Proposed Specifications for LTCH QRP
Quality Measures and Standardized Data
Elements

Prepared for

Center for Clinical Standards and Quality
Centers for Medicare & Medicaid Services
Mail Stop C3-19-26
7500 Security Boulevard
Baltimore, MD 21244-1850

Prepared by

RTI International
3040 Cornwallis Road
Research Triangle Park, NC 27709
CMS Contract No. HHSM-500-2013-13015I

RAND Corporation
1776 Main Street
Santa Monica, California 90401-3208
CMS Contract No. HHSM-500-2013-13014I
# Table of Contents

Chapter 1 Introduction .......................................................................................................................... 1

Chapter 2 IMPACT Act Measures Beginning with the FY 2020 LTCH QRP ........................................ 3
  Section 1: Cross-Setting Measures Development Work: An Introduction ........................................ 3
  Section 2: Cross-Setting Pressure Ulcer Measure: Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury .......................................................................................................................... 3
    Measure Description .......................................................................................................................... 3
    Purpose/Rationale for the Quality Measure ...................................................................................... 4
    Denominator .................................................................................................................................... 7
    Denominator Exclusions ................................................................................................................... 8
    Numerator ....................................................................................................................................... 8
    Measure Time Window .................................................................................................................... 9
    Items Included in the Quality Measure .......................................................................................... 10
    Risk Adjustment Covariates ......................................................................................................... 13
    Quality Measure Calculation Algorithm ......................................................................................... 16

Chapter 3 Ventilator Weaning (Liberation) Measures Beginning with the FY 2020 LTCH QRP .......... 19
  Section 1: Compliance with Spontaneous Breathing Trial (SBT) by Day 2 of the LTCH Stay .......... 19
    Measure Description ....................................................................................................................... 19
    Purpose/Rationale for the Quality Measure .................................................................................... 20
    Denominator .................................................................................................................................. 24
    Denominator Exclusions ................................................................................................................ 25
    Numerator ..................................................................................................................................... 25
    Items Included in the Quality Measure .......................................................................................... 26
    Risk Adjustment ............................................................................................................................ 26
    Quality Measure Calculation Algorithm ......................................................................................... 26
  Section 2: Ventilator Liberation Rate ................................................................................................ 28
    Measure Description ....................................................................................................................... 28
    Purpose/Rationale for the Quality Measure .................................................................................... 29
    Denominator .................................................................................................................................. 31
    Denominator Exclusions ................................................................................................................ 32
    Numerator ..................................................................................................................................... 32
    Items Included in the Quality Measure .......................................................................................... 33
    Risk Adjustment ............................................................................................................................ 33
    Quality Measure Calculation Algorithm ......................................................................................... 35

Chapter 4 Standardized Data Elements ................................................................................................. 37
  Section 1: Standardized Patient Assessment Data Element Work: An Introduction ......................... 37
  Section 2: Functional Status ............................................................................................................ 38
Section 3: Cognitive Function ................................................................................................................ 39
Standardized Data Elements to Assess Cognitive Impairment .......................................................... 40
Brief Interview for Mental Status (BIMS) .......................................................................................... 40
Confusion Assessment Method (CAM©) ............................................................................................. 42
Behavioral Signs and Symptoms ....................................................................................................... 44
Mental Status (Depressed Mood) .......................................................................................................... 45
Standardized Data Elements to Assess Depressed Mood .................................................................. 46
Patient Health Questionnaire-2 (PHQ-2) ............................................................................................ 46
Section 4: Special Services, Treatments, and Interventions (Including Nutritional Approaches) ....... 48
Standardized Data Elements to Assess for Special Services, Treatments, and Interventions .......... 49
Chemotherapy (IV, Oral, Other) .......................................................................................................... 49
Radiation ............................................................................................................................................... 51
Oxygen Therapy (Continuous, Intermittent) ....................................................................................... 52
Suctioning (Scheduled, As Needed) .................................................................................................... 53
Tracheostomy Care .............................................................................................................................. 55
Invasive Mechanical Ventilation ........................................................................................................ 56
Non-invasive Mechanical Ventilation (Continuous Positive Airway Pressure [CPAP], Bilevel Positive Airway Pressure [BiPAP]) .......................................................... 58
IV Medications ..................................................................................................................................... 60
Transfusions ......................................................................................................................................... 61
Dialysis (Hemodialysis, Peritoneal dialysis) ...................................................................................... 62
IV Access .............................................................................................................................................. 64
Parenteral/IV Feeding ........................................................................................................................... 65
Feeding Tube ....................................................................................................................................... 66
Mechanically Altered Diet .................................................................................................................... 67
Therapeutic Diet ................................................................................................................................... 68
Section 5: Medical Conditions and Co-Morbidities .......................................................................... 70
Section 6: Impairments ........................................................................................................................... 70
Standardized Data Elements to Assess Hearing and Vision Impairments ....................................... 71
Hearing .................................................................................................................................................. 71
Vision ...................................................................................................................................................... 72

Appendix 1 Data Elements Used in Calculation of Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury .................................................................................................. 75
Appendix 2 Pressure Ulcer Quality Measure Item Standardization: Data Elements Collected for Calculation of Quality Measures used in SNF, LTCH, and IRF Quality Reporting Programs ........................................................................................................... 81
Appendix 3 Reliability and Validity of Items used to Calculate Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury ................................................................. 83
Chapter 1
Introduction

In this document, we present specifications for the following three (3) measures proposed for adoption for the LTCH QRP through the FY 2018 IPPS/LTCH PPS proposed rule:

1. Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury
2. Compliance with Spontaneous Breathing Trial (SBT) by Day 2 of the LTCH Stay
3. Ventilator Weaning (Liberation) Rate
Chapter 2
IMPACT Act Measures Beginning with the FY 2020 LTCH QRP

Section 1: Cross-Setting Measures Development Work: An Introduction

The Improving Medicare Post-Acute Care Transformation Act (IMPACT Act), enacted October 6, 2014, directs the Secretary of Health and Human Services to “specify quality measures on which Post-Acute Care (PAC) providers are required under the applicable reporting provisions to submit standardized patient assessment data” in several quality measure domains, including but not limited to incidence of major falls, skin integrity, and function. The IMPACT Act requires the implementation of quality measures to address these measure domains in Home Health Agencies (HHAs), Skilled Nursing Facilities (SNFs), Long-Term Care Hospitals (LTCHs), and Inpatient Rehabilitation Facilities (IRFs).

The IMPACT Act also requires, to the extent possible, the submission of such quality measure data through the use of a PAC assessment instrument and the modification of such instrument as necessary to enable such use. This requirement refers to the collection of such data by means of the Minimum Data Set (MDS) 3.0 for SNFs, the LTCH Continuity Assessment Record and Evaluation (CARE) Data Set for LTCHs, and the Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) for IRFs.

For more information on the statutory history of the SNF, LTCH, or IRF QRP, please refer to the FY 2015 final rules. More information on the IMPACT Act is available at https://www.govtrack.us/congress/bills/113/hr4994.

In this document, we present specifications for the following quality measure adopted for the QRP:

Outcome Measure: Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury, Measure Steward: CMS

Section 2: Cross-Setting Pressure Ulcer Measure: Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury

Measure Description

This quality measure reports the percent of patients/residents with Stage 2-4 pressure ulcers, or unstageable pressure ulcers due to slough/eschar, non-removable dressing/device, or deep tissue injury, that are new or worsened since admission. The measure is calculated using data from the MDS 3.0 assessment instrument for SNF residents, the LTCH CARE Data Set for LTCH patients, and the IRF-PAI for IRF patients. Data are collected separately in each of the three settings using standardized data elements. Data elements are referred to hereafter in this specification as items that have been harmonized across the MDS 3.0, LTCH CARE Data Set, and IRF-PAI. For residents or patients in SNFs, LTCHs and IRFs, this measure reports the percent of patient stays with reports of Stage 2-4 pressure ulcers, or unstageable pressure ulcers due to slough/eschar, non-removable dressing/device, or deep tissue injury, that were not present or were at a lesser stage on admission.

It is important to note that data collection and measure calculation for this measure are conducted separately for each of the three provider settings and will not be combined across settings. CMS is not comparing measures across provider settings.
For SNF residents, this measure is restricted to Medicare Part A residents. In IRFs, this measure is limited to Medicare (Part A and Medicare Advantage) patients. In LTCHs, this measure includes all patients.

**Purpose/Rationale for the Quality Measure**

This quality measure is proposed as a cross-setting quality measure to meet the requirements of the IMPACT Act of 2014 addressing the domain of skin integrity and changes in skin integrity. A pressure ulcer measure has previously been successfully implemented in NHs, SNFs, LTCHs and IRFs. The data for the pressure ulcer measure have been collected and submitted by LTCHs and IRFs (using the LTCH CARE Data Set and IRF-PAI, respectively) since October 1, 2012. Effective December 14, 2016, data for the pressure ulcer measure is publicly reported for LTCHs on CMS’ Long-Term Care Hospital Compare at: [https://www.medicare.gov/longtermcarehospitalcompare/](https://www.medicare.gov/longtermcarehospitalcompare/) and for IRFs on CMS’ Inpatient Rehabilitation Facility Compare at: [https://www.medicare.gov/inpatientrehabilitationfacilitycompare/](https://www.medicare.gov/inpatientrehabilitationfacilitycompare/).

In order to improve the quality measure and address recommendations provided by a cross-setting pressure ulcer Technical Expert Panel (TEP) and supported by the National Pressure Ulcer Advisory Panel (NPUAP), the quality measure has been modified in two ways. First, the measure has been modified to incorporate the addition of unstageable pressure ulcers due to slough or eschar, unstageable pressure ulcers due to non-removable dressing or device, and unstageable pressure ulcers presenting as deep tissue injuries in the numerator.

Second, the measure calculation has been amended to include M0300 items instead of M0800 items for the IRF QRP and LTCH QRP. This item calculation modification is intended to reduce redundancies in assessment items and facilitate cross-setting quality comparison as specified by the IMPACT Act. To reflect these two changes, the measure is being proposed for FY 2018 federal rulemaking as: Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury.

This measure is intended to encourage SNFs, LTCHs, and IRFs to prevent pressure ulcer development or worsening, and to closely monitor and appropriately treat existing pressure ulcers.

Pressure ulcers are recognized as a serious medical condition. Considerable evidence exists regarding the seriousness of pressure ulcers, and the relationship between pressure ulcers and pain, decreased quality of life, and increased mortality in aging populations.\(^1\)\(^2\)\(^3\)\(^4\) Pressure ulcers interfere with activities of daily living and functional gains made during rehabilitation, predispose patients to osteomyelitis and septicemia, and are strongly associated with longer hospital stays, longer IRF stays, and mortality.\(^5\)\(^6\)\(^7\) Additionally, patients with acute care hospitalizations related to pressure ulcers are more

---

likely to be discharged to long-term care facilities (e.g., a nursing facility, an intermediate care facility, or a nursing home) than hospitalizations for all other conditions.8,9

Pressure ulcers typically result from prolonged periods of uninterrupted pressure on the skin, soft tissue, muscle, or bone.10,11,12 Elderly individuals in SNFs, LTCHs, and IRFs have a wide range of impairments or medical conditions that increase their risk of developing pressure ulcers, including but not limited to, impaired mobility or sensation, malnutrition or under-nutrition, obesity, stroke, diabetes, dementia, cognitive impairments, circulatory diseases, and dehydration. The use of wheelchairs and medical devices (e.g., hearing aids, feeding tubes, tracheostomies, percutaneous endoscopic gastrostomy tubes), a history of pressure ulcers, or presence of a pressure ulcer at admission are additional factors that increase pressure ulcer risk in elderly patients.13,14,15,16,17,18,19,20,21

Pressure ulcers are high-cost adverse events across the spectrum of health care settings, from acute hospitals to home health.22,23,24 Pressure ulcer incidence rates vary considerably by clinical setting, ranging from 0.4% to 38% in acute care, 2.2% to 23.9% in SNFs and NHs, and 0% to 17% in home care.25 No national survey of pressure ulcer incidence or prevalence has been conducted in LTCHs or

---

IRFs. However, a study evaluating 2009 Medicare FFS claims data from post-acute care facilities found 15,995 secondary diagnosis claims of Stage 3 or 4 pressure ulcers in LTCHs; 2,342 secondary diagnosis claims of Stage 3 or 4 pressure ulcers in IRFs; and 9,939 secondary diagnosis claims of Stage 3 or Stage 4 pressure ulcers in SNFs. Additionally, analysis conducted by RTI International examined the national incidence of new or worsened Stage 2, 3, or 4 pressure ulcers in LTCHs, SNFs, or IRFs at discharge compared with admission using discharges from January through December 2015. In LTCHs, RTI found a national incidence of 0.95 percent of new or worsened Stage 2 pressure ulcers, 0.65 percent of Stage 3 pressure ulcers, and 0.48 percent of Stage 4 pressure ulcers. In SNFs, RTI found a national incidence of 1.28 percent of new or worsened Stage 2 pressure ulcers, 0.26 percent of new or worsened Stage 3 pressure ulcers, and 0.05 percent of new or worsened Stage 4 pressure ulcers. In IRFs, RTI found a national incidence of 0.56 percent of new or worsened Stage 2 pressure ulcers, 0.09 percent of new or worsened Stage 3 pressure ulcers, and 0.01 percent of new or worsened Stage 4 pressure ulcers.

Pressure ulcers that are unstageable due to slough or eschar, unstageable due to non-removable dressing or device, and unstageable presenting as deep tissue injuries (DTI) are also potentially avoidable and considered to be important indicators of quality of care. Furthermore, some studies indicate that DTIs, if managed using appropriate care, can be resolved without deteriorating into Stage 3, or Stage 4 pressure ulcers.

The rate of unstageable pressure ulcers varies according to the type of unstageable pressure ulcer and setting. An analysis conducted by RTI International examined the national incidence of new or worsened unstageable pressure ulcers in LTCHs, IRFs, or SNFs at discharge compared with admission using discharges from January through December 2015. In LTCHs, RTI found a national incidence of 1.15 percent of new unstageable pressure ulcers due to slough/eschar, 0.05 percent of new unstageable pressure ulcers due to non-removable dressing/device, and 1.01 percent of new DTIs. In SNFs, RTI found a national incidence of 0.40 percent of new unstageable pressure ulcers due to slough/eschar, 0.02 percent of new unstageable pressure ulcers due to non-removable dressing/device, and 0.57 percent of new DTIs. In IRFs, RTI found a national incidence of 0.14 percent of new unstageable pressure ulcers due to slough/eschar, 0.02 percent of new unstageable pressure ulcers due to non-removable dressing/device, and 0.26 percent of new DTIs. There is some evidence to suggest that the proportion of pressure ulcers identified as DTI has increased over time. An international study spanning the time 2006 to 2009 found DTIs increased by three-fold, to nine percent of all observed ulcers in 2009 and that DTIs were more prevalent than either Stage 3 or 4 ulcers. During the same time period, the proportion of Stage 1 and 2 ulcers decreased, and the proportion of Stage 3 and 4 ulcers remained constant.

As reported in the Federal Register, in 2006 the average cost for a hospital stay related to pressure ulcers was $40,381.30. As of 2010, the cost for treatment of Stage 4 hospital acquired pressure ulcers and complications averaged $129,248 per admission. Using data from 2009 and 2010, severe (Stage 3 and Stage 4) pressure ulcers acquired during a hospital stay were estimated to have increased CMS payments across 90-day episodes of care by at least $18.8 million a year.

The terminology and definitions developed by the National Pressure Ulcer Advisory Panel (NPUAP) for the care of pressure ulcers are often used to inform the PAC patient and resident assessment instruments and corresponding assessment manuals, specifically the IRF-PAI, the LTCH CARE Data Set, the MDS for SNFs, and the OASIS for HHAs. Considering the recent updates made by the NPUAP to their Pressure Ulcer Staging System, CMS intends to continue the adaptation of NPUAP terminology for coding the patient and resident assessment instruments. CMS will provide guidance which emphasizes that terminology related to these wounds may include injuries, as well as pressure ulcers, while retaining current holistic assessment instructions definitions and terminology. Further guidance and information on adaptation of the NPUAP guidelines, and definitions, and terminology, via assessment manuals and assessment instruments will be posted on the Web site at: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/LTCH-Quality-Reporting/LTCH-CARE-Data-Set-and-LTCH-QRP-Manual.html

**Denominator**

Specific denominator definitions for each setting are provided below.

**IRF Denominator**

The denominator is the total number of Medicare* (Part A and Medicare Advantage) patient stays with an IRF-PAI assessment in the measure target period, except those that meet the exclusion criteria.

*IRF-PAI data are submitted for Medicare patients (Part A and Medicare Advantage) only.

**LTCH Denominator**

The denominator is the number of patient stays with both an admission and planned or unplanned discharge LTCH CARE Data Set assessment with the discharge date in the measure target period, except those that meet the exclusion criteria.

**SNF Denominator**

The denominator is the number of Medicare Part A SNF stays in the selected time window for SNF residents ending during the selected time window, except those who meet the exclusion criteria.

---


Denominator Exclusions

Specific denominator exclusions for each setting are provided below.

IRF Numerator:
1. Patient stay is excluded if data on new or worsened Stage 2, 3, 4, and unstageable pressure ulcers, including deep tissue injuries, are missing at discharge; i.e., (M0300B1 = [-] or M0300B2 = [-]) and (M0300C1 = [-] or M0300C2 = [-]) and (M0300D1 = [-] or M0300D2 = [-]) and (M0300E1 = [-] or M0300E2 = [-]) and (M0300F1 = [-] or M0300F2 = [-]) and (M0300G1 = [-] or M0300G2 = [-]).
2. Patient stay is excluded if the patient died during the IRF stay; i.e., Item 44C = [0].

LTCH Numerator:
1. Patient stay is excluded if data on new or worsened Stage 2, 3, 4, and unstageable pressure ulcers, including deep tissue injuries, are missing on the planned or unplanned discharge assessment; i.e., (M0300B1 = [-] or M0300B2 = [-]) and (M0300C1 = [-] or M0300C2 = [-]) and (M0300D1 = [-] or M0300D2 = [-]) and (M0300E1 = [-] or M0300E2 = [-]) and (M0300F1 = [-] or M0300F2 = [-]) and (M0300G1 = [-] or M0300G2 = [-]).
2. Patient stay is excluded if the patient died during the LTCH stay; i.e., A0250 = [12].

SNF Numerator:
1. Resident stay is excluded if data on new or worsened Stage 2, 3, 4, and unstageable pressure ulcers, including deep tissue injuries are missing at discharge; i.e., (M0300B1 = [-] or M0300B2 = [-]) and (M0300C1 = [-] or M0300C2 = [-]) and (M0300D1 = [-] or M0300D2 = [-]) and (M0300E1 = [-] or M0300E2 = [-]) and (M0300F1 = [-] or M0300F2 = [-]) and (M0300G1 = [-] or M0300G2 = [-]).
2. Resident stay is excluded if the resident died during the SNF stay.

Numerator

Specific numerator definitions for each setting are provided below.

IRF Numerator

The numerator is the number of Medicare (Part A and Medicare Advantage) stays for which the IRF-PAI indicates one or more Stage 2-4 pressure ulcer(s), or unstageable pressure ulcers due to slough/eschar, non-removable dressing/device, or deep tissue injury, that are new or worsened at discharge compared to admission.

1) Stage 2 (M0300B1) - (M0300B2) > 0, OR
2) Stage 3 (M0300C1) - (M0300C2) > 0, OR
3) Stage 4 (M0300D1) - (M0300D2) > 0, OR
4) Unstageable – Non-removable dressing/device (M0300E1) - (M0300E2) > 0, OR
5) Unstageable – Slough and/or eschar (M0300F1) - (M0300F2) > 0, OR
6) Unstageable – Deep tissue injury (M0300G1) - (M0300G2) > 0
**LTCH Numerator**

The numerator is the number of stays for which the discharge assessment indicates one or more new or worsened Stage 2-4 pressure ulcers, or unstageable pressure ulcers due to slough/eschar, non-removable dressing/device, or deep tissue injury, compared to admission.

1) Stage 2 (M0300B1) - (M0300B2) > 0, OR  
2) Stage 3 (M0300C1) - (M0300C2) > 0, OR  
3) Stage 4 (M0300D1) - (M0300D2) > 0, OR  
4) Unstageable – Non-removable dressing/device (M0300E1) - (M0300E2) > 0, OR  
5) Unstageable – Slough and/or eschar (M0300F1) - (M0300F2) > 0, OR  
6) Unstageable – Deep tissue injury (M0300G1) - (M0300G2) > 0

**SNF Numerator**

The numerator is the number of complete resident Medicare Part A stays for which the discharge assessment indicates one or more new or worsened Stage 2-4 pressure ulcers, or unstageable pressure ulcers due to slough/eschar, non-removable dressing/device, or deep tissue injury, compared to admission.

1) Stage 2 (M0300B1) - (M0300B2) > 0, OR  
2) Stage 3 (M0300C1) - (M0300C2) > 0, OR  
3) Stage 4 (M0300D1) - (M0300D2) > 0, OR  
4) Unstageable – Non-removable dressing/device (M0300E1) - (M0300E2) > 0, OR  
5) Unstageable – Slough and/or eschar (M0300F1) - (M0300F2) > 0, OR  
6) Unstageable – Deep tissue injury (M0300G1) - (M0300G2) > 0

**Measure Time Window**

Specific measure time window descriptions for each setting are provided below.

**IRF Time Window**

The measure will be calculated quarterly using a rolling 12 months of data. For public reporting, the quality measure score reported for each quarter is calculated using a rolling 12 months of data. All IRF records, except those that meet the exclusion criteria, during the 12 months will be included in the denominator and are eligible for inclusion in the numerator. For patients with multiple records during the 12-month time window, each record is eligible for inclusion in the measure.

**LTCH Time Window**

The measure will be calculated quarterly using a rolling 12 months of data. For public reporting, the quality measure score reported for each quarter is calculated using a rolling 12 months of data. All LTCH stays, except those that meet the exclusion criteria, during the 12 months are included in the denominator and are eligible for inclusion in the numerator. For patients with multiple stays during the 12-month time window, each stay is eligible for inclusion in the measure.
**SNF Time Window**

The measure will be calculated quarterly using a rolling 12 months of data. For public reporting, the quality measure score reported for each quarter is calculated using a rolling 12 months of data. All Medicare Part A SNF stays, except those that meet the exclusion criteria, during the 12 months are included in the denominator and are eligible for inclusion in the numerator. For residents with multiple stays during the 12-month time window, each stay is eligible for inclusion in the measure.

**Items Included in the Quality Measure**

See **Appendix 1** for a summary of the M0300 items in instruments across settings.

**IRF Items:**

- Items from the time of discharge:
  - M0300B1 (Number of Stage 2 pressure ulcers), M0300B2 (Number of these Stage 2 pressure ulcers that were present upon admission),
  - M0300C1 (Number of Stage 3 pressure ulcers), M0300C2 (Number of these Stage 3 pressure ulcers that were present upon admission),
  - M0300D1 (Number of Stage 4 pressure ulcers), M0300D2 (Number of these Stage 4 pressure ulcers that were present upon admission),
  - M0300E1 (Number of unstageable pressure ulcers due to non-removable dressing/device), M0300E2 (Number of these unstageable pressure ulcers that were present upon admission),
  - M0300F1 (Number of unstageable pressure ulcers due to coverage of wound bed by slough and/or eschar), M0300F2 (Number of these unstageable pressure ulcers that were present upon admission),
  - M0300G1 (Number of unstageable pressure ulcers with suspected deep tissue injury in evolution), M0300G2 (Number of these unstageable pressure ulcers that were present upon admission).

- In addition, items from the time of admission used to risk-adjust this quality measure:
  1. Functional Mobility Admission Performance:
     a. For stays with a discharge date prior to 10/1/2017:
        FIM® Item (39I) Transfers: Bed, Chair, and Wheelchair on admission;
     b. For stays with a discharge date on or after 10/1/2017:
        GG0170C (Functional Mobility Admission Performance; Lying to Sitting on Side of Bed);
  2. Bowel Continence
     a. For stays with a discharge date prior to 10/1/2017 - Using 2014 IRF-PAI (Version 1.2) or 2015 IRF-PAI (Version 1.3) or 2016 IRF-PAI (Version 1.4):
        FIM® Item (32) Bowel Frequency of Accidents;
b. For stays on and after 10/1/2017 - Using 2016 IRF-PAI (Version 1.4):
   H0400 (Bowel Continence);

3. Peripheral Vascular Disease / Peripheral Arterial Disease or Diabetes Mellitus:
   a. For stays with a discharge date prior to 10/1/2016 - Using 2014 IRF-PAI (Version 1.2) or 2015 IRF-PAI (Version 1.3):
      I0900A, I0900B, I2900A (Peripheral Vascular Disease or Peripheral Arterial Disease or Diabetes);
   b. For stays with a discharge date on or after 10/1/2016 - Using 2016 IRF-PAI (Version 1.4):
      I0900 (Peripheral Vascular Disease (PVD) or Peripheral Arterial Disease (PAD); or
      I2900 (Diabetes Mellitus);

4. Low Body Mass Index, based on Height (25A) and Weight (26A) at admission:
   - 25A (Height); and
   - 26A (Weight).

**LTCH Items:**
- Items from the planned or unplanned discharge assessment:
  - M0300B1 (Number of Stage 2 pressure ulcers), M0300B2 (Number of these Stage 2 pressure ulcers that were present upon admission),
  - M0300C1 (Number of Stage 3 pressure ulcers), M0300C2 (Number of these Stage 3 pressure ulcers that were present upon admission),
  - M0300D1 (Number of Stage 4 pressure ulcers), M0300D2 (Number of these Stage 4 pressure ulcers that were present upon admission),
  - M0300E1 (Number of unstageable pressure ulcers due to non-removable dressing/device), M0300E2 (Number of these unstageable pressure ulcers that were present upon admission),
  - M0300F1 (Number of unstageable pressure ulcers due to coverage of wound bed by slough and/or eschar), M0300F2 (Number of these unstageable pressure ulcers that were present upon admission),
  - M0300G1 (Number of unstageable pressure ulcers with suspected deep tissue injury in evolution), M0300G2 (Number of these unstageable pressure ulcers that were present upon admission).
- In addition, items from the admission assessment used to risk-adjust this quality measure:
  1. Functional Mobility Admission Performance:
     a. For stays with a target date prior to 4/1/2016:
        GG0160C (Functional Mobility; Lying to Sitting on Side of Bed);
     b. For stays with a target date on or after 4/1/2016:
        GG0170C (Functional Mobility; Lying to Sitting on Side of Bed);
2. Bowel Continence:
   - H0400 (Bowel Continence);
3. Peripheral Vascular Disease / Peripheral Arterial Disease or Diabetes Mellitus:
   a. I0900 (Peripheral Vascular Disease (PVD) or Peripheral Arterial Disease (PAD)); or
   b. I2900 (Diabetes Mellitus),
4. Low Body Mass Index, based on Height and Weight:
   - K0200A (Height); and
   - K0200B (Weight).

**SNF Items:**

- Items from the discharge assessment:
  - M0300B1 (Number of Stage 2 pressure ulcers), M0300B2 (Number of these Stage 2 pressure ulcers that were present upon admission/entry or reentry),
  - M0300C1 (Number of Stage 3 pressure ulcers), M0300C2 (Number of these Stage 3 pressure ulcers that were present upon admission/entry or reentry),
  - M0300D1 (Number of Stage 4 pressure ulcers), M0300D2 (Number of these Stage 4 pressure ulcers that were present upon admission/entry or reentry),
  - M0300E1 (Number of unstageable pressure ulcers due to non-removable dressing/device), M0300E2 (Number of these unstageable pressure ulcers that were present upon admission/entry or reentry),
  - M0300F1 (Number of unstageable pressure ulcers due to coverage of wound bed by slough and/or eschar), M0300F2 (Number of these unstageable pressure ulcers that were present upon admission/entry or reentry),
  - M0300G1 (Number of unstageable pressure ulcers with suspected deep tissue injury in evolution), M0300G2 (Number of these unstageable pressure ulcers that were present upon admission/entry or reentry).
- In addition, items from the PPS 5-Day assessment used to risk-adjust this quality measure:
  1. Functional Mobility Admission Performance:
     a. For stays with a target date prior to 10/1/2018:
        - G0110A1 (Activities of Daily Living (ADL) Assistance: Bed mobility Self-Performance);
     b. For stays with a target date on or after 10/1/2018:
        - GG0170C (Mobility; Lying to Sitting on Side of Bed);
  2. Bowel Continence:
     - H0400 (Bowel Continence);
  3. Peripheral Vascular Disease / Peripheral Arterial Disease or Diabetes Mellitus:
     a. I0900 (Peripheral Vascular Disease (PVD) or Peripheral Arterial Disease (PAD)); or
     b. I2900 (Diabetes Mellitus),
4. Low Body Mass Index, based on Height and Weight:
   K0200A (Height); and
   K0200B (Weight).

**Risk Adjustment Covariates**

Specific covariate definitions for each setting are provided below.

**IRF Risk Adjustment Covariates**

For each patient stay covariate values are assigned either ‘0’ for covariate condition not present or ‘1’ for covariate condition present as reported at admission.

1. Functional Mobility Admission Performance:
   a. For stays with a discharge date prior to 10/1/2017:
      Indicator of minimal or more assistance for the FIM® Item (39I) Transfers: Bed, Chair, and Wheelchair on admission:
      Covariate = [1] (yes) if 39I FIM Levels = [0, 1, 2, 3, 4] ([0]= Activity does not occur, [1] = Total Assistance (Subject less than 25%), [2]=Maximal Assistance (Subject = 25% or more), [3] = Moderate Assistance (Subject = 50% or more), [4] = Minimal Assistance (Subject = 75% or more))
      Covariate = [0] (no) if 39I FIM Levels = [5, 6, 7, -, ^]( [5] = Supervision (Subject = 100%), [6]= Modified Independence (Device), [7] =Complete Independence (Timely, Safely), [-] = No response available, [^] = Valid skip)
   b. For stays with a discharge date on or after 10/1/2017:
      Indicator of supervision/touching assistance or more assistance for the functional mobility item Lying to Sitting on Side of Bed at admission:
      Covariate = [1] (yes) if GG0170C = [01, 02, 03, 04, 07, 09, 88] ([01] = Dependent, [02] = Substantial/maximal assistance, [03] = Partial/moderate assistance, [04] = Supervision or touching assistance, [07] = Patient refused, [09] = Not applicable, [88] = (activity) not attempted due to medical condition or safety concerns)
      Covariate = [0] (no) if GG0170C= [05, 06, -, ^] ([05] = Setup or clean-up assistance, [06] = Independent, [-] = No response available, [^] = Valid skip)

2. Bowel Continence
   a. For stays with a discharge date prior to 10/1/2017 - Using 2014 IRF-PAI (Version 1.2) or 2015 IRF-PAI (Version 1.3) or 2016 IRF-PAI (Version 1.4):
      Bowel Continence on admission for the FIM® Item (32) Bowel Frequency of Accidents:
      Covariate = [0] (no) if Item 32 = [6, 7, -, ^] ([6] = No accidents; uses device such as an ostomy, [7] = No accidents, [-]=No response available, [^] = Valid skip)
b. For stays on and after 10/1/2017 - Using 2016 IRF-PAI (Version 1.4):

Bowel Continence (H0400) at admission


Covariate = [0] (no) if H0400 = [0, 9, - , ^\] ([0] = Always continent, [9] = Not rated, [- ] = No response available, [\^] = Valid skip)

3. Peripheral Vascular Disease / Peripheral Arterial Disease or Diabetes Mellitus:

a. For stays with a discharge date prior to 10/1/2016 - Using 2014 IRF-PAI (Version 1.2) or 2015 IRF-PAI (Version 1.3):

Covariate = [1] (yes) if any of the following are true:


b. I0900B = [1] (checked)


Covariate = [0] (no) if I0900A = [0, - ] AND I0900B= [0, - ] AND I2900A = [0, - ] ([0] = No, [-] = No response available)

b. For stays with a discharge date on or after 10/1/2016 - Using 2016 IRF-PAI (Version 1.4):

Covariate = [1] (yes) if any of the following are true:

1. I0900 = [1] (checked)

2. I2900 = [1] (checked)

Covariate = [0] (no) if I0900 = [0, - ] AND I2900 = [0, - ] ([0] = No, [-] = No response available)

3. Low Body Mass Index, based on Height and Weight:

Covariate = [1] (yes) if BMI ≥ [12.0] AND ≤ [19.0]

Covariate = [0] (no) if BMI < [12.0] OR > [19.0]

Covariate = [0] (no) if 25A = [-] OR 26A = [-] ([-) = No response available)

Where: BMI = (weight * 703 / height²) = ([26A] * 703) / (25A²) and the resulting value is rounded to one decimal place.

**LTCH Risk Adjustment Covariates**

For each patient stay covariate values are assigned, either ‘0’ for covariate condition not present or ‘1’ for covariate condition present, as reported on the admission assessment.

1. Functional Mobility Admission Performance:

a. For stays with a target date prior to 4/1/2016:

Supervision/touching assistance or more for the functional mobility item Lying to Sitting on Side of Bed

Covariate = [1] (yes) if GG0160C = [01, 02, 03, 04, 07, 09, 88] ([01] = Dependent, [02] = Substantial/maximal assistance, [03] = Partial/moderate assistance, [04] = Supervision or touching assistance, [07] = Patient refused, [09] = Not applicable, [88] = (activity) not attempted due to medical condition or safety concerns)
Covariate = [0] (no) if GG0160C = [05, 06, - , ^] ([05] = Set-up or clean-up assistance, [06] = Independent, [-] = No response available, [^] = Valid skip)

b. For stays with a target date on or after 4/1/2016:

Supervision/touching assistance or more for the functional mobility item Lying to Sitting on Side of Bed

Covariate = [1] (yes) if GG0170C = [01, 02, 03, 04, 07, 09, 88] ([01] = Dependent, [02] = Substantial/maximal assistance, [03] = Partial/moderate assistance, [04] = Supervision or touching assistance, [07] = Patient refused, [09] = Not applicable, [88] = (activity) not attempted due to medical condition or safety concerns)

Covariate = [0] (no) if GG0170C = [05, 06, - , ^] ([05] = Setup or clean-up assistance, [06] = Independent, [-] = No response available, [^] = Valid skip)

2. Bowel Continence:


Covariate = [0] (no) if H0400 = [0, 9, - , ^] ([0] = Always continent, [9] = Not rated, [-] = No response available, [^] = Valid skip)

3. Peripheral Vascular Disease / Peripheral Arterial Disease or Diabetes Mellitus:

Covariate = [1] (yes) if any of the following are true:

3. I0900 = [1] (checked)
4. I2900 = [1] (checked)

Covariate = [0] (no) if I0900 = [0, -] AND I2900 = [0, -] ([0] = No, [-] = No response available)

4. Low Body Mass Index, based on Height and Weight on the Admission assessment:

Covariate = [1] (yes) if BMI ≥ [12.0] AND ≤ [19.0]

Covariate = [0] (no) if BMI < [12.0] OR BMI > [19.0]

Covariate = [0] (no) if K0200A = [-] OR K0200B = [-] (‘-‘ = No response available)

Where: BMI = (weight * 703 / height²) = ([K0200B] * 703) / (K0200A²) and the resulting value is rounded to one decimal place.

**SNF Risk Adjustment Covariates**

For each resident covariate values are assigned, either ‘0’ for covariate condition not present or ‘1’ for covariate condition present, as reported on the PPS 5-Day assessment.

1. Functional Mobility Admission Performance:

a. For stays with a target date prior to 10/1/2018:

Covariate = [1] (yes) if G0110A1 = [2, 3, 4, 7, 8] (2 – Limited assistance, 3 – Extensive assistance, 4 – Total dependence, 7 – activity occurred only once or twice, 8 – Activity did not occur)

Covariate = [0] (no) if G0110A1 = [0, 1, -] (0 – Independent, 1 – Supervision, ‘-’ – no response)
b. For stays with a target date on or after 10/1/2018:

   Covariate = [1] (yes) if GG0170C = [01, 02, 03, 04, 07, 09, 88] ([01] = Dependent, [02] = Substantial/maximal assistance, [03] = Partial/moderate assistance, [04] = Supervision or touching assistance, [07] = Resident refused, [09] = Not applicable, [88] = (activity) not attempted due to medical condition or safety concerns)

   Covariate = [0] (no) if GG0170C = [05, 06, -, ^] ([05] = Setup or clean-up assistance, [06] = Independent, [-] = No response available, [^] = Valid skip)

2. Bowel Continence:

   Covariate = [1] (yes) if H0400 = [1, 2, 3] (1 – Occasionally incontinent, 2 – Frequently incontinent, 3 – Always incontinent)

   Covariate = [0] (no) if H0400 = [0, 9, -, ^] (0 – Always continent, 9 – Not rated, ‘-‘ – No response available, [^] – Valid skip)

3. Peripheral Vascular Disease / Peripheral Arterial Disease or Diabetes Mellitus:

   Covariate = [1] (yes) if any of the following are true:
   a. Active Peripheral Vascular Disease (PVD) or Peripheral Arterial Disease (PAD) in the last 7 days (I0900 = [1] (checked))

   Covariate = [0] (no) if I0900 = [0, -] AND I2900 = [0, -]

4. Low Body Mass Index, based on Height and Weight:

   Covariate = [1] (yes) if BMI >= [12.0] AND <= [19.0]

   Covariate = [0] (no) if BMI < [12.0] OR BMI > [19.0]

   Covariate = [0] (no) if K0200A = [-] OR K0200B = [-] (‘-‘ = No response available)

   Where: BMI = \( \frac{\text{weight} \times 703}{\text{height}^2} \) = \( \frac{\text{(K0200B)} \times 703}{(\text{K0200A})^2} \) and the resulting value is rounded to one decimal place.

**Quality Measure Calculation Algorithm**

The following steps are used to calculate the measure:

**A. Calculate the facility observed score (steps 1 through 3)**

**Step 1.** Calculate the denominator count:

In the SNF setting, calculate the total number of complete Medicare Part A SNF stays ending in the measure time window, which do not meet the exclusion criteria.

In the LTCH setting, calculate the total number of stays with both an admission and discharge LTCH CARE Data Set assessment in the measure time window, which do not meet the exclusion criteria.

In the IRF setting, calculate the total number of stays with an IRF-PAI assessment in the measure time window, which do not meet the exclusion criteria.

**Step 2.** Calculate the numerator count:

In the SNF setting, calculate the total number of Medicare Part A SNF stays in the denominator with discharge assessment that indicates one or more new or worsened pressure ulcers.
In the LTCH setting, calculate the total number of patient stays whose discharge assessment indicates one or more new or worsened pressure ulcers compared to the admission assessment. In the IRF setting, calculate the total number of patient stays whose IRF-PAI assessment indicates one or more new or worsened pressure ulcers at discharge compared to admission.

**Step 3.** Calculate the facility’s observed score:
Divide the facility’s numerator count by its denominator count to obtain the facility’s observed score; that is, divide the result of step 2 by the result of step 1.

**B. Calculate the expected score for each patient/resident (steps 4 and 5)**

**Step 4.** Determine presence or absence of the pressure ulcer covariates for each patient/resident:
Assign covariate values, either ‘0’ for covariate condition not present or ‘1’ for covariate condition present, for each patient/resident for each of the four covariates as reported on the PPS 5-Day assessment for the SNF setting or the assessment at admission for the LTCH and IRF settings, as described in the Risk Adjustment section above.

**Step 5.** Calculate the expected score for each patient/resident with the following formula:

\[
\text{Patient-/resident-level expected QM score} = \frac{1}{1+e^{-X}}
\]

Where \(e\) is the base of natural logarithms and \(X\) is a linear combination of the constant and the logistic regression coefficients times the covariate scores (from Formula [2], below).

\[
X = B_0 + B_1 \cdot COVA + B_2 \cdot COVB + B_3 \cdot COVC + B_4 \cdot COVD
\]

Where \(B_0\) is the logistic regression constant, \(B_1\) is the logistic regression coefficient for the first covariate, \(COVA\) is the patient/resident-level score for the first covariate, \(B_2\) is the logistic regression coefficient for the second covariate, and \(COVB\) is the patient-/resident-level score for the second covariate, etc. The regression constant and regression coefficients* are numbers obtained through statistical logistic regression analysis.

* Regression coefficients and constants are calculated separately for each facility type (SNF, LTCH, and IRF) and are updated each reporting period.

**C. Calculate the facility-level expected score (step 6)**

**Step 6.** Once an expected QM score has been calculated for all resident or patient stays for the SNF, LTCH and IRF settings, calculate the facility-level expected QM score by averaging all resident-/patient-level expected scores.

**D. Calculate National mean observed QM score (steps 7 through 9)**

**Step 7.** Calculate the national denominator count:
Calculate the total number of resident or patient stays retained after exclusions and sum to derive the national denominator count.

**Step 8.** Calculate the national numerator count:
Calculate the total number of resident or patient stays that triggered the QM and sum to derive the national numerator count.

**Step 9.** Calculate National mean observed QM score:
Divide the numerator count by its denominator count to obtain the national mean observed score; that is, divide the result of step 8 by the result of step 7.
E. Calculate the Facility-level adjusted score (step 10)

**Step 10.** Calculate the facility-level adjusted score based on the:
- Facility-level observed QM score (step 3),
- Facility-level expected QM score (step 6), and
- National mean observed QM score (step 9).*

*The national mean observed QM score is updated separately for each facility type (SNF, LTCH, and IRF) for each reporting period.*

The calculation of the adjusted score uses the following equation:

\[ Adj = \frac{1}{1 + e^{-y}} \]  

where
- \( Adj \) is the facility-level adjusted QM score,
- \( y = (\ln(Obs/(1–Obs)) - \ln(Exp/(1–Exp)) + \ln(Nat/(1–Nat))) \)
- Obs is the facility-level observed QM score,
- Exp is the facility-level expected QM score,
- Nat is the national mean observed QM score,
- \( \ln \) indicates a natural logarithm, and
- e is the base of natural logarithm.
Chapter 3
Ventilator Weaning (Liberation) Measures Beginning with the FY 2020 LTCH QRP

This section describes draft specifications for two ventilator weaning (liberation) quality measures for Long-Term Care Hospitals (LTCHs). The Centers for Medicare & Medicaid Services (CMS) solicits public comments on these quality measure specifications to inform ongoing quality measure development and implementation for the CMS LTCH Quality Reporting Program (QRP). The quality measures described in this section focus on ventilator weaning processes and outcomes.

Section 3004(a) of the Affordable Care Act amended section 1886(m)(5) of the Act required the Secretary to establish the Long-Term Care Hospital Quality Reporting Program (LTCH QRP), to include quality measures specified by the Secretary in a form and manner, and at a time, specified by the Secretary. For a detailed discussion of the considerations we use for the selection of LTCH QRP quality measures, such as alignment with the CMS Quality Strategy, which incorporates the three broad aims of the National Quality Strategy, we refer readers to the FY 2015 IPPS/LTCH PPS final rule (79 FR 50286 through 50287) and the FY 2016 IPPS/LTCH PPS final rule (80 FR 49728).

Invasive mechanical ventilation care was identified through technical expert panels and public comment periods as a gap in the LTCH QRP measure set and aligns with the National Quality Strategy Priority and the CMS Quality Strategy Goal of “promoting the most effective prevention and treatment practices” by reducing the risk of complications from unnecessarily prolonged mechanical ventilation.

**Section 1: Compliance with Spontaneous Breathing Trial (SBT) by Day 2 of the LTCH Stay**

**Measure Description**

This measure assesses facility-level compliance with Spontaneous Breathing Trial (SBT), including Tracheostomy Collar Trial (TCT) or Continuous Positive Airway Pressure (CPAP) breathing trial, by Day 2 of the Long-Term Care Hospital (LTCH) stay for patients on invasive mechanical ventilation support upon admission, and for whom at admission weaning attempts were expected or anticipated. This measure is calculated and reported separately for the following two components:

Component 1, “Percentage of Patients Assessed for Readiness for SBT by Day 2 of LTCH Stay”: the percentage of patients who were assessed for readiness for SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH stay.

Component 2, “Percentage of Patients Ready for SBT Who Received SBT by Day 2 of LTCH Stay”: the percentage of patients found ready for SBT (including TCT or CPAP breathing trial) for whom an SBT (including TCT or CPAP breathing trial) was performed by Day 2 of LTCH stay.

Patients included in Component 2 comprise a subset of the population in Component 1. While all patients admitted on invasive mechanical ventilation are included in the denominator for Component 1, only those patients who were found ready for SBT (including TCT and CPAP breathing trial) are included in the denominator for Component 2.
Definitions

- **Invasive mechanical ventilation support** is defined as the use of a device to assist or control pulmonary ventilation, inclusive of the weaning period, either intermittently or continuously through a tracheostomy or by endotracheal intubation. Note: Lung expansion devices such as intermittent positive-pressure breathing (IPPB), nasal positive end-expiratory pressure (nasal PEEP), and continuous nasal positive airway pressure (CPAP, hypoCPAP) are not considered ventilators unless delivered via tracheostomy or endotracheal intubation (e.g., ET-CPAP).

- **Day 1 of the LTCH stay** is the day of admission.

- **Day 2 of the LTCH stay** is defined as the second day of the patient’s LTCH stay.

- “**Weaning**” patients are those patients on invasive mechanical ventilation upon admission to the LTCH, for whom weaning attempts are expected or anticipated at admission (e.g. patients admitted for the purpose of weaning).

- “**Non-weaning**” patients are those patients on invasive mechanical ventilation upon admission to the LTCH, for whom at admission weaning attempts are NOT expected or anticipated (e.g., patients who are chronically ventilated in the community or a facility, or have progressive neuromuscular disease such as amyotrophic lateral sclerosis, or irreversible neurological injury or disease or dysfunction such as high (C2) spinal cord injury). Consideration of a patient as non-weaning must be based on documentation found in the patient’s medical record at admission.

- **SBT** is a trial of unassisted breathing during the day and full ventilator support at night, administered to patients with endotracheal tubes. This includes TCT or CPAP breathing trial.

- **TCT** is a trial of unassisted breathing via a tracheostomy collar (mask) with aerosol (mist), administered to patients with tracheostomy tubes. TCT would apply only to patients with tracheostomy tubes.

- **CPAP breathing trial** is a trial of unassisted breathing for a certain period of time administered while the patient is wearing any type of continuous positive airway pressure respiratory support device that prevents the airways from closing by delivering slightly pressurized air through a mask continuously or via electronic cycling throughout the breathing cycle.

- “**Documentation**” indicates explicit physician, registered nurses, or respiratory therapist documentation of the reason that a patient was not deemed ready for SBT (including TCT or CPAP breathing trial) within the given time frame. Documentation must be dated by Day 2 of the LTCH stay.

**Purpose/Rationale for the Quality Measure**

This ventilator-related process quality measure, Compliance with Spontaneous Breathing Trial (SBT) by Day 2 of the LTCH Stay, is important for encouraging implementation of evidence-based weaning guidelines as early during the LTCH patient stay as is beneficial to patients, in order to decrease LTCH patient exposure to adverse ventilator-associated morbidity and mortality.
Patients on invasive mechanical ventilation comprise a substantial proportion of LTCH patient admissions, and thus present a critical focus for assessment of high quality care. In 2012, about 22,000 or 15.8% of all LTCH discharges received PMV services during the LTCH stay.33

Although often necessary for life support, invasive mechanical ventilation is not without risk of harm to patients, and these risks increase as duration of ventilation continues.34 35 36 Studies have shown that invasive mechanical ventilation of critically ill patients is associated with higher rates of mortality37 38 39 and morbidity, including ventilator-associated pneumonia,40 41 42 43 44 ventilator-associated lung

injury,45 46 47 ventilator-induced diaphragm dysfunction,48 49 psychological distress50 51 52 and post-traumatic stress disorder,53 disability54 and decreased functional status,55 56 and chronic critical illness syndrome.57 Mechanical ventilation is also associated with increased costs. Studies in the ICU setting indicate that patients who require mechanical ventilation can have up to 50% higher costs than patients who do not receive mechanical ventilation.58 Patients on prolonged ventilation (≥21 days) incur even greater health care costs; the estimated cost per one-year survival for patients who are ventilated for ≥ 21 days is $423,596.59

Discontinuation of invasive mechanical ventilation, known as weaning or liberation, is associated with improved patient health outcomes. In LTCHs, fewer days of mechanical ventilation may lead to decreased risk of ventilator-associated complications/events, enhanced rehabilitation opportunities, and shorter LOS.60 Ventilator liberation has been associated with lower post-discharge mortality, even among the elderly,61 62 and fewer days of mechanical ventilation may lead to decreased risk of ventilator-

associated complications/events, enhanced rehabilitation opportunities, and a shorter length of stay. However, prior studies have shown that some physicians may underestimate the probability of weaning success. Based on studies and observations of implementation of regular assessment for SBTs and weaning protocols in ICUs, adherence to the recommended weaning processes, including prompt assessment of weaning readiness and initiation of SBTs, appears quite variable, likely due to differences in clinicians’ intuitive thresholds for determination of patients’ readiness to wean. Clinician delays in recognizing that weaning may be possible and in beginning assessment of weaning readiness are two common causes of weaning delays.

In 2005, an international task force convened and developed recommendations to address the entire weaning process. This task force recommended that weaning be considered as soon as possible, because failure to assess the patient for readiness to wean may lead to undue prolonged mechanical ventilation, thus exposing patients unnecessarily to adverse ventilator-associated morbidity and mortality. Evidence continues to support early patient assessment using weaning criteria and performance of a spontaneous breathing trial as soon as it medically appropriate for the patient.

In a study of ventilator weaning in an LTCH by Jubran and colleagues, 32% of newly admitted LTCH patients on invasive mechanical ventilation were able to breathe unassisted during the first 5 days following admission, suggesting that many ICU patients sent to LTCHs for “failure to wean” from the ventilator may not have undergone ventilator weaning attempts during the latter part of their stay in an

---

69 Ibid.
76 Ibid.
ICU. That a substantial portion of newly admitted LTCH patients could be weaned within 5 days underscores the need to assess patients’ ability to breathe without assistance soon after admission, in order to identify individuals who are able to discontinue invasive mechanical ventilation.

Because invasive mechanical ventilation should be discontinued as soon as patients are capable of breathing independently, unnecessarily prolonged mechanical ventilation can be an indicator of poor quality care. This quality measure is designed to encourage adherence to evidence-based and consensus based guidelines through implementation of trials of unassisted breathing and early assessment of weaning criteria. The anticipated improvement in quality is an improvement in timeliness of weaning and ventilator liberation for patients admitted to LTCHs on invasive mechanical ventilation. Additionally, facilities can use results of this measure to improve early compliance with evidence-based weaning guidelines and develop ventilator weaning quality improvement programs.

**Denominator**

The target population for this measure is patients who were on invasive mechanical ventilation support upon admission to the LTCH, for whom weaning attempts were expected or anticipated at admission. If a patient has more than one LTCH stay during the reporting period, each discharge will be reported and included in the measure calculation. The denominator will be calculated separately according to each of the component groups below:

**Component 1, Percentage of Patients Assessed for Readiness for SBT by Day 2 of LTCH Stay**

The denominator for Component 1 is patients who were on invasive mechanical ventilation upon admission to an LTCH, for whom weaning attempts are expected or anticipated at admission.

**Component 2, Percentage of Patients Ready for SBT Who Received SBT by Day 2 of LTCH Stay**

The denominator for Component 2 is the subset of patients in the denominator of Component 1, who were assessed and deemed ready for SBT by Day 2 of the LTCH stay.

For patients with more than one LTCH stay during the reporting period, each admission and discharge is reported and included in the measure calculation. For example, if an LTCH patient is transferred to a short-stay acute care hospital for a procedure, surgery, or some other reason(s), returns to the LTCH within three (3) calendar days, and is subsequently discharged from the LTCH, this is considered one “patient stay.” However, if this patient’s “stay” at the short-stay acute care hospital exceeds three (3) calendar days, whereby day one begins on the day of transfer from the LTCH to the short-stay acute care hospital, regardless of the hour of transfer, then a new LTCH CARE Data Set Admission Assessment is conducted upon return of the patient to the LTCH, and a second LTCH CARE Data Set Discharge Assessment accompanies the second discharge. Admission and Discharge (Planned or Unplanned) Assessments are completed for this patient for the first stay, and Admission and Discharge (Planned or Unplanned) Assessments are completed for the second stay. Both stays for this patient are included in the measure calculation and reporting.

---


Denominator Exclusions

This measure (both Component 1 and Component 2) excludes patients with missing data and invasively mechanically ventilated patients identified as non-weaning at the time of admission to an LTCH. Patients who may be identified as non-weaning by LTCHs include patients who are considered chronically ventilated as defined by evidence-based guidelines for ventilator liberation80 or patients with an acute or chronic condition that negates any expectation or anticipation of weaning attempts at admission (e.g., amyotrophic lateral sclerosis, or severe neurological injury or disease or dysfunction such as high (C2) spinal cord injury). Consideration of a patient as non-weaning must be based on documentation found in the patient’s medical record.

After patient-level exclusions are applied, LTCHs with denominator counts of less than 20 in the sample during the reporting period will be excluded from public reporting, owing to small sample size.

Denominator exclusion details

Patients are excluded from the target population (i.e., denominator) if they meet either of the following criteria:

1. O0150A. Spontaneous Breathing Trial (SBT) (including Tracheostomy Collar or Continuous Positive Airway Pressure (CPAP) Breathing Trial) by Day 2 of LTCH Stay: Invasive Mechanical Ventilation Support upon Admission to the LTCH = 0 (i.e., No, not on invasive mechanical ventilation support), OR:

2. O0150A. Spontaneous Breathing Trial (SBT) (including Tracheostomy Collar or Continuous Positive Airway Pressure (CPAP) Breathing Trial) by Day 2 of LTCH Stay: Invasive Mechanical Ventilation Support upon Admission to the LTCH = 2, Yes, non-weaning (i.e., No weaning attempts are expected or anticipated at admission)

Numerator

The numerator represents patients admitted on invasive mechanical ventilation who were assessed for readiness for SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH stay and, if deemed ready, who received an SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH stay.

The numerator will be computed and reported separately according to each of the components below. Each component numerator is the number of patients in the following components:

Component 1, Percentage of Patients Assessed for Readiness for SBT by Day 2 of the LTCH Stay

The numerator represents the number of patients admitted on invasive mechanical ventilation during the reporting period who were assessed for readiness for SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH stay

For the purpose of this measure component, a patient is considered in the numerator if the LTCH reports, on the LTCH CARE Data Set Admission Assessment, either of the following combinations of items:

O0150B = 1 (Yes) AND O0150C = 1 (Yes). Assessed for readiness for SBT by day 2 of the LTCH stay and Deemed medically ready for a SBT by day 2 of the LTCH stay.

OR

O0150B = 1 (Yes) AND O0150D = 1 (Yes): Assessed for readiness for SBT by day 2 of the LTCH stay and documentation of reason(s) that patient was deemed medically unready for a SBT by day 2 of the LTCH stay.

The sum of the numbers of patients in these two groups represents the number of patients admitted on invasive mechanical ventilation who were assessed for readiness for SBT by day 2 of the LTCH stay, as reported on the Admission Assessment.

**Component 2, Percentage of Patients Ready for SBT Who Received SBT by Day 2 of LTCH Stay**

The numerator represents the number of patients admitted on invasive mechanical ventilation during the reporting period who were ready for SBT and who received an SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH stay.

For the purpose of this measure component, a patient is considered in the numerator if the LTCH reports on the LTCH CARE Data Set Admission Assessment item O0150E = 1 (Yes), SBT performed by day 2 of the LTCH stay.

Compliance with SBT (including TCT or CPAP breathing trial) by day 2 of LTCH stay is reported as a percentage and is calculated and reported for these two numerator components separately.

**Items Included in the Quality Measure**

For this quality measure, the following ventilator weaning items are assessed at the time of admission:

- O0150. Spontaneous Breathing Trial (SBT) (including Tracheostomy Collar or Continuous Positive Airway Pressure (CPAP) Breathing Trial) by Day 2 of LTCH Stay
- O0150A Invasive Mechanical Ventilation Support upon Admission to the LTCH
- O0150B Assessed for readiness for SBT by day 2 of the LTCH stay
- O0150C Deemed medically ready for SBT by day 2 of the LTCH stay
- O0150D Is there documentation of reason(s) in the patient’s medical record that the patient was deemed medically unready for SBT by day 2 of the LTCH stay?
- O0150E SBT performed by day 2 of the LTCH stay

**Risk Adjustment**

This measure is not risk-adjusted or stratified.

**Quality Measure Calculation Algorithm**

Component 1, Percentage of Patients Assessed for Readiness for SBT by Day 2 of LTCH Stay

\[ \frac{A + B}{C - D} \times 100 \]
where

A = Number of patients who were deemed ready for SBT by Day 2 of the LTCH Stay
B = Number of patients with documentation that the patient was deemed medically unready for SBT by Day 2 of the LTCH stay
C = All patients admitted on invasive mechanical ventilator support for any duration during the reporting period
D = Patients for whom weaning attempts were NOT expected or anticipated at admission

Steps for Calculation

1. Of patients admitted to the LTCH during the reporting period, identify all patients who were on invasive mechanical ventilation support upon admission to the LTCH. This is the target population.
2. Of patients identified in (1) above, identify the subset of patients for whom weaning attempts are not expected or anticipated at admission. These patients are excluded from the measure.
3. Of the patients identified in (1) above, identify the subset of patients for whom weaning attempts were expected or anticipated at admission. This is the denominator for Component 1 of the measure.
4. Of the patients identified in (3) above, identify the subset of patients who were found ready for SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH stay.
5. Of the patients identified in (3) above, identify the subset of patients who were assessed and documented as being unready for SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH stay.
6. The numerator for Component 1 is the sum of the number of patients identified in (4) and (5) above.
7. Calculate the percentage of patients who were assessed for SBT by Day 2 of the LTCH stay by dividing the number of patients in (6) by the number of patients in (3).

Component 2, Percentage of Patients Ready for SBT Who Received SBT by Day 2 of LTCH Stay

\[ \frac{E}{F} \times 100 \]

where

E = Number of patients who received an SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH Stay
F = Number of patients who were deemed ready for SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH Stay

1. The group of patients identified in (4) above is the denominator for Component 2 of the measure.
2. Of the patients identified in (8) above, identify the number of patients who received an SBT (including TCT or CPAP breathing trial) by Day 2 of the LTCH stay. This is the numerator for component 2 of the measure.
3. Divide the results of Step (9) by Step (8).
Section 2: Ventilator Liberation Rate

Measure Description

This measure reports facility-level Ventilator Liberation Rate for patients admitted to an LTCH requiring invasive mechanical ventilation support, and for whom weaning attempts were expected or anticipated as reported on the Admission Assessment. The Ventilator Liberation Rate is defined as the percentage of patients who are alive and fully weaned at discharge.

Data will be collected using items to be added to the LTCH CARE Data Set Admission, Planned Discharge and Unplanned Discharge Assessments. A patient is considered fully weaned if he or she does not require any invasive mechanical ventilation support for at least two consecutive calendar days immediately prior to the date of discharge.

Definitions

- **Invasive mechanical ventilation support** is defined as the use of a device to assist or control pulmonary ventilation, inclusive of the weaning period, either intermittently or continuously through a tracheostomy or by endotracheal intubation. Note: Lung expansion devices such as intermittent positive-pressure breathing (IPPB), nasal positive end-expiratory pressure (nasal PEEP), and continuous nasal positive airway pressure (CPAP, hypoCPAP) are not considered ventilators unless delivered via tracheostomy or endotracheal intubation (e.g., ET-CPAP).

- **Day 1 of the LTCH stay** is the day of admission.

- **Day 2 of the LTCH stay** is defined as the second day of the patient’s LTCH stay.

- “**Weaning**” patients are those patients on invasive mechanical ventilation upon admission to the LTCH, for whom weaning attempts are expected or anticipated at admission (e.g., patients admitted for the purpose of weaning).

- “**Non-weaning**” patients are those patients on invasive mechanical ventilation upon admission to the LTCH, for whom at admission weaning attempts are NOT expected or anticipated (e.g., patients who are chronically ventilated in the community or a facility, or have progressive neuromuscular disease such as amyotrophic lateral sclerosis, or irreversible neurological injury or disease or dysfunction such as high (C2) spinal cord injury). Consideration of a patient as non-weaning must be based on documentation found in the patient’s medical record at admission.

- **A patient is considered fully weaned** if he or she is alive and does not require any invasive mechanical ventilation support for at least two consecutive calendar days immediately prior to the day of discharge from the LTCH.

- **A patient is considered not fully weaned** if he or she is not alive or requires invasive mechanical ventilation support for any duration of time during the two consecutive calendar days immediately prior to the day of discharge from the LTCH.
Purpose/Rationale for the Quality Measure

Patients on invasive mechanical ventilation comprise a substantial proportion of LTCH patient admissions, and thus present a critical focus for assessment of high quality care. In 2012, about 22,000 or 15.8% of all LTCH discharges received PMV services during the LTCH stay.\(^1\)

Although often necessary for life support, invasive mechanical ventilation is not without risk of harm to patients, and these risks increase as duration of ventilation continues.\(^2\) \(^3\) \(^4\) Studies have shown that invasive mechanical ventilation of critically ill patients is associated with higher rates of mortality\(^5\) \(^6\) \(^7\) and morbidity, including ventilator-associated pneumonia,\(^8\) \(^9\) \(^10\) \(^11\) \(^12\) ventilator-associated lung

---

injury,93 94 95 ventilator induced diaphragm dysfunction,96 97 psychological distress98 99 100 and post-traumatic stress disorder,101 disability102 and decreased functional status,103 104 and chronic critical illness syndrome.105 Mechanical ventilation is also associated with increased costs. Studies in the ICU setting indicate that patients who require mechanical ventilation can have up to 50% higher costs than patients who do not receive mechanical ventilation.106 Patients on prolonged ventilation (≥ 21 days) incur even greater health care costs; the estimated cost per one-year survival for patients who are ventilated for ≥ 21 days is $423,596.107

Discontinuation of invasive mechanical ventilation, known as weaning or liberation, is feasible for many ventilated patients, and is associated with improved health outcomes. Although attempts to liberate patients from invasive mechanical ventilation in LTCHs have variable success, expectations of successful ventilator liberation are high for many LTCH patients.108 109 110 A recent meta-analysis of weaning attempts in ICU patients with PMV found a pooled weaning rate in US ICUs of 47% (95% CI 42-51). The analysis included nine studies (4,769 patients); weaning rates reported for included studies

105 Ibid.
varied from 13% to 56%. These findings have also been observed in LTCHs, where higher weaning rates have been associated with lower post-discharge mortality. In LTCHs, fewer days of mechanical ventilation may lead to decreased risk of ventilator-associated complications, enhanced rehabilitation opportunities, and shorter LOS.

Unnecessarily prolonged mechanical ventilation increases the risk of negative patient outcomes and can be an indicator of poor quality care or of persistent illness. Based on the evidence, improving weaning processes and increasing weaning rates are expected to mitigate the risk of harm associated with invasive mechanical ventilation, thus contributing to more favorable clinical outcomes for patients and decreased costs.

This quality measure, Ventilator Liberation Rate, will assess the proportion of patients discharged alive from an LTCH who are fully weaned, thereby promoting weaning efforts and encouraging quality management of LTCH patients on invasive mechanical ventilation. Kahn et al. noted that inclusion of a liberation outcome measure is key to providing a truly patient-centered measure related to invasive mechanical ventilation weaning among LTCH patients.

**Denominator**

The target population is patients discharged from an LTCH AND who were on invasive mechanical ventilation support upon admission to the LTCH, for whom at admission weaning attempts were expected or anticipated.

For patients with more than one LTCH stay during the reporting period, each admission and discharge is included in the measure calculation and reporting. For example, if an LTCH patient is

---


transferred to a short-stay acute care hospital for a procedure, surgery, or some other reason(s), returns to the LTCH within three (3) calendar days, and is subsequently discharged from the LTCH, this is considered one “patient stay.” However, if this patient’s “stay” at the short-stay acute care hospital exceeds three (3) calendar days, whereby day one begins on the day of transfer from the LTCH to the short-stay acute care hospital, regardless of the hour of transfer, then a new LTCH CARE Data Set Admission Assessment is conducted upon return of the patient to the LTCH, and a second LTCH CARE Data Set Discharge Assessment accompanies the second discharge. Admission and Discharge (Planned or Unplanned) Assessments are completed for this patient for the first stay, and Admission and Discharge (Planned or Unplanned) Assessments are completed for the second stay. Both stays for this patient are included in the measure calculation and reporting.

**Denominator Exclusions**

This measure excludes patients with missing data and invasively mechanically ventilated patients identified as non-weaning at the time of admission to an LTCH. Patients who may be considered non-weaning include patients who are considered chronically ventilated as defined by evidence-based guidelines for ventilator liberation\(^ {120}\) or patients with an acute or chronic condition that may negate any expectation or anticipation of weaning attempts at admission (e.g., amyotrophic lateral sclerosis, or severe neurological injury or disease or dysfunction such as high (C2) spinal cord injury). Consideration of a patient as non-weaning must be based on documentation found in the patient’s medical record by Day 2 of LTCH stay.

After patient-level exclusions are applied, LTCHs with denominator counts of less than 20 patient stays during the reporting period will be excluded from public reporting, owing to a small sample size.

**Denominator exclusion details**

Patients are excluded from the target population (i.e., denominator) if they meet either of the following criteria:

1. O0150A. Spontaneous Breathing Trial (SBT) by Day 2 of LTCH Stay: Invasive Mechanical Ventilation Support upon Admission to the LTCH = 0 (i.e., No, not on invasive mechanical ventilation support), OR:

2. O0150A. Spontaneous Breathing Trial (SBT) by Day 2 of LTCH Stay: Invasive Mechanical Ventilation Support upon Admission to the LTCH = 2, Yes, non-weaning (i.e., No weaning attempts are expected or anticipated at admission)

**Numerator**

The numerator represents the number of patients who were reported as fully weaned at discharge on the Planned or Unplanned Discharge Assessments.

A patient is included in the numerator if the LTCH reports that Item O0250A (Invasive Mechanical Ventilator: Weaning Status at Discharge) = 1 (Fully weaned) on the LTCH CARE Data Set Planned or Unplanned Discharge Assessments.

**Items Included in the Quality Measure**

For this quality measure, the following items are assessed at the time of admission:

- **A0900** Birth Date
- **GG0100B** Prior Functioning: Everyday Activities. Indoor Mobility (Ambulation)
- **I0103** Metastatic Cancer
- **I0104** Severe Cancer
- **I0605** Severe Left Systolic/Ventricular Dysfunction (known ejection fraction ≤ 30%).
- **I5200** Multiple Sclerosis (MS)
- **I5450** Amyotrophic Lateral Sclerosis
- **I5455** Other Progressive Neuromuscular Disease
- **I4900** Hemiplegia or Hemiparesis
- **I5000** Paraplegia
- **I5101** Complete Tetraplegia
- **I5102** Incomplete Tetraplegia
- **I5470** Severe Anoxic Brain Damage, Cerebral Edema, or Compression of Brain
- **I5110** Other Spinal Cord Disorder/Injury
- **I5480** Other Severe Neurological Injury, Disease, or Dysfunction
- **I7100** Lung Transplant
- **I7101** Heart Transplant
- **I7102** Liver Transplant
- **I7103** Kidney Transplant
- **I7104** Bone Marrow Transplant
- **O0100H** IV Medications
- **O0100H2a** Vasoactive Medications (e.g. continuous vasopressors or inotropes)
- **O0100J** Dialysis
- **O0100J2a** Hemodialysis
- **O0100J3a** Peritoneal dialysis
- **O0150A** Spontaneous Breathing Trial (SBT) (including Tracheostomy Collar or Continuous Positive Airway Pressure (CPAP) Breathing Trial) by Day 2 of LTCH Stay: Invasive Mechanical Ventilation Support upon Admission to the LTCH

The following item is assessed at the time of discharge for patients with Planned or Unplanned Discharge Assessments:

- **O0200A** Ventilator Liberation Rate: Invasive Mechanical Ventilator: Liberation Status at Discharge

**Risk Adjustment**

This measure is risk-adjusted to account for various risk factors using a statistical risk model.

We are developing, subsequent to measure testing and data analysis, a statistical risk model based on hierarchical logistic regression to predict the probability of full ventilator liberation at discharge for patients discharged from the LTCH alive. Patient characteristics related to admission and a marker for the specific discharging LTCH are included in the equation.
The equation is hierarchical in that both individual patient characteristics are accounted for, as well as the clustering of patient characteristics by LTCH. The statistical model estimates both the average predictive effect of the patient characteristics across all facilities, and the degree to which each LTCH has an effect on ventilator weaning (liberation) that differs from that of the average LTCH. The LTCH effects are assumed to be randomly distributed around the average (according to a normal distribution). When computing the LTCH effect, hierarchical modeling accounts for the potential predictors of ventilator weaning (liberation) in LTCHs, on average, such as patient characteristics, the observed LTCH rate, and the number of LTCH stays eligible for inclusion in the measure. The estimated LTCH effect is determined mostly by the LTCH’s own data if the number of patient discharges is relatively large (as the estimate would be relatively precise), but is adjusted toward the average if the number of patient discharges is small (as that would yield a less precise estimate).

We are testing the following risk adjustment model:

Let \( Y_{ij} \) denote the outcome (equal to 1 if patient \( i \) is alive and fully liberated at LTCH discharge, 0 otherwise) for a patient \( i \) at LTCH \( j \); \( Z_{ij} \) denotes a set of risk adjustment variables. We assume the outcome is related to the risk adjusters via a logit function with dispersion:

\[
\text{logit}(\text{Prob}(Y_{ij} = 1)) = \alpha_j + \beta_i Z_{ij} + \varepsilon_{ij}
\]

where \( Z_{ij} = (Z_{i1}, Z_{i2}, \ldots Z_{ik}) \) is a set of \( k \) patient-level risk adjustment variables; \( \alpha_j \) represents the LTCH-specific intercept; \( \mu \) is the adjusted average outcome across all LTCHs; \( \tau^2 \) is the between-LTCH variance component; and \( \varepsilon \sim N(0, \sigma^2) \) is the error term.


The estimated equation is used twice in the measure. The sum of the probabilities of ventilator weaning (liberation) of all patients in the LTCH measure, including both the effects of patient characteristics and the LTCH, is the “predicted number” of liberated patients after adjusting for the LTCH’s case mix. The same equation is used without the LTCH effect to compute the “expected number” of liberated patients for the same patients at the average LTCH. This is shown in equation 2.

\[
\text{logit}(\text{Prob}(Y_{ij} = 1)) = \beta_0 + \beta_i Z_{ij} + \varepsilon_{ij}
\]

The ratio of the predicted-to-expected number of fully liberated patients is a measure of the degree to which ventilator weaning (liberation) rates are higher or lower than what would otherwise be expected. This standardized risk ratio is then multiplied by the mean observed ventilator liberation rate for all LTCH stays included in the measure. As a result, this yields the risk-adjusted ventilator weaning (liberation) rate for each LTCH. Please note that the estimation procedure is recalculated for each measurement period. Re-estimating the models for each measurement period allows the estimated effects of the patient characteristics to vary over time as patient case-mix and medical treatment patterns change.

Proposed risk adjustment variables include variables for age; prior functional status; selected conditions and comorbidities; special treatments and programs; and medications from the LTCH CARE Data Set V4.00 as provided below.

The following variables will be used as risk adjusters for initial measure testing:

1. Age
2. Prior Functioning: Everyday Activities
3. Metastatic cancer
4. Severe cancer
5. Left ventricular assistive device with known ejection fraction $\leq 30\%$
6. Progressive Neuromuscular Disease
7. Severe Neurological Injury, Disease, or Dysfunction
8. Post-transplant (lung, heart, liver, kidney, and bone marrow)
9. Vasoactive medication (i.e. continuous vasopressors or inotropes)
10. Dialysis

**Quality Measure Calculation Algorithm**

Risk-adjusted ventilator weaning (liberation) rate:

1. Identify all patients discharged (alive or expired) during the reporting period from an LTCH.
2. Of patients discharged (alive or expired) from the LTCH during the reporting period, identify all patients who were admitted on invasive mechanical ventilation support upon admission to an LTCH. This is the target population.
3. Of patients identified in (2), identify the subset of patients for whom weaning attempts are not expected or anticipated at admission. These patients are excluded from the measure.
4. Of the patients identified in (2), identify the subset of patients for whom weaning attempts were expected or anticipated at admission. This is the denominator.
5. Of patients identified in (4), identify the subset of patients who are reported as alive and fully weaned at discharge on the Planned or Unplanned Discharge Assessments. This is the numerator.
6. Identify presence or absence of risk factors for each patient identified in (4).
7. Calculate the predicted number of patients ($\text{pred}_j$) who are reported as alive and fully weaned at discharge for each LTCH using the hierarchical logistic regression model specified in 3.4.7.
8. Calculate the expected number of patients ($\text{exp}_j$) who are reported as alive and fully weaned at discharge for each LTCH using the logistic regression model specified in 3.4.7.
9. Calculate the LTCH standardized risk ratio ($\text{SRR}_j$) using the following equation: $\text{SRR}_j = \frac{\text{pred}_j}{\text{exp}_j}$.
10. Calculate the risk-adjusted LTCH ventilator (liberation) rate by multiplying the standardized risk ratio by the overall national observed ventilator (liberation) rate times 100.
This page intentionally left blank}
Chapter 4
Standardized Data Elements

Section 1: Standardized Patient Assessment Data Element Work: An Introduction

The Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT Act) requires CMS to develop, implement, and maintain standardized patient assessment data elements for PAC settings. The goals of implementing cross-setting standardized patient assessment data elements are to facilitate care coordination, interoperability, and improve outcomes of Medicare beneficiaries and other patients receiving post-acute care. Existing PAC assessment instruments (i.e., Outcome and Assessment Information Set (OASIS) for HHAs, Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) for IRFs, LTCH CARE Data Set (LCDS) for LTCHs, and the Minimum Data Set (MDS) for SNFs) often collect data items pertaining to similar concepts, but the individual data elements -- questions and response options -- vary by assessment instrument. With a few exceptions, the data elements collected in these assessment instruments are not currently standardized or interoperable, therefore, patient responses across the assessment instruments cannot be compared easily. The IMPACT Act further requires that the assessment instruments described above be modified to include core data elements on health assessment categories and that such data be standardized and interoperable. Implementation of a core set of standardized assessment items across PAC settings has important implications for Medicare beneficiaries and other patients receiving post-acute care, families, providers, and policymakers. CMS is proposing standardized patient assessment data elements for five categories specified in the IMPACT Act. These categories are:

1. Functional status, such as mobility and self-care
2. Cognitive function (e.g., able to express ideas and to understand normal speech) and mental status (e.g., depression and dementia)
3. Special services, treatments, and interventions (e.g., need for ventilator, dialysis, chemotherapy, and total parenteral nutrition)
4. Medical conditions and co-morbidities (e.g., diabetes, heart failure, and pressure ulcers)
5. Impairments (e.g., incontinence; impaired ability to hear, see, or swallow)

In the following sections, we present specifications and evidence of support for the standardized patient assessment data elements proposed in the LTCH QRP.
Section 2: Functional Status

Beginning with the FY 2020 LTCH QRP, we are proposing that the submission of the data used in the 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), that we finalized in the FY 2016 IPPS/LTCH PPS final rule (80 FR 49739 through 49747), also meets the requirement for the collection of standardized data in the area of Functional Status.

This cross-setting function process measure requires the collection of admission and discharge functional status data using standardized clinical assessment items, or data elements, which assess specific functional activities, that is, self-care and mobility activities. These activities are coded using a 6-level rating scale that indicates the patient's level of independence with the activity; higher scores indicate more independence. For more information about this quality measure, we refer readers to the FY 2016 IPPS/LTCH PPS final rule (80 FR 49739 through 49747).
Section 3: Cognitive Function

Impairments in cognitive function can result from a number of underlying conditions, including dementia, Alzheimer’s Disease, stroke, brain injury, side effects of medication, metabolic and/or endocrine imbalances, and delirium. Cognitive impairments may affect a patient or resident’s ability to recover from illness or injury, or they may be a sign of an acute condition (e.g., hypoxia) that requires immediate intervention. Cognitive impairment that manifests with behavioral symptoms—or that impairs a patient’s ability to communicate, prompting behavioral disturbances—may put the patient or resident or others in the care setting at risk for injury or assault, or may signal unmet patient or resident needs (e.g. pain management). Screening for the presence of impairment can help ensure appropriate and timely intervention.

A substantial proportion of PAC patients and residents experience cognitive impairment, delirium, and behavioral distress. Testing from the PAC PRD found that about one-third of patients and residents in PAC settings were classified as having moderately or severely impaired cognitive function. About one-third exhibited disorganized thinking and altered level of consciousness, and about one-half exhibited inattention. Fewer than 7 percent of patients and residents exhibited signs and symptoms of behavioral distress in the PAC PRD.

Therapeutic interventions can improve patient outcomes, and evidence suggests that treatment (e.g., drugs, physical activity) can stabilize or delay symptom progression in some patients, thereby improving quality of life. In addition, assessments help PAC providers to better understand the needs of their patients by establishing a baseline for identifying changes in cognitive function and mental status (e.g., delirium), elucidating the patient’s ability to understand and participate in treatments during their stay, highlighting safety needs (e.g., to prevent falls), and identifying appropriate support needs at the time of discharge. The standardized assessment of patient or resident cognition supports clinical decision-making, early clinical intervention, person-centered care, and improved care continuity and coordination. The use of valid and reliable standardized assessments can aid in the communication of information within and across providers, enabling the transfer of accurate health information.

123 This estimate is based on responses to the Brief Interview for Mental Status (BIMS) in a study of patient/residents in the Post-Acute Care Payment Reform Demonstration (Gage et al., 2012).
Standardized Data Elements to Assess Cognitive Impairment

CMS has identified several data elements as applicable for cross-setting use in standardized assessment of cognitive impairment. The proposed data elements comprise:

1. The Brief Interview for Mental Status (BIMS);
2. The Confusion Assessment Method (CAM); and
3. Behavioral Signs & Symptoms

It should be noted that the data elements proposed involve different aspects of cognition (e.g., short term memory, executive function), types of data (e.g., interview, performance-based), and are collected by various modes (e.g., clinician assessed, patient reported).

Brief Interview for Mental Status (BIMS)

The Brief Interview for Mental Status (BIMS) is a performance-based cognitive assessment developed to be a brief cognition screener, with a focus on learning and memory. The BIMS evaluates repetition, recall with and without prompting, and temporal orientation.

Relevance to LTCHs

The BIMS data elements comprehensively assess cognitive functioning in greater detail than existing data elements in the LCDS. In older adults, dementia and cognitive impairment are associated with long-term functional dependence and, consequently, poor quality of life and increased health care costs and mortality. Therefore, assessment of mental status and early detection of cognitive decline or impairment is critical in the LTCH setting. The PAC PRD found that 16.8 percent of LTCH patients are moderately cognitively impaired and 15.5 percent are severely cognitively impaired, as assessed by the BIMS. The burden of cognitive impairment in LTCHs is high. The intensity of routine nursing care is higher for LTCH patients with cognitive impairment than those without, and dementia is a significant variable in predicting readmission after discharge to the community from LTCHs. Assessing cognitive function using the BIMS would provide important information for care planning, care transitions, patient safety, and resource use in LTCHs.

---


**Proposed Data Elements for the Assessment of Cognitive Function: The BIMS**

### Section C  Cognitive Patterns

#### C0100. Should Brief Interview for Mental Status (C0200-C0500) be Conducted?
Attempt to conduct interview with all patients.

<table>
<thead>
<tr>
<th>Entry Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No (patient is rarely/never understood) → Skip to C1310. Signs and Symptoms of Delirium (from CAM+)&lt;br&gt;1</td>
</tr>
</tbody>
</table>

#### C0200. Repetition of Three Words

**Ask patient:** "I am going to say three words for you to remember. Please repeat the words after I have said all three. The words are: **sock**, **blue** and **bed**. Now tell me the three words."

**Number of words repeated after first attempt**

<table>
<thead>
<tr>
<th>Entry Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None&lt;br&gt;1</td>
</tr>
</tbody>
</table>

After the patient’s first attempt, repeat the words using cues ("sock, something to wear; blue, a color; bed, a piece of furniture"). You may repeat the words up to two more times.

#### C0300. Temporal Orientation (orientation to year, month, and day)

**Ask patient:** "Please tell me what year it is right now."

- A. Able to report correct year
  - 0 | Missed by > 5 years or no answer<br>1 | Missed by 2-5 years<br>2 | Missed by 1 year<br>3 | Correct

**Ask patient:** "What month are we in right now?"

- B. Able to report correct month
  - 0 | Missed by > 1 month or no answer<br>1 | Missed by 6 days to 1 month<br>2 | Accurate within 5 days

**Ask patient:** "What day of the week is today?"

- C. Able to report correct day of the week
  - 0 | Incorrect or no answer<br>1 | Correct

#### C0400. Recall

**Ask patient:** "Let’s go back to an earlier question. What were those three words that I asked you to repeat? If unable to remember a word, give cue (something to wear; a color; a piece of furniture) for that word.

- A. Able to recall "sock"
  - 0 | Could not recall<br>1 | Yes, after cueing ("something to wear")<br>2 | Yes, no cue required

- B. Able to recall "blue"
  - 0 | Could not recall<br>1 | Yes, after cueing ("a color")<br>2 | Yes, no cue required

- C. Able to recall "bad"
  - 0 | Could not recall<br>1 | Yes, after cueing (a piece of furniture)<br>2 | Yes, no cue required

#### C0500. BIMS Summary Score

<table>
<thead>
<tr>
<th>Entry Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add scores for questions C0200-C0400 and fill in total score (00-15)&lt;br&gt;Enter 99 if the patient was unable to complete the interview</td>
<td></td>
</tr>
</tbody>
</table>

### Current use

The BIMS data elements are currently used in the MDS 3.0 and the IRF-PAI.

### Evidence supporting use of the BIMS

The BIMS data elements were tested in the PAC PRD, where they showed substantial to almost perfect reliability of 0.71 to 0.91 (weighted kappas) when used across all four PAC settings. The lowest agreement was on the “repetition of three words” memory data element, with a kappa of 0.71, which still falls within the range of substantial agreement. PAC PRD testing also demonstrated feasibility of the BIMS for use in LTCHs and found evidence of strong reliability of the BIMS data elements in the LTCH
setting. In addition, the BIMS data elements were also found to be predictive of cost.130 The BIMS data elements were also included in the national MDS 3.0 test in nursing homes and showed almost perfect reliability. 131 Agreement ranged from 0.862 to 0.994 (standard kappa). The BIMS data elements were found to be highly correlated (0.906) with a gold-standard measure of cognitive function, the Modified Mini-Mental Status (3MS) exam.132

**Confusion Assessment Method (CAM©)**

The Confusion Assessment Method (CAM) screens for certain types of cognitive impairment, including delirium and reversible confusion. Delirium, when undetected or untreated, can increase the likelihood of complications, rehospitalization, and death compared to patients/residents without delirium.133 The CAM is available free of charge, for public use.

Although multiple versions of the CAM have been developed, CMS is proposing that the Short version be adopted for standardized patient assessment data elements. The Short CAM contains only four items (i.e., items 1 to 4) from the original Confusion Assessment Method (Long CAM). These items focus on an acute change in mental status, inattention, disorganized thinking, and altered level of consciousness.

**Relevance to LTCHs**

The CAM data elements would provide important information for the LTCH setting if added to the LCDS. Because patients with multiple comorbidities are hospitalized in LTCHs for long periods of time, it is important to assess delirium, which is associated with a high mortality rate and prolonged duration of stay in hospitalized older adults.134 The prevalence of signs and symptoms of delirium in LTCH patients is high. As assessed in the PAC PRD using the CAM, the following proportions of LTCH patients showed the following signs or symptoms of delirium: 48 percent of patients in LTCHs exhibited inattention; 35.6 percent had disorganized thinking; and 31.7 percent had an altered level of consciousness.135 Assessing certain types of cognitive impairment, including delirium and reversible confusion, using the Short CAM would provide important information for care planning, care transitions, patient safety, and resource use in LTCHs.

---


Current use

The Short CAM data elements are currently collected in the MDS 3.0 and the LCDS, and the scoring is based on staff observations of delirium. While the Short CAM data elements are used in both assessment tools, the response options currently differ. The current version of the LCDS includes two response options (yes/no, indicating that the behavior is present or not present), whereas the MDS 3.0 offers three response options (behavior continuously present, does not fluctuate; behavior present, fluctuates; behavior not present). The LCDS and MDS versions of the CAM also differ slightly in wording and criteria for the “Altered Level of Consciousness” item.

Evidence supporting use of the CAM

The four elements in the Short CAM have been shown to be effective in identifying delirium in validated research studies. The Short CAM was tested in the PAC PRD and found to be reliable across all four settings. The “Inattention” and “Disorganized Thinking” questions had substantial inter-rater reliability agreement (kappa range of 0.70 to 0.73) and the “Altered Level of Consciousness” question showed moderate agreement (kappa of 0.58).

A version of the CAM, with the addition of an item to assess psychomotor retardation, was tested in the national MDS 3.0 test in nursing homes. Reliabilities were substantial or almost perfect. Overall average kappa ranged from 0.893 to 0.850 and items ranged from 0.784 to 0.902 (standard kappa).

References:

Behavioral Signs and Symptoms

Behavior disturbances can require additional resources from providers. They can disrupt care, result in poorer patient outcomes, and place the patient at risk for injury, isolation, and inactivity. Assessment and documentation of these disturbances can help inform care planning and patient transitions. For example, standardized assessment of behavioral symptoms would foster attention to the patient’s needs and limitations early in the care planning process, and could trigger additional clinical assessment (e.g., for pain or depression) that could address underlying causes of behavioral disturbances.

The Behavioral Signs and Symptoms data elements assess whether the patient has exhibited any behavioral symptoms that may indicate cognitive impairment or other issues during the assessment period. These include physical, verbal, and other disruptive or dangerous behavioral symptoms, but exclude wandering. These assessed behavioral disturbances can indicate unrecognized needs and care preferences and are associated commonly with dementia and other cognitive impairment, but associated less commonly with adverse drug events, mood disorders, and other conditions.

Relevance to LTCHs

The Behavioral Signs and Symptoms data elements would provide important information about resource use in LTCHs. As has been documented in LTCHs, patients displaying behavioral disturbances require more case management time, and these symptoms may also disrupt the institutional or home environment and impact the safety and privacy of other patients and residents, caregivers, and staff. For LTCH staff, exposure to aggressive behavior has a negative effect on job satisfaction. Among LTCHs studied in the PAC PRD, 1.6 percent of LTCH patients were physically aggressive towards others; 1.7 percent were verbally aggressive towards others; and 6.6 percent exhibited another concerning behavior towards themselves. Assessing behavioral disturbances with the Behavioral Signs and Symptoms data elements would provide useful information for care planning, resource use, and patient and staff safety in LTCHs.

Proposed Data Elements for the Assessment of Cognitive Function:
Behavioral Signs and Symptoms

<table>
<thead>
<tr>
<th>Section E</th>
<th>Behavioral Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>E0200. Behavioral Symptoms - Presence &amp; Frequency</td>
<td></td>
</tr>
<tr>
<td>Note presence of symptoms and their frequency.</td>
<td></td>
</tr>
<tr>
<td><strong>Coding:</strong></td>
<td></td>
</tr>
<tr>
<td>0. Behavior not exhibited</td>
<td></td>
</tr>
<tr>
<td>1. Behavior of this type occurred 1 to 3 days, but less than daily</td>
<td></td>
</tr>
<tr>
<td>2. Behavior of this type occurred 4 to 6 days, but less than daily</td>
<td></td>
</tr>
<tr>
<td>3. Behavior of this type occurred daily</td>
<td></td>
</tr>
<tr>
<td><strong>Enter Code in Boxes</strong></td>
<td></td>
</tr>
<tr>
<td>A. Physical behavioral symptoms directed toward others (e.g., hitting, kicking, pushing, scratching, grabbing, abusing others sexually)</td>
<td></td>
</tr>
<tr>
<td>B. Verbal behavioral symptoms directed toward others (e.g., threatening others, screaming at others, cursing at others)</td>
<td></td>
</tr>
<tr>
<td>C. Other behavioral symptoms not directed toward others (e.g., physical symptoms such as hitting or scratching self, pacing, rummaging, public sexual acts, disinhibition in public, throwing or smearing food or bodily wastes, or verbal/vocal symptoms like screaming, disruptive sounds)</td>
<td></td>
</tr>
</tbody>
</table>

Current use

The Behavioral Signs and Symptoms data elements are currently in use in the MDS 3.0.

---

Evidence supporting use of Behavioral Signs and Symptoms

The Behavioral Signs and Symptoms data elements were tested in the PAC PRD with two response options per data element (yes/no to indicate that behavior is present/not present). Because of the low incidence of these behavioral disturbances, the PAC PRD did not report inter-rater reliability for these items.

The Behavioral Signs and Symptoms data elements were tested in the national MDS 3.0 test in nursing homes with three response options per data element (Not present in last 5 days, present 1-2 days, present 3 or more days). Reliabilities were almost perfect and ranged from 0.964 to 0.984 (standard kappa)\textsuperscript{142}. The Behavioral Signs and Symptoms data elements were also validated against a gold-standard measure of behavior disturbance, the Cohen Mansfield Agitation Inventory (CMAI), where kappas ranged from 0.532 to 0.856.

**Mental Status (Depressed Mood)**

Depression is the most common mental health condition in older adults, yet under-recognized and thus under-treated. Existing data show that depressed mood is relatively common in patients and residents receiving PAC services. The PAC PRD found that about 9 percent of individuals in PAC were classified as having likely depression.\textsuperscript{143} The prevalence varied from a low of 7 percent of beneficiaries in SNFs to a high of 11 percent in IRFs.\textsuperscript{144}

Diagnosis and treatment of depression can lead to significant improvement of symptoms, as measured on depression assessment scales. Depressive symptoms improve in 60 to 80 percent of elderly patients taking an antidepressant medication.\textsuperscript{145} Psychosocial treatments of depression in older adults have been shown to be more effective than no treatment, based on self-rated and clinician-rated measures of depression.\textsuperscript{146 147}

Assessments of the signs and symptoms of depression help PAC providers to better understand the needs of their patients and residents by prompting further evaluation (i.e., to establish a diagnosis of depression); elucidating the patient’s or resident’s ability to participate in therapies for conditions other than depression during their stay; and identifying appropriate ongoing treatment and support needs at the time of discharge. The standardized assessment of depression among PAC patients and residents supports clinical decision-making, early clinical intervention, person-centered care, and improved care continuity.


\textsuperscript{143} This estimate is based on patient responses to a question about being sad in the two weeks prior to the assessment interview in a study of patient/residents in the PAC PRD (Gage et al., 2012). If they responded “often” or “always,” they were considered to have depression.


and coordination. The use of valid and reliable standardized assessments can aid in the communication of information within and across providers, further enabling the transfer of accurate health information.

**Standardized Data Elements to Assess Depressed Mood**

CMS has identified the Patient Health Questionnaire (PHQ-2) data elements for standardization for assessment of depressed mood.

**Patient Health Questionnaire-2 (PHQ-2)**

The Patient Health Questionnaire-2 (PHQ-2) data elements use a summed item scoring approach to screen for signs and symptoms of depressed mood in patients and residents by assessing the cardinal criteria for depression: depressed mood and anhedonia (inability to feel pleasure). At least one of the two must be present for a determination of probable depression, which signals the need for additional clinical assessment to determine a depression diagnosis.

**Relevance to LTCHs**

Major depressive disorder is common in LTCH patients, with a prevalence of 8.2 percent for LTCHs, as assessed in the PAC PRD. Screening for the signs and symptoms of depression using the PHQ-2 would provide important information for care planning, care transitions, and resource use in LTCHs.

**Proposed Data Elements for the Assessment of Cognitive Function: PHQ-2**

**Current use**

The PHQ-2 data elements are currently in use in the OASIS-C2. The PHQ-9 data elements, which include the two questions used in the PHQ-2 plus additional items, are in use in MDS 3.0.

**Evidence supporting use of PHQ-2**

The PHQ-2 is a brief, reliable screening tool for assessing signs and symptoms of depression. Among studies conducted in primary care centers with large samples of adults, the PHQ-2 has performed

---


well as both a screening tool for identifying depression and to assess depression severity. It has also been shown to be sensitive to changes in a patient’s mood. Across 15 studies that assessed the diagnostic accuracy of the PHQ-2 against a recognized gold-standard instrument for the diagnosis of major depression in adults, sensitivity estimates (based on the summed-item approach to scoring and a cutoff score of 3) have varied, ranging between 39 percent and 97 percent (median value = 77 percent); specificity estimates (based on the summed-item approach to scoring and a cutoff score of 3) have been higher and more stable, ranging between 74 percent and 97 percent (median value = 90 percent). Thus, the specificity of the PHQ-2 appears to be comparable to

that of the longer form PHQ-9, although the slightly lower sensitivity of the PHQ-2 means that more cases of depressive symptoms are likely to be missed using this brief instrument compared with the PHQ-9. The PHQ-2 was tested in the PAC PRD and found to be reliable in beta testing across the four PAC settings (kappas ranged from 0.74 to 0.91). It is thus a viable option for standardization, with the benefits of the shorter assessment counterbalancing the limitation of the lower sensitivity.

The PHQ-9 was also tested in the national MDS 3.0 test in nursing homes. For the two presence items in the PHQ-2 (little interest in doing things; feeling down, depressed or hopeless), kappa statistics were almost perfect and ranged from 0.981 to 0.988. The PHQ-9 was also found to have agreement with Modified Schedule for Affective Disorders and Schizophrenia (m-SADS), a gold-standard measure for mood disorder, in residents without severe cognitive impairment (weighted kappa=0.685) and with the Cornell Depression Scale, a gold-standard measure for mood disorder, in residents with severe cognitive impairment (correlation=0.63).

---


169 Ibid.
Some medical conditions require complex clinical care, consisting of special services, treatments, and interventions. The implementation of these interventions typically indicates conditions of a more serious nature and can be life-sustaining. Patients and residents who need them may have few clinical alternatives. Conditions requiring the use of special services, treatments, and interventions can have a profound effect on an individual’s health status, self-image, and quality of life. Providers should be aware of the patient or resident’s clinical needs in order to plan the provision of these important therapies and to ensure the continued appropriateness of care and support care transitions. The assessment of special services, treatments, and interventions may also help to identify resource use intensity by capturing the medical complexity of patients/residents.

Standardized Data Elements to Assess for Special Services, Treatments, and Interventions

CMS has identified data elements for cross-setting standardization of assessment for 15 special services, treatments, and interventions in the areas of cancer, respiratory, and other treatments, as well as nutritional approaches. The proposed data elements are:

1. Chemotherapy (IV, Oral, Other);
2. Radiation;
3. Oxygen therapy (Continuous, Intermittent);
4. Suctioning (Scheduled, As needed);
5. Tracheostomy Care;
6. Invasive Mechanical Ventilator;
7. Non-invasive Mechanical Ventilator (Bilevel Positive Airway Pressure [BiPAP]; Continuous Positive Airway Pressure [CPAP]);
8. Intravenous (IV) Medications (Antibiotics, Anticoagulation, Other);
9. Transfusions;
10. Dialysis (Hemodialysis, Peritoneal dialysis);
11. Intravenous (IV) Access (Peripheral IV, Midline, Central line, Other);
12. Parenteral/IV Feeding;
13. Feeding Tube;
14. Mechanically Altered Diet; and
15. Therapeutic Diet.

Chemotherapy (IV, Oral, Other)

Chemotherapy is a type of cancer treatment that uses medications to destroy cancer cells. This treatment indicates that a patient has a malignancy (cancer) and therefore has a serious, often life-threatening or life-limiting condition. Both intravenous (IV) and oral chemotherapy have serious side effects, including nausea/vomiting, extreme fatigue, risk of infection (due to a suppressed immune system), anemia, and an increased risk of bleeding (due to low platelet counts). Oral chemotherapy can be as potent as chemotherapy given by IV but can be significantly more convenient and less resource-intensive to administer. Because of the toxicity of these agents, special care must be exercised in handling, and transporting chemotherapy drugs. IV chemotherapy may be given by peripheral IV but is more commonly given via an indwelling central line, which raises the risk of bloodstream infections. The need for chemotherapy predicts resource intensity, both because of the complexity of administering these potent, toxic drug combinations following specific protocols and because of what the need for chemotherapy signals about the patient’s underlying medical condition. Furthermore, the resource
intensity of IV chemotherapy is higher than for oral chemotherapy, as the protocols for administration and the care of the central line (if present) require significant resources.

Relevance to LTCHs

In one study of inpatient survival in four LTCH settings, which reviewed approximately 300 medical records, the prevalence of malignancy was 16 percent.170 Given the significant burden of malignancy in LTCH patients, the resource intensity of administering chemotherapy, and the side effects and potential complications of these highly-toxic medications, assessing whether the patient is receiving chemotherapy would provide important information for care planning, clinical decision making, and resource use in LTCHs.

Proposed Data Elements for the Assessment of Special Services, Treatments, and Interventions: Chemotherapy

<table>
<thead>
<tr>
<th>Section 0</th>
<th>Special Treatments, Procedures, and Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>0C100. Special Treatments, Procedures, and Programs</td>
<td>Check all of the following treatments, procedures, and programs that were performed during the first 3 days of admissions. For chemotherapy and dialysis, check if it is part of the patient’s treatment plan.</td>
</tr>
<tr>
<td>Cancer Treatments</td>
<td>A. Chemotherapy (if checked, please specify below)</td>
</tr>
<tr>
<td></td>
<td>1a. IV</td>
</tr>
<tr>
<td></td>
<td>1b. Oral</td>
</tr>
<tr>
<td></td>
<td>1c. Other</td>
</tr>
</tbody>
</table>

Current use

Chemotherapy data elements are currently used in the MDS 3.0. They ask first if the resident received chemotherapy in the past 14 days while not a resident of the assessing facility, and then ask if the resident has received chemotherapy in the past 14 days while a resident but do not assess the route of chemotherapy.

Evidence supporting use of Chemotherapy (IV, Oral, Other)

An IV Chemotherapy data element was found to be feasible for cross-setting use in the PAC PRD.171 A checkbox for chemotherapy during the last 14 days was shown to have reliabilities of 0.695 and 0.8 in studies of MDS 2.0 in nursing homes.172

---


**Radiation**

Radiation is a type of cancer treatment that uses high-energy radiation to shrink tumors and kill cancer cells by damaging their DNA. However, it can also damage normal cells, leading to side effects such as fatigue, skin irritation or damage, hair loss, nausea, and delayed side effects such as fibrosis (scar tissue formation), damage to the bowels if radiation was delivered to the abdominal region, memory loss, and infrequently, a second cancer due to radiation exposure. Radiation is a mainstay of cancer treatment; about half to two-thirds of all patients with cancer receive radiation therapy at some point in their treatment course. The indications range from early-stage cancer treated with curative intent to palliative radiation therapy, such as to treat metastatic cancer; tumors that are pressing on the spine or growing within bones, causing severe pain; or shrinking a tumor near the esophagus, which can inhibit swallowing. There are many types of radiation, such as external-beam radiation therapy and internal radiation therapy (brachytherapy that is delivered from sources placed inside or on the body), and systemic radiation therapy (in which the patient swallows or receives an injection of a radioactive substance).

**Relevance to LTCHs**

As mentioned in the discussion of Chemotherapy, one study of inpatient survival in four LTCH settings found that the prevalence of malignancy was 16 percent. Radiation is an important therapy for particular types of cancer and the resource utilization is high, with frequent radiation sessions required, often daily for a period of several weeks. Assessing whether a patient is receiving radiation therapy is important to determine resource utilization because LTCH patients will need to be transported to and from radiation treatments, and monitored and treated for side effects after receiving this intervention. Therefore, assessing whether the patient is receiving Radiation would provide important information for care planning, clinical decision making, and resource use in LTCHs.

**Proposed Data Element for the Assessment of Special Services, Treatments, and Interventions: Radiation**

A version of this data element, Radiation, is currently collected in the MDS 3.0. It uses a 14-day look-back period to assess whether a patient received radiation while a resident or before admission to the facility.

---


Evidence supporting use of Radiation

In studies of the MDS 2.0, a checkbox for radiation during the last 14 days was shown to have reliabilities of 1 and 0.66.176

Oxygen Therapy (Continuous, Intermittent)

Oxygen therapy provides a patient/resident with supplemental oxygen when medical conditions (e.g., chronic obstructive pulmonary disease [COPD], pneumonia, severe asthma) prevent the patient or resident from adequately oxygenating their bloodstream. Oxygen administration is a resource-intensive intervention, as it requires specialized equipment: a reliable source of oxygen, various delivery systems (e.g., oxygen concentrator, liquid oxygen containers, and high-pressure systems), and the patient interface (e.g., nasal cannula, various types of masks). Accessories are also required (e.g., regulators, filters, tubing, etc.). While the equipment is generally the same for both sub-elements of this data element (continuous vs. intermittent), the main differences between delivering oxygen intermittently versus continuously are the severity of the underlying illness (which often requires more hours per day of oxygen therapy), and the bedside nursing care to set up the oxygen delivery system if the patient is unable (whether physically or cognitively) to do so independently.

The proposed Oxygen (Continuous, Intermittent) data elements assess if the patient received oxygen therapy and whether the oxygen was delivered continuously (typically defined as >=14 hours per day) or intermittently.

Relevance to LTCHs

In a small study of LTCH patients, the prevalence of respiratory failure was 45 percent, so continuous oxygen therapy is likely a part of the treatment plan for many LTCH patients.177 While continuous and intermittent oxygen therapy both require resources, in terms of medical equipment, clinical monitoring, and staff resources, distinguishing between oxygen delivered intermittently and continuously provides information on the severity of the underlying illness (which is related to the number of hours of oxygen therapy per day), and the level of monitoring and bedside care required. Assessing whether a patient is receiving Oxygen Therapy would provide important information for care planning, clinical decision making, care transitions, and resource use in LTCHs.


Proposed Data Elements for the Assessment of Special Services, Treatments, and Interventions: Oxygen Therapy

Current use

Related data elements are collected in the OASIS-C2 and the MDS 3.0. In the MDS, the data elements use a 14-day look-back period to assess whether a patient received oxygen therapy while a resident or before admission to the facility.

Evidence supporting use of Oxygen Therapy (Continuous, Intermittent)

A related data element on high concentration oxygen use (FiO2>40%) was used and found feasible for cross-setting use in the PAC PRD. In nursing homes, a checkbox for oxygen therapy during the last 5 days was shown to have reliability ranging from 0.925 to 0.955 in the national MDS 3.0 test. Oxygen therapy data elements during the last 14 days were shown to have reliabilities ranging from of 0.81 to 0.87 in studies of MDS 2.0.

Suctioning (Scheduled, As Needed)

Suctioning is used to clear secretions from the airway when a person cannot clear those secretions on his or her own due to a variety of reasons, including excess production of secretions from a pulmonary infectious process or neurological deficits that inhibit the ability to cough, swallow, etc. It is done by aspirating secretions through a catheter connected to a suction source.

Types of suctioning include oropharyngeal and nasopharyngeal suctioning, nasotracheal suctioning, and suctioning through an artificial airway such as a tracheostomy tube. Oropharyngeal and nasopharyngeal suctioning are a key part of many patients’ care plans, both to prevent the accumulation of secretions that can lead to aspiration pneumonias (a common condition in patients with inadequate gag reflexes) and to relieve obstructions from mucus plugging during an acute or chronic respiratory infection, which often lead to desaturations and increased respiratory effort. Suctioning can be done on a scheduled basis if the patient is judged to clinically benefit from regular interventions; or can be done as needed, such as when secretions become so prominent that gurgling or choking is noted, or a sudden


180 Ibid.
desaturation occurs from a mucus plug. As suctioning is generally performed by a care provider rather than independently, this intervention can be quite resource-intensive if it occurs every hour, for example, rather than once a shift. It also signifies an underlying medical condition that prevents patients from clearing their secretions effectively, which also means they are in need of increased nursing care more generally (such as after a stroke or during an acute respiratory infection).

Relevance to LTCHs

Suctioning clears excessive airway sections in LTCH patients, which not only improves patient comfort but it also improves oxygenation and also serves a preventive purpose, in that excess secretions can be aspirated and cause aspiration pneumonia. Pneumonia itself is also a cause of excess secretions and is particularly common in the LTCH setting. The reported annual incidence of pneumonia in long-term care residents ranges from 99 to 912 per 1,000 persons, with a median reported incidence of 365 per 1,000 persons. Furthermore, between 9 percent and 51 percent of patients acquiring pneumonia in long-term care facilities are transferred to acute hospitals, representing worsening in clinical status.\(^\text{181}\) Pneumonia is one of several reasons patients may not be able to handle their secretions. In a small study of inpatient survival in LTCHs, the prevalence of pneumonia among LTCH patients was 13 percent; the prevalence of chronic obstructive pulmonary disease (COPD) was 13 percent; and the prevalence of a primary cerebral insult was 8 percent.\(^\text{182}\) Each of these conditions may require frequent suctioning as part of the patient care routine, while taking care to minimize airway trauma and thereby increase the production of secretions. Finally, suctioning of excess secretions is important in patients with tracheostomies to ensure the tracheostomy remains unobstructed and the patient can adequately oxygenate. Assessing whether Suctioning is being performed for a patient would provide important information for care planning, clinical decision making, care transitions, and resource use in LTCHs.

Proposed Data Element

For the Assessment of Special Services, Treatments, and Interventions: Suctioning

Current use

Related Suctioning data elements are collected in the MDS 3.0. These data elements use a 14-day look-back period to assess whether a patient received suctioning while a resident or before admission to the facility.


Evidence supporting use of Suctioning (Scheduled, As Needed)

In the PAC PRD, suctioning was assessed as part of Trach Tube with Suctioning data element, which evaluated whether patients or residents had a tracheostomy tube or needed suctioning. This related data element was found feasible for cross-setting use in the PAC PRD.\(^{183}\) A checkbox for suctioning during the last 14 days was shown to have reliabilities of 0.89 and 0.775 in studies of MDS 2.0.\(^{184}\)

**Tracheostomy Care**

A tracheotomy is a surgical procedure that consists of making a direct airway opening (tracheostomy) into the trachea (windpipe). Tracheostomies are created primarily for reasons such as to bypass an obstructed upper airway; in chronic cases, to enable the removal of secretions from the airway; and to deliver oxygen to the patient’s lungs. For example, patients with a need for long-term ventilation (such as those in a persistent vegetative state or those who require long-term ventilator weaning but are alert and oriented); patients with tumors of the upper airway; patients with severe neck, mouth, or chest wall injuries; patients with degenerative neuromuscular diseases such as amyotrophic lateral sclerosis (ALS); patients with spinal cord injuries; and patients with airway burns are just some of the examples of the indications for a tracheostomy. Generally, in all of these cases we note that suctioning is necessary to ensure that the tracheostomy is clear of secretions, which can inhibit successful oxygenation of the individual. Often, individuals with tracheostomies are also receiving supplemental oxygenation. The presence of a tracheostomy, permanent or temporary, warrants careful monitoring and immediate intervention should the tracheostomy become occluded, or in the case of a temporary tracheostomy, the devices used become dislodged.

For patients with a tracheostomy, tracheostomy care, which primarily consists of cleansing, dressing changes, and replacement of the tracheostomy cannula (tube), is a critical part of their care plans. Regular cleansing is important to prevent infection, such as pneumonia, and to prevent any occlusions with which there are risks for inadequate oxygenation. While in rare cases the presence of a tracheostomy is not associated with increased care demands (and in some of those instances, the care of the tracheostomy is performed by the patient) in general the presence of such a device is associated with increased patient risk, and clinical care services will necessarily include close monitoring since to ensure that no life threatening events occur as a result of the tracheostomy, often considered part of the patient’s life line.

The data element, Tracheostomy Care, assesses whether a patient/resident received tracheostomy care during the assessment period.

**Relevance to LTCHs**

While individuals with tracheostomies represent only 3 percent of LTCH patients overall, having a tracheostomy is the clinical characteristic most strongly associated with discharge to an LTCH among Medicare beneficiaries being discharged from acute care settings.\(^{185}\) Further, patients with tracheostomies are at relatively high risk of hospital acquired infections or other complications, and require close monitoring.

---


monitoring to ensure that their tracheostomy is patent, enabling the patient to breathe or be mechanically ventilated through the tracheostomy. Among patients with tracheostomies, total episode spending was lower for those who used an LTCH compared to those who did not, making assessment of this clinical characteristic very important in the LTCH setting in order to facilitate cross-setting comparisons of case mix, resource intensity, and total Medicare spending per episode of care. Assessing whether Tracheostomy Care is being performed for a patient would provide important information for care planning, clinical decision making, care transitions, and resource use in LTCHs.

Proposed Data Element for the Assessment of Special Services, Treatments, and Interventions: Tracheostomy Care

Current use

A version of this data element currently exists in the MDS 3.0.

Evidence supporting use of Tracheostomy Care

In two studies of the MDS 2.0, a checkbox for tracheostomy care during the last 14 days was shown to have reliability of 1.

Invasive Mechanical Ventilation

Invasive mechanical ventilation includes any type of electrically or pneumatically powered closed-system mechanical support devices, to ensure adequate ventilation of the patient who is unable to support his or her own respiration. Patients receiving closed-system ventilation include those receiving ventilation via a tracheostomy, as well as those patients with an endotracheal tube (e.g., nasally or orally intubated). Depending on the patient’s underlying diagnosis, clinical condition, and prognosis, he or she may or may not be a candidate for weaning off the ventilator. For instance, certain medical conditions such as lung infections are expected to improve or resolve to a point where the patient can support his or her own respiration, whereas chronic neurodegenerative diseases are likely to progress over time and therefore preclude the patient from weaning and eventually having the tube removed.

Ventilation in this manner is a resource-intensive therapy associated with life threatening conditions without which the patient would not survive. However, ventilator use has inherent risks requiring close monitoring and failure to adequately care for the patient who is ventilator dependent can

186 Ibid.
lead to iatrogenic events such as death, pneumonia and sepsis. Mechanical ventilation further signifies the complexity of the patient’s underlying medical and/or surgical condition.

Assessment of this item will be accomplished by a new quality measure, “Compliance with Spontaneous Breathing Trial (SBT) by Day 2 of the LTCH Stay,” which will be included in the Admission assessment only and will replace the assessment of invasive mechanical ventilation (weaning versus non-weaning) in the extant LCDS. The quality measure will allow a more accurate and nuanced assessment of the patient’s candidacy for weaning from the ventilator, as well as document the steps taken to allow the patient a trial of spontaneous breathing, if appropriate. Specifically, the first subquestion of the item asks if the patient is on invasive mechanical ventilation support and, if yes, whether it is weaning or non-weaning support. If it is weaning, the next part of the item asks if the patient was assessed for readiness for SBT by day 2 of the LTCH stay. If deemed medically ready, the assessor documents if SBT was performed by day 2 of the LTCH stay and, if deemed medically unready for SBT by day 2, the item asks for documentation of the reason.

Relevance to LTCHs

Invasive mechanical ventilation is common in the LTCH setting. About 22 percent of LTCH patients used an invasive mechanical ventilator, compared with less than 1 percent of patients and residents in home health and SNFs. Of note, invasive mechanical ventilation is associated with high daily and aggregate costs. In a national study of mechanical ventilation use in the United States, the estimated aggregated costs were $27 billion, 12 percent of all hospital costs. The daily incremental cost of mechanical ventilation for intensive care unit (ICU) patients was estimated at between $600 and $1500 per day. While this study was of acute care hospitals, the costliness of this intervention can be extrapolated to LTCHs as well. Assessment of whether the patient is on Invasive Mechanical Ventilation would provide important information for care planning, clinical decision making, care transitions, and resource use in LTCHs.

---


Proposed Data Elements for the Assessment of Special Services, Treatments, and Interventions: Invasive Mechanical Ventilation

**Current use**

Invasive mechanical ventilation is currently assessed in the MDS 3.0, the OASIS-C2, and the LCDS. The MDS uses a 14-day look-back period to assess whether a patient received mechanical ventilation on a ventilator or respirator while a resident or before admission to the facility. The OASIS-C2 assessment data element includes a checkbox item for respiratory treatments used at home, in which “ventilator (continually or at night)” is included. The LCDS has two items that specify whether the invasive mechanical ventilator is weaning or non-weaning.

**Evidence supporting use of Invasive Mechanical Ventilation**

Checkbox items for ventilator (weaning and non-weaning) were tested in the PAC PRD and were found to be feasible for cross-setting use.191 A version of the item was tested in the MDS 3.0 National Evaluation Study and had perfect reliability (1.0).192

**Non-invasive Mechanical Ventilation (Continuous Positive Airway Pressure [CPAP], Bilevel Positive Airway Pressure [BiPAP])**

CPAP and BiPAP are respiratory support devices that prevent the airways from closing by delivering slightly pressurized air through a mask continuously or via electronic cycling throughout the breathing cycle. A BiPAP/CPAP mask provides breathing support through the provision of positive airway pressure that prevents airways from collapsing down during the respiratory cycle. Non-invasive mechanical ventilation differs from invasive mechanical ventilation because the interface with the patient is a mask rather than an endotracheal tube that is passed into the windpipe. CPAP and BiPAP have a variety of clinical indications, from obstructive sleep apnea, to acute respiratory infections, to progressive neuromuscular decline leading to respiratory failure. The key difference between CPAP and BiPAP is that

---


CPAP delivers the same amount of positive airway pressure throughout the breathing cycle while BiPAP, as the name implies, delivers two different pressure levels, a higher pressure to support inhalation and a lower pressure to prevent the airways from collapsing during exhalation. These interventions signify underlying medical conditions in the patient who requires their use.

Relevance to LTCHs

LTCH patients have a high prevalence of respiratory insufficiency, which may be managed by invasive or non-invasive mechanical ventilation. In a survey of respiratory care directors at 17 long-term acute-care hospitals in Massachusetts and Rhode Island with over 2,000 beds (unpublished data), of 180 patients who were receiving mechanical ventilation at the time (2003), 24 percent received non-invasive ventilation. Of those, 74 percent had COPD, 20 percent had restrictive processes (including neuromuscular diseases), and 6 percent had other conditions. Assessment of Non-Invasive Mechanical Ventilation, including CPAP and BiPAP, would provide important information for care planning, care transitions, and resource use in LTCHs. Particularly when used in the context of acute illness or progressive respiratory decline, additional staff (e.g., respiratory therapists) are required to monitor and adjust the CPAP and BiPAP settings and the patient may require more nursing resources.

Proposed Data Elements for the Assessment of Special Services, Treatments, and Interventions: Non-invasive Mechanical Ventilation

Current use

The BiPAP/CPAP data elements assess if the patient received bilevel positive airway pressure or continuous positive airway pressure during the assessment period. They are currently collected in the OASIS-C2, LCDS, and the MDS 3.0. The OASIS-C2 assessment data elements include a checkbox item for respiratory treatments, in which continuous/bi-level positive airway pressure is included. The LCDS uses a checklist format, including an item asking if a non-invasive ventilator (BIPAP, CPAP) is part of the patient’s treatment plan. The MDS 3.0 uses a 14-day look-back period to assess (checklist format) whether a patient needed treatment with BiPAP/CPCP while a resident or before admission to the facility.

Evidence supporting use of Non-invasive Mechanical Ventilation (CPAP, BiPAP)

A checkbox item for Non-invasive Ventilation (CPAP) was tested in the PAC PRD and was found to be feasible for cross-setting use.

**IV Medications**

Intravenous (IV) medications are drugs or biologics that are administered via intravenous push (bolus), single, intermittent, or continuous infusion through a tube placed into the vein, including one that allows the fluids to enter the circulation through one of the larger heart vessels or more peripherally through a vein, e.g., commonly referred to as central midline, or peripheral ports.

This data element is important to collect, as IV medications are more resource intensive to administer than oral medications and signify a higher patient complexity (and often higher severity of illness). The clinical indications for each of the sub-types of IV medications proposed (antibiotics, anticoagulants, and other) are very different. IV antibiotics are used for severe infections when a) the bioavailability of the oral form of the medication would be inadequate to kill the pathogen; b) an oral form of the medication does not exist; or c) the patient is unable to take the medication by mouth. Due to growing concern about antimicrobial resistance, antibiotic stewardship initiatives are aimed at increasing evidence-based antibiotic prescribing and decreasing antibiotic overuse. While the particular antibiotic(s) would not be collected, collecting data on the use of IV antibiotics overall in the four PAC settings would assist with monitoring the implementation of evidence-based prescribing guidelines moving forward.

IV anticoagulants refers to anti-clotting medications (“blood thinners”) often used for the prevention and treatment of deep vein thrombosis and other thromboembolic complications. IV anticoagulants are commonly used in patients with limited mobility (either chronically or acutely, in the post-operative setting), who are therefore at risk of deep vein thrombosis, or patients with certain cardiac arrhythmias such as atrial fibrillation. When a patient is on an IV anticoagulant, they require frequent monitoring of laboratory values to ensure appropriate anticoagulation status.

**Relevance to LTCHs**

Intravenous medications are a common and important part of clinical care for patients in LTCHs. For instance, in a study of LTCHs, 41 percent of patients had an active infection, defined by receiving antibiotics and having a high white blood cell count and/or fever, or sepsis, with a mortality of 78 percent. Furthermore, in the same study, 18 percent of LTCH patients were requiring vasopressors or had a left ventricular ejection fraction <35 percent or NYHA class III/IV, with a mortality of 80.4 percent. The indications, risks, and benefits of each of these classes of IV medications are distinct, making it important to assess each separately in PAC; knowing not only whether or not patients are receiving IV medication but also the type of medication will be helpful in the LTCH setting.

Given the clinical complexity of patients in LTCHs, it is likely that they are receiving one or more medications using the IV route. Assessing IV Medications, including the type of medications, would provide important information for care planning, clinical decision making, patient safety, care transitions, and resource use in LTCHs.

---

Proposed Data Elements for the Assessment of Special Services, Treatments, and Interventions: IV Medications

Note: The response category H2a. Vasoactive medications is not being proposed for standardized assessment of Special Services, Treatments, and Interventions: IV Medications. This response option is being proposed to support the quality measure, Ventilator Liberation Rate, described elsewhere in this document.

Current use

An IV Medications data element is currently in use in the MDS 3.0 but without the sub-elements specifying types of IV Medication.

Evidence supporting use of IV Medications

A similar data element, IV Vasoactive Medications, was tested in the PAC PRD and found to be feasible across PAC settings. This data element was specific to the IV administration of vasoactive drugs (e.g., pressors, dilators, continuous medication for pulmonary edema) that increase or decrease blood pressure and/or heart rate.

In nursing homes, a checkbox for IV medications during the last 5 days was shown to have reliability of 0.952 in the national MDS 3.0 test and IV medications during the last 14 days was shown to have reliabilities of 0.92 and 0.564 in studies of MDS 2.0.196

Transfusions

Transfusions are the administration of blood or blood products (e.g. platelets, synthetic blood products) into the bloodstream. Blood transfusions are highly protocolized, with multiple safety checks and monitoring required during and after the infusion to avoid adverse events. Coordination with the facility’s blood bank is necessary, as well as documentation by clinical staff to ensure compliance with regulatory requirements. In addition, the need for transfusions signifies underlying patient complexity that is likely to require additional nursing staff and care coordination, and impacts planning for transitions of care, as transfusions are not performed in all PAC settings. Receipt of transfusions is also important to assess for case mix adjustment due to the need for added resources and to the extent that receipt of transfusions indicates a more medically complex patient.

**Relevance to LTCHs**

In the clinically-complex LTCH population, there may be many underlying reasons that a patient requires a transfusion of blood or blood products. In fact, unpublished data show that transfusions are the second most-common LTCH procedure, occurring in 18.4 percent of LTCH admissions from 2007 to 2012. Transfusions are resource-intensive, requiring coordination among the blood bank and bedside care staff, and close monitoring is necessary given the incidence of adverse reactions, which may range from mild to severe. Assessing whether the patient requires Transfusions would provide important information for care planning, clinical decision making, patient safety, care transitions, and resource use in LTCHs.

**Proposed Data Element for the Assessment of Special Services, Treatments, and Interventions: Transfusions**

**Current use**

The Transfusions data element is currently collected in the MDS 3.0, using a checkbox format.

**Evidence supporting use of Transfusions**

In nursing homes, a checkbox for transfusions in the past 5 days was shown to have reliability of 0.666 in the national MDS 3.0 test. A checkbox for transfusions in the last 14 days was shown to have reliabilities of 0.57 and 0.304 when tested in two studies of MDS 2.0.

**Dialysis (Hemodialysis, Peritoneal dialysis)**

Dialysis is used primarily in the case of end stage kidney failure. It is a process by which waste, salt, and excess water are removed from the body and key electrolytes such as sodium, potassium, and bicarbonate are maintained at a safe level. Hemodialysis is conducted using an artificial kidney, an external hemodialyzer, which filters the blood. During peritoneal dialysis, the dialysate is injected into the peritoneal (abdominal) cavity, excess fluid and waste products are drawn out of the blood and into the dialysate, and the fluid is then drained. Hemodialysis sessions are typically performed three times a week and last up to four hours each. Peritoneal dialysis can be performed continuously overnight or intermittently during the day.

Both forms of dialysis (hemodialysis and peritoneal dialysis) are resource intensive, not only during the actual dialysis process but before, during and following. Patients who need and undergo

199 Ibid.
dialysis procedures are at high risk for physiologic and hemodynamic instability from fluid shifts and electrolyte disturbances as well as infections that can lead to sepsis. Further, patients receiving hemodialysis are often transported to a different facility, or, at a minimum, to a different part of the hospital if the LTCH is adjacent to a dialysis center. Close monitoring for fluid shifts, blood pressure abnormalities, and other adverse effects is required prior to, during, and following each dialysis session. Nursing staff typically perform peritoneal dialysis at the bedside, and, as with hemodialysis, close monitoring is required.

Relevance to LTCHs

In the LTCH setting, 15 percent of patients in one study were hemodialysis-dependent, with a mortality of 77.8 percent. Importantly, receipt of dialysis has implications for discharge destination of LTCH patients. In a study of dialysis patients admitted to an LTCH, 63 of 206 (31 percent) were discharged to home, 11 of 206 (5.4 percent) died or transferred to hospice, 81 of 206 (40 percent) went to a nursing home, and 49 of 206 (24 percent) were re-admitted to an acute hospital. Mortality after re-admission to this latter setting was high, at 32 percent. Furthermore, 12.2 percent of LTCH patients have hemodialysis indicated on their admission assessment and 10.4 percent have hemodialysis indicated on their discharge assessment. Given how common this resource-intensive service is in the LTCH setting, it is important to assess for care planning and case mix adjustment. Assessing Dialysis (Hemodialysis, Peritoneal dialysis) would provide important information for care planning, clinical decision making, patient safety, care transitions, and resource use in LTCHs.

Proposed Data Elements for the Assessment of Special Services, Treatments, and Interventions: Dialysis

Current use

A Dialysis data element is currently collected in the MDS 3.0, using a 14-day look-back period to assess whether a patient received dialysis while a resident or before admission to the facility. These data elements use a checkbox format to indicate peritoneal or renal dialysis including hemofiltration treatments, Slow Continuous Ultrafiltration (SCUF), Continuous Arteriovenous Hemofiltration (CAVH), and Continuous Ambulatory Peritoneal Dialysis (CAPD).

---


63
Evidence supporting use of Dialysis (Hemodialysis, Peritoneal dialysis)

In nursing homes, a data element assessing dialysis in the past 5 days was tested in the national MDS 3.0 test and shown to have almost perfect reliability (0.908 to 0.927). Dialysis in the last 14 days was also shown to have almost perfect reliability (0.92 to 0.965) in studies of MDS 2.0.204

IV Access

Intravenous (IV) access refers to a catheter inserted into a vein for a variety of clinical reasons, including long-term medication treatment, hemodialysis, large volumes of blood or fluid, frequent access for blood samples, intravenous fluid administration, total parenteral nutrition (TPN), or in some instances the measurement of central venous pressure.

The data elements associated with IV Access distinguish between peripheral access and central access. Further, different types of central access are specified. The rationale for distinguishing between a peripheral IV and central IV access is that central lines confer higher risks associated with life threatening events such as pulmonary embolism, infection and bleeding. Patients with central lines, including those peripherally inserted or who have subcutaneous central line “port” access, always require vigilant nursing care to ensure patency of the lines and importantly to ensure that such invasive lines are free from any potentially life-threatening events such as infection, air embolism, as well as bleeding from an open lumen.

Relevance to LTCHs

Clinically complex patients in the LTCH setting are likely to be receiving medications or nutrition intravenously. Assessing IV Access would provide important information for care planning, clinical decision making, patient safety, care transitions, and resource use in LTCHs. See also “IV Medications” and “Parenteral/IV Feeding” sections of this document.

---


204 Ibid.
Current use

The IV Access data elements as proposed are not currently included in any of the PAC assessments.

Evidence supporting use of IV Access

The IV Access data elements were not tested in the PAC PRD but that study did test a related data element, Central Line Management, which was found feasible for cross-setting use.

Parenteral/IV Feeding

Patients can be fed parenterally (i.e. intravenously) to bypass the usual process of eating and digestion. The person receives nutritional formulas containing salts, glucose, amino acids, lipids and added vitamins. Parenteral/IV feeding is often used following surgery, when feeding by mouth or digestive system is not possible, when a patient's digestive system cannot absorb nutrients due to chronic disease, or if a patient's nutritional requirement cannot be met by tube feeding and supplementation.

The need for parenteral/IV feeding indicates a clinical complexity that prevents the patient from meeting his/her nutritional needs enterally and is more resource intensive than other forms of nutrition, as it often involves monitoring of blood chemistries and maintenance of a central line. Therefore, assessing a patient’s need for parenteral feeding is important for care planning and case mix adjustment. In addition to the risks associated with central and peripheral intravenous access, parenteral/IV feeding is associated with significant risks such as embolism and sepsis.

Relevance to LTCHs

The need for parenteral/IV feeding in LTCHs is common: 8.5 percent of LTCH patients have total parenteral nutrition (TPN) indicated on their admission assessment and 5.2 percent have TPN indicated on their discharge assessment. As mentioned above, the need for TPN indicates a level of clinical complexity that prevents the patient from meeting his/her nutritional needs enterally. Assessing Parenteral/IV Feeding would provide important information for care planning, care transitions, and resource use in LTCHs.

Proposed Data Element for the Assessment of Special Services, Treatments, and Interventions: Parenteral/IV Feeding


Current use

Versions of the Parenteral/IV Feeding data element are currently collected in the OASIS-C2, IRF-PAI, LCDS, and the MDS 3.0. The OASIS-C2 data element assesses whether the patient is receiving parenteral nutrition at home. Section O of the IRF-PAI includes a check box data element to assess total parenteral nutrition (TPN) with a 3-day look-back period. The LCDS includes a checklist with a question asking whether TPN is part of the patient’s treatment plan at admission. The MDS 3.0 uses a 7-day look-back period to assess, via a checklist, whether a patient received parenteral/IV feeding while a resident or before admission to the facility.

Evidence supporting use of Parenteral/IV Feeding

A similar data element, the Total Parenteral Nutrition, was tested in the PAC PRD and found to be feasible across PAC settings. Parental/IV feeding in the last 5 days was shown to have almost perfect reliability (0.946 to 0.951) in the national MDS 3.0 test in nursing homes.\textsuperscript{207} Parental/IV in the last 7 days was shown to have fair (0.213) and almost perfect (0.83) reliabilities in studies of the MDS 2.0.\textsuperscript{208}

Feeding Tube

The Feeding Tube data element refers to enteral nutrition, which is the delivery of a nutritionally complete diet containing protein, carbohydrate, fat, water, minerals, and vitamins, directly into the stomach, duodenum, or jejunum. It is typically used for patients/residents who have a functional gastrointestinal tract but are unable to maintain an adequate or safe oral intake. This data element assesses if the patient/resident received enteral nutrition during the assessment period.

Relevance to LTCHs

Patients with severe malnutrition are at higher risk for a variety of complications.\textsuperscript{209} In the LTCH setting, there are a variety of reasons why patients may not be able to eat orally (including clinical or cognitive status). The majority of patients admitted to acute care hospitals experience deterioration of their nutritional status during their hospital stay, making assessment of nutritional status and method of feeding if unable to eat orally very important in the LTCH setting.\textsuperscript{210} Additionally, this information is useful for the purposes of care planning, care transitions, and resource use in LTCHs, as enteral nutrition is most often used in medically complex patients and is a relatively resource-intensive feeding method, requiring frequent monitoring and administration.

\textsuperscript{208} Ibid.
Proposed Data Element for the Assessment of Special Services, Treatments, and Interventions: Feeding Tube

Current use

A version of the Feeding Tube data element is currently used in three existing PAC assessments. The data element Enteral Nutrition is currently collected in the OASIS-C2, with a question asking if the patient is receiving enteral nutrition at home. In the MDS 3.0, the data element, Feeding tube – Nasogastric Or Abdominal (PEG),\ uses a 7-day look-back period to assess whether a patient used a feeding while not a resident or before admission to the facility. In the IRF-PAI, a Swallowing Status data element captures some information related to enteral nutrition through the response option “Tube/Parenteral Feeding.”

Evidence supporting use of Feeding Tube

In the national MDS 3.0 test in nursing homes, the Feeding Tube data element, collected for the last 5 days, was shown to have almost perfect reliability (0.886). In studies of the MDS 2.0, the Feeding Tube data element, collected in the last 7 days, was also shown to have almost perfect reliability (0.98).\(^{211}\)

Mechanically Altered Diet

A mechanically altered diet is one that is specifically prepared to alter the texture or consistency of food to facilitate oral intake. Examples include soft solids, puréed foods, ground meat, and thickened liquids. A mechanically altered diet should not automatically be considered a therapeutic diet.

The provision of a mechanically altered diet is resource intensive, as it signifies difficulty swallowing/eating safety (dysphagia). Often, nurses are required to slowly feed patients meals consisting of a mechanically altered diet rather than having them eat independently.

Relevance to LTCHs

Patients with severe malnutrition are at higher risk for a variety of complications.\(^{212}\) In the LTCH setting, there are a variety of reasons why patients may have impairments related to oral feedings, including clinical or cognitive status. Specifically, 15 percent to 26 percent of residents in LTCHs require

---


a pureed diet.\textsuperscript{213} \textsuperscript{214} The majority of patients admitted to acute care hospitals experience deterioration of their nutritional status during their hospital stay,\textsuperscript{215} making assessment of nutritional status and method of feeding if unable to eat a regular diet very important in the LTCH setting. In a Canadian study involving 93 LTCH patients, a diversified texture modified food diet improved patients’ nutritional status and slowed weight loss in older adults with dysphagia.\textsuperscript{216} Low interest in, and reduced consumption of, pureed food may increase the risk of malnutrition and dehydration and decrease the quality of life for older adults with dysphagia.\textsuperscript{217} Assessing whether an LTCH patient requires a mechanically altered diet would provide important information for care planning, care transitions, patient safety, and resource use in LTCHs.

\textit{Proposed Data Element for the Assessment of Special Services, Treatments, and Interventions: Mechanically Altered Diet}

\begin{center}
\begin{tabular}{|c|}
\hline
\textbf{K0520. Nutritional Approaches}  \\
Check all of the following nutritional approaches that were performed during the first 3 days of admission.
\hline
\textbf{C. Mechanically altered diet - require change in texture of food or liquids (e.g., pureed food, thickened liquids)}  \\
\hline
1. Performed during the first 3 days of admission \\
Check all that apply
\end{tabular}
\end{center}

\textit{Current use}

The Mechanically Altered Diet data element is currently collected in the MDS 3.0. It uses a 7-day look-back period to assess if a patient received a mechanically altered diet while a resident or before admission to the facility.

\textit{Evidence supporting use of Mechanically Altered Diet}

In the national MDS 3.0 test and studies of MDS 2.0 in nursing homes, the Mechanically Altered Diet data element was shown to have almost perfect reliability (0.82 to 0.960).\textsuperscript{218}

\textbf{Therapeutic Diet}

A therapeutic diet is a diet intervention ordered by a health care practitioner as part of the treatment for a disease or clinical condition manifesting an altered nutritional status, to eliminate, decrease, or increase certain substances in the diet (e.g., sodium or potassium).

\begin{flushleft}
\end{flushleft}
The Therapeutic Diet data element is important to collect in the LTCH setting in order to distinguish therapeutic diet from various other nutritional approaches. It is less resource intensive from the bedside nursing perspective but does signify one or more underlying clinical conditions that preclude the patient from eating a regular diet. The communication among PAC settings of whether a patient is receiving a particular therapeutic diet is critical to ensure safe transitions of care.

**Relevance to LTCHs**

Data are lacking on the prevalence of therapeutic diets among patients in LTCHs. However, given the clinical complexity of these patients and the multiple comorbidities, it is likely that therapeutic diets are common. Assessing whether a patient requires a Therapeutic Diet would provide important information for care planning, clinical decision making, care transitions, and resource use in LTCHs.

![Proposed Data Element for the Assessment of Special Services, Treatments, and Interventions: Therapeutic Diet](image)

**Current use**

This Therapeutic Diet data element is currently collected in the MDS 3.0. It uses a 7-day look-back period to assess whether a patient received a therapeutic diet while a resident or before admission to the facility.

**Evidence supporting use of Therapeutic Diet**

In the national MDS 3.0 test and studies of MDS 2.0 in nursing homes, the Therapeutic Diet data element was shown to have substantial to almost perfect reliability (0.797 to 0.931).²¹⁹

---
Section 5: Medical Conditions and Co-Morbidities

Standardized data elements to satisfy the IMPACT Act category of Medical conditions and comorbidities are already submitted for calculation of the measure the Percent of Residents or Patients with Pressure Ulcers That Are New or Worsened (Short Stay) (NQF #0678), which was finalized for adoption into the LTCH QRP in the FY 2014 IPPS/LTCH PPS final rule, and for the other PAC quality reporting programs in the FY 2016 SNF PPS final rule, the FY 2014 IRF PPS final rule, and the CY 2016 HH PPS final rule. The standardized data elements used to calculate and risk adjust this measure fall under the IMPACT Act category “medical conditions and comorbidities,” listed in section 1899B(b)(1)(B) of the Act, which includes pressure ulcers and diabetes. The data elements proposed for use in the proposed measure, Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury, are also related to the category of medical conditions and comorbidities, are described in Chapter 2, Section 2, of this document.
Section 6: Impairments

Hearing and vision impairments are common conditions that, if unaddressed, affect patients’ and residents’ activities of daily living, communication, physical functioning, rehabilitation outcomes, and overall quality of life. Sensory limitations can lead to confusion in new settings, increase isolation, contribute to mood disorders, and impede accurate assessment of other medical conditions such as cognition. Hearing impairments may cause difficulty in communication of important information concerning the patient’s or resident’s condition, preferences, and care transitions; vision impairments have been associated with increased risk of falls. Both types of impairment can also interfere with comprehension of and adherence to discharge plans. Onset of hearing and vision impairments can be gradual, so accurate screening tools and follow-up evaluations are essential to determining which patients and residents need hearing- or vision-specific medical attention or assistive devices, and to ensuring that person-directed care plans are developed to accommodate a patient or resident’s needs during post-acute care and at discharge.

Assessments pertaining to sensory status aids PAC providers in better understanding the needs of their patients and residents by establishing a diagnosis of hearing or vision impairment, elucidating the patient or resident’s ability and willingness to participate in treatments or use assistive devices during their stay, and identifying appropriate ongoing therapy and support needs at the time of discharge. The standardized assessment of vision impairment among PAC patients and residents supports clinical decision-making, early clinical intervention, person-centered care, and improved care continuity and coordination. The use of valid and reliable standardized assessments can aid in the communication of information within and across providers, further enabling the transfer of accurate health information.

Standardized Data Elements to Assess Hearing and Vision Impairments

CMS has identified two data elements for cross-setting standardized assessment of hearing and vision impairment. The proposed data elements are:

1. Hearing (Ability to Hear)
2. Vision (Ability to See in Adequate Light)

Hearing

Hearing impairment is one of the most common complaints in adults over the age of 60 and is a major contributor to difficulties in speech comprehension. About 51 percent of nursing facility patients and residents are estimated to have moderate to severe hearing impairment. Data from the PAC PRD suggest that severe hearing impairment affects 1 to 2 percent of Medicare FFS beneficiaries in the four types of PAC.

---


222. Hearing impairments were classified into categories from mildly impaired to severely impaired. The percentages reported here refer to severe impairment of hearing, defined as “Absence of useful hearing” (Gage et al., 2012).

Relevance to LTCHs

In LTCHs, 1.7 percent of patients have severe hearing impairment.\(^{224}\) Assessing LTCH patients’ ability to hear is not only important for patient quality of life while hospitalized and post-discharge but also facilitates care planning for the inpatient stay as well as post-discharge care. Assessing Hearing in a patient would provide important information for communication, ensuring safety, care planning, care transitions, and resource use in LTCHs.

Proposed Data Element for the Assessment of Impairments: HEARING

Current use

The Hearing data element (Ability to Hear) is currently collected in the MDS 3.0.

Evidence supporting use of Hearing

The Hearing data element tested in the PAC PRD includes one question regarding hearing ability, which showed high reliability across PAC settings (unweighted kappa = 0.78). The MDS 3.0 version of the Hearing data element also had almost perfect agreement in the MDS 3.0 national test in nursing homes (weighted kappa = 0.938 and 0.894).\(^{225}\) In MDS 2.0 testing, the Hearing data element showed moderate to good reliability (0.575 – 0.88).\(^{226}\)

Vision

Visual impairment can be caused not only by age-related diseases (e.g., age-related macular degeneration [AMD], cataract, glaucoma, and diabetic retinopathy) but also due to nearsightedness, farsightedness, loss of near vision with age, and/or untreated disease.\(^{227}\) In addition to conditions affecting the eye itself, visual deficits can also be caused by other conditions such as stroke and traumatic brain injury. The PAC PRD study found that between 1 and 3 percent of Medicare FFS beneficiaries among the four types of PAC providers had the most extreme category of visual impairment assessed, having “No vision or object identification questionable.”\(^{228}\)

\(^{224}\) Ibid.
\(^{226}\) Ibid.
Relevance to LTCHs

In LTCHs studied in the PAC PRD, 2.8 percent of patients had severe vision impairment.\textsuperscript{229} Assessing visual impairment in LTCHs is important for patient quality of life and care planning for eventual discharge from this setting. Additionally, assessment of this information is useful for ensuring safety in the LTCH setting, as impaired vision increases the risk of falls.\textsuperscript{230, 231} Assessing Vision in a patient would provide important information for patient safety, communication, care planning, care transitions, and resource use in LTCHs.

Proposed Data Element for the Assessment of Impairments: VISION

Current use

The Vision data element (Ability to See in Adequate Light) is currently collected in the MDS 3.0. The data element contains five response options ranging from 0 (adequate) to 4 (severely impaired).

Evidence supporting use of Vision

The MDS 3.0 Vision data element has been shown to perform reliably in screening for vision impairment (weighted kappa = 0.917) in the national MDS 3.0 test in nursing homes\textsuperscript{232}. In studies of MDS 2.0, the Vision data element was shown to have moderate to almost perfect reliability ranging from 0.581 to 0.85. The Vision data element is also linked to performance with readily available materials (i.e., newspaper). Finally, the Vision data element was tested in the PAC PRD assessment. The PAC PRD found substantial agreement for inter-rater reliability across settings for this data element (kappa of 0.74).\textsuperscript{233}

\textsuperscript{229} Ibid.
Appendix 1
Data Elements Used in Calculation of Changes in Skin Integrity
Post-Acute Care: Pressure Ulcer/Injury

<table>
<thead>
<tr>
<th>SNF</th>
<th>IRF</th>
<th>LTCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>M0300 – Current Number of Unhealed Pressure Ulcers/Injuries at Each Stage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**B. Stage 2:** Partial thickness loss of skin with exposed dermis presenting with a red or pink wound bed, without slough. May also present as an intact or open/ruptured blister.

Enter number

1: Number of Stage 2 pressure ulcers. If 0 skip to M0300C Stage 3

Enter number

2: Number of these Stage 2 pressure ulcers that were present upon admission/entry or reentry. Enter how many were noted at the time of admission.

**C. Stage 3:** Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle is not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling.

Enter number

1: Number of Stage 3 pressure ulcers. If 0 skip to M0300D Stage 4

Enter number

2: Number of these Stage 3 pressure ulcers that were present upon admission. Enter how many were noted at the time of admission.

**D. Stage 4:** Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often includes undermining and tunneling.

Enter number

1: Number of Stage 4 pressure ulcers. If 0 skip to M0300E Unstageable non-removable dressing/device

(continued)
<table>
<thead>
<tr>
<th></th>
<th>SNF</th>
<th>IRF</th>
<th>LTCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Unstageable -</td>
<td>Non-removable dressing: Known but not stageable due to non-removable</td>
<td>Non-removable dressing: Known but not stageable due to non-removable</td>
<td>Non-removable dressing: Known but not stageable due to non-removable</td>
</tr>
<tr>
<td></td>
<td>dressing/device.</td>
<td>dressing/device.</td>
<td>dressing/device.</td>
</tr>
<tr>
<td></td>
<td>1: Number of unstageable pressure ulcers/injuries non-removable</td>
<td>1: Number of unstageable pressure ulcers/injuries non-removable</td>
<td>1: Number of unstageable pressure ulcers/injuries non-removable</td>
</tr>
<tr>
<td></td>
<td>dressing/device.</td>
<td>dressing/device.</td>
<td>dressing/device.</td>
</tr>
<tr>
<td></td>
<td>2: Number of these unstageable pressure ulcers/injuries that were</td>
<td>2: Number of these unstageable pressure ulcers/injuries that were</td>
<td>2: Number of these unstageable pressure ulcers/injuries that were</td>
</tr>
<tr>
<td></td>
<td>present upon admission/ entry or reentry.</td>
<td>present upon admission/ entry or reentry.</td>
<td>present upon admission/ entry or reentry.</td>
</tr>
<tr>
<td></td>
<td>Enter number</td>
<td>Enter number</td>
<td>Enter number</td>
</tr>
<tr>
<td></td>
<td>(continued)</td>
<td>(continued)</td>
<td>(continued)</td>
</tr>
<tr>
<td>SNF Risk Adjustment Covariates</td>
<td>IRF Risk Adjustment Covariates</td>
<td>LTCH Risk Adjustment Covariates</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------</td>
<td>-------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Functional Mobility Admission Performance</strong></td>
<td><strong>Functional Mobility Admission Performance</strong></td>
<td><strong>Functional Mobility Admission Performance</strong></td>
<td></td>
</tr>
<tr>
<td>For stays with a target date prior to 10/1/2018:</td>
<td>For stays with a target date prior to 10/1/2017:</td>
<td>For stays with a target date prior to 4/1/2016:</td>
<td></td>
</tr>
<tr>
<td><strong>G0110A1. Activities of Daily Living (ADL) Assistance: Bed Mobility Self-Performance</strong></td>
<td><strong>FIM® Item (39I) Transfers: Bed, Chair, and Wheelchair upon admission:</strong></td>
<td><strong>GG0160C. Functional Mobility: Lying to Sitting on Side of Bed:</strong></td>
<td></td>
</tr>
<tr>
<td>How resident moves to and from lying position, turns side to side, and positions body while in bed or alternate sleep furniture.</td>
<td>7. Complete Independence (Timely, Safely)</td>
<td>The ability to safely move from lying on the back to sitting on the side of the bed with feet flat on the floor, no back support.</td>
<td></td>
</tr>
<tr>
<td>0. Independent</td>
<td>6. Modified Independence (Device)</td>
<td>06. Independent</td>
<td></td>
</tr>
<tr>
<td>1. Supervision</td>
<td>5. Supervision (Subject = 100%)</td>
<td>05. Setup or clean-up assistance</td>
<td></td>
</tr>
<tr>
<td>2. Limited assistance</td>
<td>4. Minimal Assistance (Subject = 75% or more)</td>
<td>04. Supervision or touching assistance</td>
<td></td>
</tr>
<tr>
<td>3. Extensive assistance</td>
<td>3. Moderate Assistance (Subject = 50% or more)</td>
<td>03. Partial/moderate assistance</td>
<td></td>
</tr>
<tr>
<td>4. Total dependence</td>
<td>2. Maximal Assistance (Subject = 25% or more)</td>
<td>02. Substantial/maximal assistance</td>
<td></td>
</tr>
<tr>
<td>7. Activity occurred only once or twice</td>
<td>1. Total Assistance (Subject less than 25%)</td>
<td>01. Dependent</td>
<td></td>
</tr>
<tr>
<td>8. Activity did not occur</td>
<td>0. Activity does not occur</td>
<td>07. Patient refused</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>09. Not applicable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>88. Not attempted due to medical condition or safety concerns</td>
<td></td>
</tr>
</tbody>
</table>

For stays with a target date on or after 10/1/2018:  
**GG0170C. Mobility: Lying to Sitting on Side of Bed:** 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.

06. Independent  
05. Setup or clean-up assistance  
04. Supervision or touching assistance  
03. Partial/moderate assistance  
02. Substantial/maximal assistance  
01. Dependent  
If activity was not attempted, code reason:  
07. Patient refused  
09. Not applicable  
88. Not attempted due to medical condition or safety concerns

For stays with a target date on or after 10/1/2017:  
**GG0170C. Mobility: Lying to Sitting on Side of Bed:** 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.

06. Independent  
05. Setup or clean-up assistance  
04. Supervision or touching assistance  
03. Partial/moderate assistance  
02. Substantial/maximal assistance  
01. Dependent  
If activity was not attempted, code reason:  
07. Patient refused  
09. Not applicable  
88. Not attempted due to medical condition or safety concerns

For stays with a target date on or after 4/1/2016:  
**GG0170C. Functional Mobility: Lying to Sitting on Side of Bed:** The ability to safely move from lying on the back to sitting on the side of the bed with feet flat on the floor, no back support.

06. Independent  
05. Setup or clean-up assistance  
04. Supervision or touching assistance  
03. Partial/moderate assistance  
02. Substantial/maximal assistance  
01. Dependent  
If activity was not attempted, code reason:  
07. Patient refused  
09. Not applicable  
88. Not attempted due to medical condition or safety concerns

(continued)
<table>
<thead>
<tr>
<th>SNF Risk Adjustment Covariates</th>
<th>IRF Risk Adjustment Covariates</th>
<th>LTCH Risk Adjustment Covariates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowel Continence</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>H0400. Bowel Continence</strong></td>
<td>For stays with a discharge date</td>
<td>H0400. Bowel Continence</td>
</tr>
<tr>
<td>3. 0. Always continent</td>
<td>prior to 10/1/2017 - Using 2014</td>
<td>0. Always continent</td>
</tr>
<tr>
<td>4. 1. Occasionally incontinent</td>
<td>IRF-PAI (Version 1.2) or 2015</td>
<td>1. Occasionally incontinent</td>
</tr>
<tr>
<td>5. 2. Frequently incontinent</td>
<td>IRF-PAI (Version 1.3) or 2016</td>
<td>2. Frequently incontinent</td>
</tr>
<tr>
<td>6. 3. Always incontinent</td>
<td>IRF-PAI (Version 1.4): FIM®</td>
<td>3. Always incontinent</td>
</tr>
<tr>
<td>7. 9. Not rated</td>
<td>Item (32) Bowel Frequency of</td>
<td>9. Not rated, patient had an</td>
</tr>
<tr>
<td></td>
<td>Accidents</td>
<td>ostomy or did not have a bowel</td>
</tr>
<tr>
<td></td>
<td>7. No accidents</td>
<td>movement for the entire 3 days</td>
</tr>
<tr>
<td></td>
<td>6. No accidents; uses device</td>
<td></td>
</tr>
<tr>
<td></td>
<td>such as a ostomy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. One accident in the past 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Two accidents in the past 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Three accidents in the past 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Four accidents in the past 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Five or more accidents in the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>past 7 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For stays on and after 10/1/2017-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Using 2016 IRF-PAI (Version 1.4):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H0400. Bowel Continence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0. Always continent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Occasionally incontinent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Frequently incontinent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Always incontinent</td>
<td></td>
</tr>
</tbody>
</table>
|                                | 9. Not rated                   |                                | (continued)
<table>
<thead>
<tr>
<th>SNF Risk Adjustment Covariates</th>
<th>IRF Risk Adjustment Covariates</th>
<th>LTCH Risk Adjustment Covariates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peripheral Vascular Disease (PVD) / Peripheral Arterial Disease (PAD) or Diabetes</strong></td>
<td><strong>For stays with a discharge date prior to 10/1/2016 - Using 2014 IRF-PAI (Version 1.2):</strong></td>
<td><strong>For stays with a discharge date on or after 10/1/2016 - Using 2016 IRF-PAI (Version 1.4):</strong></td>
</tr>
<tr>
<td>I0900. Peripheral Vascular Disease (PVD) / Peripheral Arterial Disease (PAD)</td>
<td>0. Did not have PVD or PAD in the last 7 days</td>
<td>0. Does not have PVD or PAD</td>
</tr>
<tr>
<td></td>
<td>1. Had PVD or PAD in the last 7 days</td>
<td>1. Have PVD or PAD</td>
</tr>
<tr>
<td>I2900 Diabetes Mellitus (DM)</td>
<td>0. Did not have DM in the last 7 days</td>
<td>0. Does not have DM</td>
</tr>
<tr>
<td></td>
<td>1. Had DM in the last 7 days</td>
<td>1. Has DM</td>
</tr>
<tr>
<td><strong>Height and Weight (Low Body Mass Index)</strong></td>
<td><strong>I0900A. Peripheral Vascular Disease (PVD)</strong></td>
<td><strong>I2900. Diabetes Mellitus (DM)</strong></td>
</tr>
<tr>
<td></td>
<td>0. Does not have PVD</td>
<td>0. Does not have DM</td>
</tr>
<tr>
<td></td>
<td>1. Has PVD</td>
<td>1. Has DM</td>
</tr>
<tr>
<td><strong>I0900B. Peripheral Arterial Disease (PAD)</strong></td>
<td><strong>I2900A Diabetes Mellitus (DM)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0. Does not have PAD</td>
<td>0. Does not have DM</td>
</tr>
<tr>
<td></td>
<td>1. Has PAD</td>
<td>1. Has DM</td>
</tr>
<tr>
<td><strong>K0200A (Height); and K0200B (Weight).</strong></td>
<td><strong>I2900B Diabetes Mellitus (DM)</strong></td>
<td><strong>K0200A (Height); and K0200B (Weight).</strong></td>
</tr>
<tr>
<td><strong>25A (Height); and 26A (Weight).</strong></td>
<td>0. Does not have DM</td>
<td><strong>25A (Height); and 26A (Weight).</strong></td>
</tr>
<tr>
<td><strong>K0200A (Height); and K0200B (Weight).</strong></td>
<td>1. Has DM</td>
<td><strong>K0200B (Weight).</strong></td>
</tr>
</tbody>
</table>
Appendix 2
Pressure Ulcer Quality Measure Item Standardization: Data Elements Collected for Calculation of Quality Measures used in SNF, LTCH, and IRF Quality Reporting Programs
<table>
<thead>
<tr>
<th>Item</th>
<th>Item Description</th>
<th>MDS 3.0 (effective 10/1/2016)</th>
<th>LTCH CARE Data Set v3.00 (effective 4/1/2016)</th>
<th>IRF-PAI v1.4 (effective 10/1/2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M0300</td>
<td>Current Number of Unhealed Pressure Ulcers at Each Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Number of Stage 1 pressure ulcers</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>B1</td>
<td>Number of Stage 2 pressure ulcers</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>B2</td>
<td>Number of these Stage 2 pressure ulcers that were present upon admission</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>C1</td>
<td>Number of Stage 3 pressure ulcers</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>C2</td>
<td>Number of these Stage 3 pressure ulcers that were present upon admission</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>D1</td>
<td>Number of Stage 4 pressure ulcers</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>D2</td>
<td>Number of these Stage 4 pressure ulcers that were present upon admission</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>E1</td>
<td>Number of unstageable pressure ulcers due to non-removable dressing/device</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>E2</td>
<td>Number of these unstageable pressure ulcers that were present upon admission</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>F1</td>
<td>Number of unstageable pressure ulcers due to coverage of wound bed by slough and/or eschar</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>F2</td>
<td>Number of these unstageable pressure ulcers that were present upon admission</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>G1</td>
<td>Number of unstageable pressure ulcers with suspected deep tissue injury in evolution</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>G2</td>
<td>Number of these unstageable pressure ulcers that were present upon admission</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

X = Item is present
Appendix 3
Reliability and Validity of Items used to Calculate Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury

The assessment items used in the quality measure Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury have undergone rigorous reliability and validity testing. The goal of reliability testing is to ensure that items on an assessment obtain consistent results when assessed by different individuals. Validity testing determines if an item measures what it intends to measure. Testing of pressure ulcer assessment items conducted across post-acute care settings indicated high inter-rater reliability of the items. In addition, testing showed that inclusion of unstable pressure ulcers in the measure increased variability of scores in IRFs, LTCHs, and SNFs and may improve the ability of the measure to distinguish between high and low performing facilities. Also, support from Technical Expert Panels (TEP), the National Pressure Ulcer Advisory Panel (NPUAP), and public commenters offer construct validity. A brief summary of testing conducted on the pressure ulcer assessment items is provided below.

Item-Level Reliability Testing (MDS 3.0)

Item reliability for data elements assessing pressure ulcers, including unstable pressure ulcers, was tested for the nursing home setting during implementation of MDS 3.0. Testing results are from the RAND Development and Validation of MDS 3.0 project. The project consisted of a representative sample of for-profit and not-for-profit facilities, and hospital-based and freestanding facilities, which included 71 community nursing facilities in 8 states and 19 Veterans Affairs (VA) nursing homes. The sample included 3,822 residents from community nursing homes and 764 residents from VA nursing homes. The RAND pilot test of the MDS 3.0 items showed good reliability and are applicable to the IRF-PAI as well as the LTCH Continuity Assessment Record and Evaluation (CARE) Data Set because the items tested are the same as those used in the IRF-PAI and LTCH CARE Data Set. Furthermore, the MDS 3.0 testing results are appropriate to apply to the evaluation of the LTCH and IRF items because the items are identical across assessments, and there is significant overlap in the populations cared for by these providers. The original short stay nursing home NQF endorsed measure was endorsed by NQF to include the IRF and LTCH settings using this MDS data as evidence of reliability and validity.

Across the pressure ulcer items, average gold-standard to gold standard kappa statistic was 0.905. The average gold-standard to facility-nurse kappa statistic was 0.937. These kappa scores indicate “almost perfect” agreement using the Landis and Koch standard for strength of agreement. We believe that the kappa statistics comparing gold-standard nurse to facility nurse responses should be sufficient for evaluation of the validity of these items as well. The results of this study are publicly available on the CMS website.


More specifically, the RAND project found a high level of inter-rater reliability for assessment items used to calculate the pressure ulcer quality measure, including assessment items for unstageable pressure ulcers. The study included the following results:\(^{236}\):

- Number of existing stage 2 pressure ulcers: Kappa statistic = 0.993 (weighted)
- Number of stage 2 ulcers present on admission: Kappa statistic= 0.966 (weighted)
- Percent agreement for number of stage 3, stage 4, and nonstageable ulcers existing and present on admission was 100%

**Item-Level Reliability Testing (CARE/PAC PRD)**

Additional inter-rater reliability testing of pressure ulcer items similar to those used to calculate the quality measure in the IRF, LTCH and SNF settings was conducted as a part of the PAC PRD.\(^{237}\) For the pressure ulcer item “Does this patient have one or more unhealed pressure ulcer(s) at stage 2 or higher or unstageable?” The kappa score across all settings (acute, IRF, LTCH, SNF and HHA) was 0.845, indicating almost perfect agreement. Setting specific scores are presented below. Kappa statistics for IRF, LTCH, SNF and HHA ranged from .58 to 0.92 indicating “moderate” to “almost perfect” agreement.

For the pressure ulcer items collecting number of pressure ulcers present at assessment by stage, the kappa scores across all settings (acute, HHA, IRF, LTCH, SNF) were:

- Stage 2 Pressure Ulcers = 0.815
- Stage 3 Pressure Ulcers = 0.852
- Stage 4 Pressure Ulcers = 0.780

For the pressure ulcer item “Number of pressure ulcers present at admission by stage-Unstageable”, the kappa score across settings was 0.652, indicating substantial agreement. A setting specific score was only provided for the LTCH setting (kappa= .417, moderate agreement) as the sample size for most individual settings was too small to report (< 15).


**Additional Testing**

RTI performed additional testing of the measure to compare the performance of the measure with proposed changes to the measure as currently specified.\(^{238}\) Testing of the updated version of the measure, including adding unstageable pressure ulcers to the quality measure, increased performance scores in all settings (with scores increasing by 0.1% in IRF settings and 1.7% in NH/SNF settings) and increased the variability of measures scores. This increased variability of scores across quarters and deciles may

---


improve the ability of the measure to distinguish between high and low performing facilities. RTI presented the results of their findings during the July 18, 2016 TEP. Information regarding this study are also included in the TEP Summary Report.

Testing results by setting are as follows:

- In NH/SNFs for reporting period Q1 2012, the mean risk-adjusted score increased from the original measure of 1.8% to 3.5% when we transitioned to M0300 items and added unstageable pressure ulcer items to the measure.
- LTCH: In the mean LTCH risk-adjusted score increased from the original measure of 2.6% to 2.8% for reporting period Q2 2014 when we transition to M0300 items and add unstageable pressure ulcer items.
- IRF: The mean IRF risk-adjusted score increased from the original measure of 0.9% to 1.0% for reporting period Q1 2015 when we transition to M0300 items and add unstageable pressure ulcer items.

**Construct Validity**

A TEP meeting was held on July 18, 2016 to discuss potential changes to the measure, including changes in the data elements used to calculate the measure. During the TEP meeting, RTI presented analyses to show the impact of a transition to calculation of the measure using M0300/M1313 items and inclusion of unstageable pressure ulcers in the measure calculation. Overall, the TEP was supportive of the data element changes as well as inclusion of unstageable pressure ulcers in the measure calculation, indicating construct validity.

Specific feedback from TEP members regarding the potential transition to M0300/M1313 items is excerpted here:

> Some TEP members expressed preference for the M0300 items over the M0800 items due to differences in wording. The M0800 items collect data on “worsening in pressure ulcer status,” while the M0300 items collect data on “current number of unhealed pressure ulcers.” One TEP member stated a preference for the neutral wording of the M0300 items over the M0800 items, which could potentially be interpreted to assign blame for the worsened pressure ulcers. Another TEP member stated a preference for the perceived clarity of the M0300 items, which collect both the current number of pressure ulcers and the number that were present on admission, over the M0800 items, which require the data abstracter to perform a mental calculation to determine the number of new or worsened pressure ulcers, thus providing an opportunity for error.

None of the TEP members stated preference of the use of M0800 items instead of M0300 items in calculation of the quality measure and none of the members expressed objections to the modification. However, the TEP requested that consistent training across all post-acute care settings be made available to providers to support the change process if implemented. The TEP summary report is publicly available and is soon to be available on CMS’ website.\(^{239}\)

---

Also, prior cross-setting TEP meetings held in June and November 2013 yielded support for the inclusion of unstageable pressure ulcers in the quality measure. During these meetings, TEP members concurred that newly-acquired unstageable pressure ulcers, including suspected deep tissue injuries, should be captured in the quality measure for pressure ulcers. The TEP also advised that if a Stage 1 or 2 pressure ulcer becomes unstageable due to slough or eschar, it should be considered worsened in the quality measure for pressure ulcers. CMS and the measure development contractor received additional feedback from technical and clinical advisors and the National Pressure Ulcer Advisory Panel (NPUAP) in January 2014 supporting inclusion of unstageable pressure ulcers in the measure numerator.

**G0110A1 Risk Adjustment in SNF**

Since the IMPACT Act requires submission of standardized assessment data, there is a need to further standardize risk adjustment for the measure Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury across settings. In the SNF setting, G0110A1 has historically been used to measure limitations in bed mobility. However, effective October 1, 2018, the risk adjuster item G0110A1, Activities of Daily Living (ADL) Assistance: Bed Mobility Self-Performance will be replaced with the item GG0170C. Mobility: Lying to Sitting on Side of Bed for the SNF setting measure in order to align with the risk adjuster items used in the LTCH and IRF setting measures. Using data from SNF discharges between October 1, 2016 through December 15, 2016, RTI conducted testing on the comparability of assessment items G0110A1 and GG0170C. Testing results indicate high concordance for those coded as high risk for limitations in bed mobility using both items at 93.85 percent. Overall concordance for high and low risk for limitations in bed mobility using both items was 89.45 percent. The correlation between the G0110A1 and GG0170C assessment items in the SNF population was found to be of medium effect, according to Cohen’s standard (Spearman coefficient=0.324).

Additional testing was conducted to provide a comparison of incidence of new or worsened pressure ulcers according to how residents are characterized using the different bed mobility items: G0110A1 and GG0170C. The percent of individuals who had a new or worsened pressure ulcer and were coded as high risk for limitations in bed mobility using the item G0110A1 was 3.28, while the percent of individuals who had a new or worsened pressure ulcer and were coded as high risk for limitations in bed mobility using the item GG0170C was 3.35. Similar rates of new or worsened pressure ulcers among both groups indicates support for the replacement of G0110A1 with GG0170C to increase harmonization across settings.