidence has reported on the safety and feasibility of early mobilization and rehabilitation of critically ill but stable patients in LTCH and ICU settings with minimal adverse events and risk to the patient.^{1,2,3,4,5,6} Early mobility and rehabilitation in these settings have been associated with several improved patient outcomes, such as (1) improved strength^{3,8,13} and functional status;^{1,3,13} (2) earlier achievement of mobilization milestones, such as out of bed mobilization;^{1,17} (3) improvement in mobility and self-care function scores from admission to discharge;^{13,15} (4) greater incidence of return to functional baseline in mobility and self-care, greater unassisted walking and walking distances, and improved self-reported physical function scores at hospital discharge compared with persons not participating in early mobility and rehabilitation;¹ (5) enhanced recovery of functional exercise capacity;⁸ (6) improved self-perceived functional status;⁸ (7) reduced physiological and cognitive complications;⁸ and (8) improved cognitive function.¹³ Early mobility and rehabilitation have also been associated with (1) reduced ICU and hospital length of stay;^{1,2,3,8,12,13} (2) reduced incidence of delirium and improved patient awareness;^{1,3} (3) increased ventilator-free days and improved weaning outcomes;^{1,8,13} (4) greater incidence of discharge home directly after hospitalization compared with patients not receiving early mobilization;^{4,12} and (5) reduced hospital readmission or death in the year after hospitalization.^{1,13}

¹⁵ Scheinhorn DJ, Hassenpflug MS, Votto JJ, et al. Post-ICU mechanical ventilation at 23 long-term care hospitals: a multicenter outcomes study. *Chest*. Jan 2007;131(1):85-93.

¹⁶ Thrush A, Rozek M, Dekerlegand JL. The clinical utility of the functional status score for the intensive care unit (FSS-ICU) at a long-term acute care hospital: a prospective cohort study. *Physical Therapy*. 2012;92(12):1536-1545.

¹⁷ Morris PE. Moving our critically ill patients: mobility barriers and benefits. *Critical Care Clinics*. Jan 2007;23(1):1-20.

Mobility activities that are feasible to assess in LTCH and ICU settings include bed mobility, sitting at the edge of the bed, transferring from bed to chair, sitting in a chair, out-of-bed mobility; standing, and ambulation.^{1,4,17,18} In a sample of 103 patients with respiratory failure undergoing 1,449 activity events in a respiratory ICU, more than one-half of the activity events were reported to be ambulation, and 40% of the activity events occurred in intubated, mechanically ventilated patients at the end of the respiratory ICU stay. Moreover, 69.4% of survivors ambulated more than 100 feet, 8.2% ambulated less than 100 feet, 15.3% could sit in a chair, 4.7% could sit on the edge of the bed, and 2.4% did not accomplish any of these activities.¹⁸ Self-care items that are feasible to assess in LTCH and ICU settings include bathing, dressing, eating, grooming, and using the toilet.^{3,4,5} In a study of 19 medical ICU patients who received physical and/or occupational therapy services, 48% participated in grooming activities and 46% participated in bathing activities.⁵

Short- and long-term cognitive impairments are very frequent complications of critical illness and negatively influence survivors' ability to function independently.^{10,11,19} Delirium during hospitalization is highly prevalent in critically ill patients and has been associated with longer lengths of stay, increased duration of mechanical ventilation, and higher risk of death.¹⁰ A longer duration of delirium has been associated with worse short- and long-term cognition and executive function.^{10,19} Given these adverse consequences, the importance of early assessment of cognitive function, including possible delirium, and early initiation of cognitive rehabilitation in critical care settings is being increasingly recognized.^{11,20} Also, given the positive effects of physical exercise on cognitive function in other populations, the potential positive influence of exercise on cognitive function in the critically ill population is being examined by researchers.¹¹

2.1.3 Denominator

The denominator is the number of LTCH patient stays. There are no denominator exclusion criteria for this measure.

2.1.4 Numerator

The numerator for this quality measure is the number of Long-Term Care Hospital (LTCH) patients with complete functional assessment data and at least one self-care or mobility goal. This measure includes patients with incomplete and complete stays.

Patients with **incomplete stay records** are identified based on:

1. Reason for Assessment (A0250)
 - 11 = Unplanned discharge
 - 12 = Expired

¹⁸ Bailey P, Thomsen GE, Spuhler VJ, et al. Early activity is feasible and safe in respiratory failure patients. *Critical Care Medicine*. 2007;35(1):139-145.

¹⁹ Pandharipande PP, Girard TD, Ely EW. Long-term cognitive impairment after critical illness. *The New England Journal of Medicine*. Jan 9 2014;370(2):185-186.

²⁰ Miller RS, Patton M, Graham RM, Hollins D. Outcomes of trauma patients who survive prolonged lengths of stay in the intensive care unit. *The Journal of Trauma*. Feb 2000;48(2):229-234.

OR

2. Discharge Location (A2110)
 - 04 = Hospital emergency department
 - 05 = Short-stay acute care hospital (IPPS)
 - 06 = Long-term care hospital (LTCH)
 - 08 = Psychiatric hospital or unit
 - 12 = Discharged Against Medical Advice

OR

3. Length of stay is less than 3 days - (Discharge Date (A0270) minus Admission Date (A0220)) < 3 days.

Patients stays not meeting the criteria for incomplete patient stays will be considered **complete patient stays**.

Both types of patient stay records are included in the denominator, but the specifications vary by complete or incomplete stay for the numerator.

Complete patient stays. For patients with complete patient stays, each functional assessment item listed below must have a valid numeric score indicating the patient's status [01 – 06], or a valid code indicating the activity was not attempted (i.e. GG0130A1 = [07, 09, 10, 88]). All three of the following criteria are required for inclusion in the numerator:

1. A valid numeric score indicating the patient's functional status [01 – 06], a valid code indicating the activity was not attempted (e.g. GG0130A1 = [07, 09, 10, 88]) for each of the functional assessment items, or a “^” indicating items affected by the skip pattern on the admission assessment. All admission functional assessment items (refer to 2.3) must be completed; and
2. A valid numeric score or a valid code indicating the activity was not attempted (e.g. GG0130A2 = [07, 09, 10, 88]) for a discharge goal indicating the patient's expected level of independence, for at least one Self-care or Mobility item on the admission assessment (refer to 2.4); and
3. A valid numeric score indicating the patient's functional status [01 – 06], a valid code indicating the activity was not attempted (e.g. GG0130A3 = [07, 09, 10, 88]) for each of the functional assessment items, or a “^” indicating items affected by the skip pattern on the discharge assessment. All discharge functional assessment items (refer to 2.5) must be completed.

Incomplete patient stays. For patients with incomplete patient stays, collection of discharge functional status data might not be feasible. Each functional assessment item listed below must have a valid numeric score indicating the patient's status [01 – 06], or a valid code indicating the activity was not attempted (e.g. GG0130A1 = [07, 09, 10, 88]). The following two criteria are required for inclusion in the numerator:

1. A valid numeric score indicating the patient's functional status [01 – 06], a valid code indicating the activity was not attempted (i.e. GG0130A1 = [07, 09, 10, 88]) for each of the functional assessment items, or a “^” indicating items affected by the skip pattern on the admission assessment. All admission functional assessment items (refer to 2.3) must be completed; and
2. A valid numeric score or a valid code indicating the activity was not attempted (e.g. GG0130A2 = [07, 09, 10, 88]) for a discharge goal indicating the patient's expected level of independence, for at least one Self-care or Mobility item on the admission assessment (refer to 2.4).

2.1.5 Items Included in the Quality Measure

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.

Wash upper body (GG0130D): The ability to wash, rinse, and dry the face, hands, chest, and arms while sitting in a chair or bed.

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 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

Hearing, Speech, and Vision (Section B) items are:

For patients who are comatose as indicated by B0100 = 1, BB0700, BB0800 are skipped.

BB0700. Expression of Ideas and Wants

Valid codes for Expression of Ideas and Wants (BB0700) are:

4 – Expresses without difficulty

3 – Expresses with some difficulty

2 – Frequently exhibits difficulty with expressing needs and ideas

1 – Rarely/Never expresses or is very difficult to understand

^ – Skip pattern

BB0800. Understanding Verbal Content

Valid codes for Understanding Verbal Content (BB0800) are:

4 – Understands

3 – Usually understands

2 – Sometimes understands

1 – Rarely/Never understands

^ – Skip pattern

Cognitive Patterns (Section C) items are:

For patients who are comatose as indicated by B0100 = 1, C1610 items are skipped.

The Signs and Symptoms of Delirium (Section C) items are:

C1610A. AND C1610B. Acute Onset and Fluctuating Course
C1610C. Inattention
C1610D. Disorganized Thinking
C1610E1. AND C1610E2. Altered Level of Consciousness

Valid codes for Signs and Symptoms of Delirium (C1610) items are:

0 – No
1 – Yes
^ – Skip pattern

Bladder and Bowel (Section H) item is:

H0350. Bladder Continence

Valid codes for Bladder Continence (H0350) are:

0 – Always continent
1 – Stress incontinence only
2 – Incontinent less than daily
3 – Incontinent daily
4 – Always incontinent
5 – No urine output
9 – Not applicable

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 (self-care, mobility, expression, understanding, signs and symptoms of delirium, bladder) AND at least one self-care or mobility goal AND complete discharge functional assessment data (self-care, mobility, expression, understanding, signs and symptoms of delirium, bladder) 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 (self-care, mobility, expression, understanding, signs and symptoms of delirium, bladder) 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.

2.2 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)

2.2.1 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.

2.2.2 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 Health²¹, 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 settings²² as well as risk of nursing home placement and hospitalization of older adults living in the community.²³ Functioning is important to patients/residents and their family members.^{24,25,26}

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.²⁷ 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*²⁸ 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

²¹ Subcommittee on Health National Committee on Vital and Health Statistics, "Classifying and Reporting Functional Status" (2001).

²² 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.

²³ 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.

²⁴ 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.


²⁵ Kramer, A. M. (1997). Rehabilitation care and outcomes from the patient's perspective. *Med Care*, 35(6 Suppl), JS48-57.

²⁶ 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.

²⁷ 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.

²⁸ 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.

(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 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."²⁹ 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"³⁰ 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."³¹ 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> .

2.2.3 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.

²⁹ 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).

³⁰ Ibid.

³¹ Ibid.

2.2.4 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.

2.2.5 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

2.2.6 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.

2.2.7 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.

2.3 Long-Term Care Hospital Patients (LTCH) Functional Outcome Measure: Change in Mobility Among Patients Requiring Ventilator Support (NQF #2632)

2.3.1 Quality Measure Description

This measure estimates the risk-adjusted change in mobility score between admission and discharge among LTCH patients requiring ventilator support at admission. The change in mobility score is calculated as the difference between the discharge mobility score and the admission mobility score.

2.3.2 Purpose/Rationale for Quality Measure

Patients in LTCHs present with clinically complex conditions. In addition to having complex medical care needs for an extended period of time, LTCH patients often have functional limitations due to the nature of their conditions, as well as deconditioning due to prolonged bed rest and treatment requirements (for example, ventilator use). These patients are therefore at high risk for functional decline during the LTCH stay that is both condition-related and iatrogenic (i.e., related to medical treatment).

According to the Centers for Disease Control and Prevention (CDC), more than 300,000 patients receive mechanical ventilation in the United States each year.³² These patients are at increased risk for infections, such as pneumonia and sepsis, as well as other serious complications including pulmonary edema, pulmonary embolism, and death.^{33,34} These complications can lead to longer stays in the intensive care unit and hospital, increased health care costs and increased risk of disability (or death).³² The estimated mortality rate in patients aged 85 years and older with acute lung injury on mechanical ventilation is 60 percent.³⁵

A Medicare Payment Advisory Commission analysis of Medicare data found that 16 percent of LTCH patients used at least one ventilator-related service in 2012.³⁶ In FY 2012, MS-LTC-DRG 207, a diagnosis-related group that refers to respiratory diagnosis with ventilator support for 96 or more hours, represented the most frequently occurring diagnosis among LTCH patients, at 11.3 percent of all LTCH discharges³⁶ and MS-LTC-DRG-4, a diagnosis-related group that refers to tracheostomy with ventilator support for 96 or more hours or primary diagnosis except face, mouth, and neck without major OR procedure, represented an additional

³² Centers for Disease Control and Prevention. (2014). Ventilator-Associated Events (VAE). Retrieved from https://www.cdc.gov/nhsn/pdfs/pscmanual/10-vae_final.pdf

³³ Esteban, A., Anzueto, A., Frutos, F., Alia, I., Brochard, L., Stewart, T. E., . . . Mechanical Ventilation International Study, G. (2002). Characteristics and outcomes in adult patients receiving mechanical ventilation: a 28-day international study. *JAMA*, 287(3), 345-355. Retrieved from <http://jama.jamanetwork.com/data/Journals/JAMA/4816/JCE10020.pdf>

³⁴ Klompas, M., Khan, Y., Kleinman, K., Evans, R. S., Lloyd, J. F., Stevenson, K., ... & CDC Prevention Epicenters Program. (2011). Multicenter evaluation of a novel surveillance paradigm for complications of mechanical ventilation. *PLoS One*, 6(3), e18062.

³⁵ Rubenfeld, G. D., Caldwell, E., Peabody, E., Weaver, J., Martin, D. P., Neff, M., ... & Hudson, L. D. (2005). Incidence and outcomes of acute lung injury. *New England Journal of Medicine*, 353(16), 1685-1693.

³⁶ MedPAC (2014). Chapter 10. Long-term Care Hospital Services. In: Report to the Congress: Medicare Payment Policy. Washington, DC, Medicare Payment Advisory Commission.

1.3 percent of all LTCH discharges. Together, the two diagnosis-related groups account for a total of nearly 18,000 discharges. Furthermore, the number of ventilated patients in LTCHs has increased. The number of discharged patients with respiratory diagnosis with ventilator support for 96 or more hours increased 7.4 percent between 2008 and 2011.³⁶

Functional improvement is particularly relevant for patients who require ventilator support because these patients have traditionally had limited mobility due to cardiovascular and pulmonary instability, delirium, sedation, lack of rehabilitation therapy staff, and lack of physician referral.³⁷ To mitigate these adverse consequences, traditional practices of bed rest and immobility have been challenged in recent years, and early mobility and rehabilitation have been increasingly recognized as important to improve patients' long-term functional outcomes,³⁸⁻³⁹⁻⁴⁰ with recovery of function being described as both desirable and possible.⁴¹ Functional improvement is particularly relevant for patients who require ventilator support because these patients traditionally have limited or no mobility because of cardiovascular and pulmonary instability, delirium, sedation, lack of rehabilitation therapy staff, and lack of physician referral.³⁷

An increasing body of evidence has reported on the safety and feasibility of early mobilization and rehabilitation of critically ill, but stable, patients in LTCH and ICU settings, with minimal adverse events and risk to the patient.³⁷⁻³⁸⁻⁴²⁻⁴³⁻⁴⁴⁻⁴⁵ Early mobility and rehabilitation in these settings have been associated with several improved patient outcomes. Reported benefits of early mobility and rehabilitation include (1) improved strength³⁹⁻⁴⁰⁻⁴⁴ and functional status;⁴⁰⁻⁴²⁻⁴⁴ (2) earlier achievement of mobilization milestones, such as out of bed mobilization;⁴²⁻⁴⁶ (3) improvement in mobility and self-care function scores from admission to discharge;⁴⁰⁻⁴⁷ (4) greater incidence of return to functional baseline in mobility and self-care, greater unassisted walking and walking distances, and improved self-reported physical function scores at hospital discharge compared with persons not participating in early mobility and

³⁷ Zanni JM, Korupolu R, Fan E, et al. Rehabilitation therapy and outcomes in acute respiratory failure: an observational pilot project. *Journal of Critical Care*. Jun 2010;25(2):254-262.

³⁸ Drolet A, DeJulio P, Harkless S, et al. Move to improve: the feasibility of using an early mobility protocol to increase ambulation in the intensive and intermediate care settings. *Physical Therapy*. 2013;93(2):197-207.

³⁹ Dang SL. ABCDEs of ICU: Early mobility. *Critical Care Nursing Quarterly*. 2013;36(2):163-168.

⁴⁰ Li Z, Peng X, Zhu B, Zhang Y, Xi X. Active mobilization for mechanically ventilated patients: a systematic review. *Archives of Physical Medicine and Rehabilitation*. 2013;94(3):551-561.

⁴¹ Rochester CL. Rehabilitation in the intensive care unit. *Seminars in Respiratory and Critical Care Medicine*. Dec 2009;30(6):656-669.

⁴² Adler J, Malone D. Early mobilization in the intensive care unit: a systematic review. *Cardiopulmonary Physical Therapy Journal*. Mar 2012;23(1):5-13.

⁴³ Kress JP. Clinical trials of early mobilization of critically ill patients. *Critical Care Medicine*. 2009;37(10 Suppl).

⁴⁴ Schweickert WD, Kress JP. Implementing early mobilization interventions in mechanically ventilated patients in the ICU. *Chest*. Dec 2011;140(6):1612-1617.

⁴⁵ Schweickert WD, Pohlman MC, Pohlman AS, et al. Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial. *Lancet*. May 30 2009;373(9678):1874-1882.

⁴⁶ Morris PE. Moving our critically ill patients: mobility barriers and benefits. *Critical Care Clinics*. Jan 2007;23(1):1-20.

⁴⁷ Scheinhorn DJ, Hassenpflug MS, Votto JJ, et al. Post-ICU mechanical ventilation at 23 long-term care hospitals: a multicenter outcomes study. *Chest*. Jan 2007;131(1):85-93.

rehabilitation;⁴² (5) enhanced recovery of functional exercise capacity;³⁹ (6) improved self-perceived functional status;³⁹ (7) reduced physiological and cognitive complications;³⁹ and (8) improved cognitive function.⁴⁰ Early mobility and rehabilitation have also been associated with reduced ICU and hospital length of stay;^{39,40,42,43,44,48} reduced incidence of delirium and improved patient awareness;^{42,44} increased ventilator-free days and improved weaning outcomes;^{39,40,42} greater incidence of discharge home directly after hospitalization compared with patients not receiving early mobilization;^{45,48} and reduced hospital readmission or death in the year after hospitalization.^{42,44}

Mobility activities that are feasible to assess in LTCH and intensive care units include bed mobility, sitting at the edge of the bed, transferring from bed to chair, sitting in a chair, out-of-bed mobility, standing, and ambulation.^{42,45,46,49} In a sample of 103 patients with respiratory failure undergoing 1,449 activity events in a respiratory intensive care unit, more than one-half of the activity events were reported to be ambulation, and 40% of the activity events occurred in intubated, mechanically ventilated patients at the end of the respiratory intensive care unit stay. Moreover, 69.4% of survivors ambulated more than 100 feet, 8.2% ambulated less than 100 feet, 15.3% could sit in a chair, 4.7% could sit on the edge of the bed, and 2.4% did not accomplish any of these activities.⁴⁹

Several studies have examined functional improvement among patients in the long-term care setting. In a sample of 101 patients in LTCH (three-quarters were ventilator-dependent), median functional status scores using the Functional Status Score for the ICU (FSS-ICU; rolling, supine-to-sit transfers, unsupported sitting, sit-to-stand transfers, and ambulation) improved significantly from admission to discharge, with significant change in all five functional items. Physical therapy interventions focused on early mobilization and consisted of functional tasks, therapeutic exercise, and balance activities that varied according to each patient's individual impairments and limitations. Occupational therapy interventions primarily included cognitive assessment and retraining, activities of daily living-related training, and group therapy sessions for social, behavioral, and physical interventions. Discharge functional status scores were significantly different across five different discharge destinations (i.e., home, IRF, SNF, nursing facility/hospice/expired, and short-stay acute care hospital transfer), highlighting the association of functional status with discharge disposition. A small effect size (0.25) for rehabilitation (physical therapy and occupational therapy) was noted for the entire LTCH sample, and large effect sizes (0.80–0.91) were noted for patients discharged to home, IRF, or SNF.⁵⁰

In a sample of 103 patients with respiratory failure undergoing 1,449 activity events in a respiratory ICU, more than one-half of the activity events were reported to be ambulation, and 40% occurred in intubated, mechanically ventilated patients. At the end of the respiratory ICU stay, 69.4% of survivors ambulated more than 100 feet, 8.2% ambulated less than 100 feet,

⁴⁸ Engel HJ, Needham DM, Morris PE, Gropper MA. ICU early mobilization: from recommendation to implementation at three medical centers. *Critical Care Medicine*. Sep 2013;41(9 Suppl 1):S69-80.

⁴⁹ Bailey P, Thomsen GE, Spuhler VJ, et al. Early activity is feasible and safe in respiratory failure patients. *Critical Care Medicine*. 2007;35(1):139-145.

⁵⁰ Thrush A, Rozek M, Dekerlegand JL. The clinical utility of the functional status score for the intensive care unit (FSS-ICU) at a long-term acute care hospital: a prospective cohort study. *Physical Therapy*. 2012;92(12):1536-1545.

15.3% could sit in a chair, 4.7% could sit on the edge of the bed, and 2.4% did not accomplish any of these activities.⁴⁹

The importance of monitoring improvement in mobility skills among LTCH patients who require ventilator support at the time of admission is also supported by the high prevalence of therapy service provision as part of the treatment plan and the percentage of patients discharged home after an LTCH stay. In a study of 1,419 ventilator-dependent patients from 23 LTCHs with weaning programs,⁴⁷ physical therapy, occupational therapy, and speech therapy were the three most commonly provided services among 34 procedures, services, and treatments provided during the LTCH admission. The very high frequency of physical (84.8%), occupational (81.5%), and speech (79.7%) therapy reflects use of the rehabilitative model of care adopted by many post-ICU weaning programs, which is important in restoration of function. Improvement in functional status, including mobility and self-care, was noted from admission to discharge. Nearly 30% of all patients discharged alive returned directly home or to assisted living.⁴⁷

2.3.3 Target Population

The target population (denominator) for this quality measure is the number of LTCH patients requiring ventilator support at the time of admission to the LTCH. The denominator includes all LTCH patients discharged during the target time period, including patients age 21 and older with all payer sources.

Denominator Exclusions

1. Incomplete stays:
 - a. Patient was discharged (A2110) to hospital emergency department (A2110 = [04]), short-stay acute hospital (A2110 = [05]), or psychiatric hospital or unit (A2110 = [08]).
 - b. Patient transferred to another LTCH facility (A2110 = [06]).
 - c. Patient left the LTCH against medical advice (A2110 = [12]).
 - d. Patient had an unplanned discharge or expired (A0250 = [11, 12]).
 - e. Length of stay is less than 3 days: Discharge Date (A0270) – Admission Date (A0220) < 3 days.
2. Patient is younger than 21 years: Truncate(Admission Date (A0220) – Birth Date (A0900)). Use exact values in calculating age; do not round to nearest whole number.
3. Patient is discharged to hospice (A2110 = [10]).
4. Patient is in a coma, persistent vegetative state, complete tetraplegia, or locked-in syndrome.
 - 4.1 Items used to identify these patient records (on admission assessment):
 - Comatose (B0100 = [1])
 - Complete Tetraplegia (I5101 = [1])
 - Locked-In State (I5460 = [1])

Severe Anoxic Brain Damage, Cerebral Edema, or Compression of Brain
(I5470 = [1])

5. Patient has a progressive neurological condition, including amyotrophic lateral sclerosis, multiple sclerosis, Parkinson's disease, or Huntington's chorea.

5.1 Items used to identify these patient records (on admission assessment):

Multiple Sclerosis (I5200 = [1])
Huntington's Disease (I5250 = [1])
Parkinson's Disease (I5300 = [1])
Amyotrophic Lateral Sclerosis (I5450 = [1])

6. Patient is coded as independent on **all** mobility items on admission.

Roll left and right (GG0170A1 = [06])
Sit to lying (GG0170B1 = [06])
Lying to sitting on side of bed (GG0170C1 = [06])
Sit to stand (GG0170D1 = [06])
Chair/bed-to-chair transfer (GG0170E1 = [06])
Toilet transfer (GG0170F1 = [06])
Walk 50 feet with two turns (GG0170J1 = [06])
Walk 150 feet (GG0170K1 = [06])

2.3.4 Items Included in the Quality Measure

For this quality measure, the following mobility items are collected at admission and 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.

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.

Mobility Rating Scale: Codes and Code Definitions

- 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

Patients treated in LTCHs vary in terms of underlying medical condition, 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,⁵¹ 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*.⁵²

The list of risk adjustment variables is outlined below.

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 LTCH CARE Data Set 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 LTCH admission**
 - <55 years
 - 55–64 years
 - 65–74 years (reference category)
 - 75–84 years
 - 85+ years
- **Communication Impairment**
 - Moderate to Severe
- **Prior functioning: indoor ambulation**
 - Dependent
 - Some help
- **Prior Device Use**
 - Manual Wheelchair or Motorized and/or Scooter

⁵¹ http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Reports/Research-Reports-Items/PAC_Payment_Reform_Demo_Final.html 

⁵² <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/CARE-Item-Set-and-B-CARE.html> 

- Mechanical Lift
- **Primary Medical Condition Category**
 - Chronic respiratory condition
 - Acute onset and chronic respiratory conditions
 - Chronic cardiac condition
 - Other medical condition
- **Presence of Stage 3, 4, or unstageable pressure ulcer/injury**
- **Total Parenteral Nutrition on Admission**
- **Comorbidities**
 - Severe and Metastatic Cancers
 - Dialysis and Chronic Kidney Disease, Stage 5
 - Acute Renal Failure
 - Major Infections: Septicemia, Sepsis, Systematic Inflammatory Response Syndrome/Shock, Central Nervous System Infections, Opportunistic Infections, Bone/Joint/Muscle Infections/Necrosis
 - Diabetes Mellitus (DM)
 - Major Lower Limb Amputation
 - Stroke, Hemiplegia or Hemiparesis
 - Dementia
 - Paraplegia, Incomplete Tetraplegia, Other Spinal Cord Disorder/Injury
 - Malnutrition (protein or calorie)

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: 8 to 48).
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: 8 to 48).

3. Identify and count the included patient stays (target population). Identify patients requiring invasive ventilator support at the time of LTCH admission using the following items:
 - Invasive Mechanical Ventilation Support: weaning (O0150A = [1]) or
 - Invasive Mechanical Ventilation Support: non-weaning (O0150A = [2])
4. Identify the records of patients who meet the exclusion criteria and exclude them from analyses.
5. 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.
6. 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).
7. Calculate an average observed change in mobility score for each LTCH (using the patient data calculated in step 5). This is the facility-level observed change in mobility score.
8. Calculate an average expected change in mobility score for each LTCH (using the patient data from step 6). This is the facility-level expected change in mobility score.
9. 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.
10. Multiply each LTCH's ratio by the national average change in mobility score. This is the risk-adjusted mean change in mobility score.

**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	✓	✓	—	✓

(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
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	✓	✓	—	✓
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?	✓	✓	✓	✓

(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
GG0170R*	Wheel 50 feet with two turns	✓	✓	✓	✓
GG0170R R*	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 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

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.

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

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.

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 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.

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

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.

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

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.

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.

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.

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