Skilled Nursing Facility Quality Reporting Program Measure Calculations and Reporting User's Manual

Version 1.0

Prepared for

Centers for Medicare & Medicaid Services
under Contract No. HHSM-500- 2013-13015I
Measures and Instrument Development & Support (MIDS)

Prepared by

RTI International
3040 Cornwallis Road
Research Triangle Park, NC 27709

Current as of May 22, 2017

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SKILLED NURSING FACILITY QUALITY REPORTING PROGRAM QUALITY MEASURES USER'S MANUAL

VERSION 1.0

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Chapter 1
Skilled Nursing Facility Quality Reporting Program Measure Calculations and Reporting User's Manual Organization and Definitions

The purpose of this manual is to present the methods used to calculate quality measures that are included in the Centers for Medicare & Medicaid Services (CMS) Skilled Nursing Facility (SNF) Quality Reporting Program (QRP)[1]. Quality measures are tools that help measure or quantify healthcare processes, outcomes, patient or resident perceptions and organizational structure/systems that are associated with the ability to provide high-quality services related to one or more quality goals[2]. This manual provides detailed information for each quality measure, including quality measure definitions, inclusion and exclusion criteria and measure calculation specifications. An overview of the SNF QRP and additional information pertaining to public reporting is publicly available and can be accessed through the SNF QRP website[3]. The next section outlines the organization of this manual and provides an overview of the information found in each section.

Section 1: Organization

This manual is organized by chapter, and each chapter contains sections that provide additional details. **Chapter 1** presents the purpose of the manual, explaining how the manual is organized and defining key terms that are used throughout subsequent chapters. The remaining chapters are organized by quality measure and provide detailed information about measure specifications and reporting components. **Chapter 2** identifies the claims-based measures. **Chapter 3** presents the selection logic used to construct records and the selection criteria used to create Medicare Part A stay-level records for the assessment-based quality measures that rely on the Minimum Data Set 3.0 (MDS). **Chapter 4** describes the two Certification and Survey Provider Enhanced Reports (CASPER) data reports for the MDS-based quality measures, consisting of the CASPER Review and Correct reports and the CASPER Quality Measure (QM) reports. Note that the CASPER QM Reports are separated into two reports, one containing measure information at the facility-level and another at the patient-level. Following the discussion of quality measure specifications for each report, information is presented in table format to illustrate the report calculation month, reporting quarters and the months of data that are included in each monthly report. **Chapter 5**

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[1] This manual is specific to the SNF QRP. The manual used to calculate measures for the Nursing Home Quality Initiative (NHQI) is separate and can be found in the downloads section of the following website: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-instruments/NursingHomeQualityInits/NHQIQualityMeasures.html

[2] Centers for Medicare & Medicaid Services. (February 2016). Quality Measures. Accessed on January 25, 2017. Available at: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityMeasures/index.html?redirect=/qualitymeasures/

[3] The SNF QRP website can be found at the following link: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Skilled-Nursing-Facility-Quality-Reporting-Program/SNF-Quality-Reporting-Program-IMPACT-Act-2014.html

describes the methods used to calculate the MDS-based measures that are not risk-adjusted, and **Chapter 6** describes the methods used to calculate the risk-adjusted MDS-based measures. **Chapter 7** provides the measure logical specifications for each of the quality measures calculated from the MDS in table format. **Appendix A** includes covariate values and means used to calculate the MDS-based risk-adjusted measures.

Section 2:   Definitions

Facility Type: The SNF QRP QMs are calculated using MDS 3.0 records submitted from the following types of facilities:

- Nursing Home (SNF/NF) (A0200 = [1]) and

- Swing Bed providers (A0200 = [2])

The facility sample for the SNF QRP measures does not include facilities that are certified solely as Nursing Facilities (i.e. not Dually Certified, or Distinct Part). Swing beds are only those located in **non-critical access hospitals**.

Look-Back Scan: The look-back scan is conducted to review all assessments within a Medicare Part A Stay to determine whether certain events or conditions occurred on any of the assessments during that stay.

Some measures utilize MDS items that record events or conditions that occurred since the prior assessment was performed. The purpose of the look-back scan is to determine whether such events or conditions occurred during the entire look-back period (Medicare Part A Stay). All assessments with target dates within the Medicare Part A Stay are examined to determine whether the event or condition of interest occurred at any time during the Medicare Part A Stay.

Qualifying Reasons for Assessments (RFAs) for the look-back scan include:

A0310A = [01, 02, 03, 04, 05, 06] or

A0310B = [01, 02, 03, 04, 05] or

A0310F = [10, 11] or

A0310H = [1]

Medicare Part A Admission Record: Defined as a PPS 5-Day assessment (A0310B = [01]). Assessments are selected from all Medicare Part A Stays that end or are ongoing during the most recent 12 months (Quality Measure Target Period). If there is no 5-day PPS assessments in the most recent 12 months, the Medicare Part A Admission Record is considered missing.

The Medicare Part A Admission Record **need not** have a target date within the Quality Measure Target Period.

Medicare Part A Discharge Record: A Part A PPS Discharge Assessment (A0310H = [1]) is required when a resident ends a Medicare Part A Stay (the Assessment Reference Date (A2300) for the Medicare Part A Discharge Record occurs within the 12 month Quality Measure Target Period). The end date is defined by the End Date of Most Recent Medicare Stay (A2400C). As noted below, a Part A PPS Discharge Assessment may be combined with an OBRA Discharge

Assessment when the End Date of Most Recent Medicare Stay (A2400C) is on the same day or one day before the Discharge Date (A2000). If there is no Part A PPS Discharge Assessment in the most recent 12 months, the Medicare Part A Discharge Record is considered missing.

The Medicare Part A Discharge Record **must** have a target date that occurs within the Quality Measure Target Period.

Medicare Part A Stay Record (SNF stay): A Medicare Part A Stay includes consecutive time in the facility starting with the Medicare Part A Admission Record (PPS 5-Day assessment with A0310B = [01]) through the Medicare Part A Discharge Record (Part A PPS Discharge Assessment) with A0310H = [1] and all intervening assessments.

Note: A Part A PPS Discharge Assessment can be combined with an OBRA Discharge Assessment when the End Date of Most Recent Medicare Stay (A2400C) is the same day as the Discharge Date (i.e., A2400C = A2000) or the day before the Discharge Date (i.e., A2400C = [A2000 – 1]). In this case, where the Part A PPS Discharge Assessment and OBRA Discharge Assessment are combined, the end of the Medicare Part A Stay is based on the target date for the combined assessment (i.e. the Discharge Date (A2000).

The methodology for selecting the Medicare Part A Stay-level sample is described in **Chapter 3**.

- **Matched Stay:** Stays with a matched pair of Part A PPS 5-Day Assessment (A0310B = 01) and PPS Discharge Assessment (A0310H = 1).

- **Unmatched Stay:** Stays are identified as one of the following three types of stays: 1) stays with a Part A PPS Discharge Assessment (A0310H = 1) but no matched PPS 5-Day Assessment (A0310B = 01), 2) stays with a Part A PPS 5-Day Assessment (A0310B = 01) but no matched PPS Discharge Assessment (A0310H = 1), and 3) stays with a Part A PPS 5-Day Assessment (A0310B = 01) and a matched Death in Facility Record (A0310F=12).

Record Type: This is a grouping of MDS records with similar content and includes Entry Tracking Records, Comprehensive assessments, Quarterly assessments, different types of PPS assessments, and different types of Discharge Assessments. The selection logic for record type is provided in **Chapter 3** of this document.

Target Date: The event date for an MDS record, is defined as follows:

- For an Entry Tracking Record (A0310F = [01]), the target date is equal to the Entry Date (A1600).

- For an OBRA Discharge record (A0310F = [10, 11]) or Death-in-Facility Tracking Record (A0310F = [12]), the target date is equal to the Discharge Date (A2000).

- For all other records (A0310F = [99]), the target date is equal to the Assessment Reference Date (A2300).

The target date corresponds to the event date and allows records to be sorted in chronological order.

Target Period: The span of time that defines the Quality Measure Reporting Period (e.g., a calendar year for the quality measure Percent of Residents or Patients with New or Worsened

Pressure Ulcers [NQF[4] #0678]). The target period for each quality measure is defined in **Chapter 3**.

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Table 1-1
SNF Assessment-Based (MDS) Quality Measures Reference

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Quality Measure	NQF #	CMS ID	Measure Reference Name
Percent of Residents or Patients with Pressure Ulcers That Are New or Worsened (Short Stay)	0678	S002.01	Pressure Ulcers
Application of Percent of Residents Experiencing One or More Falls with Major Injury (Long Stay)	0674	S001.01	Application of Falls
Application of Percent of Long-Term Care Hospital (LTCH) Patients With an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function	2631	S013.01	Application of Functional Assessment/Care Plan

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[4]   NQF: National Quality Forum

Chapter 2
Medicare Claims-Based Measures

CMS utilizes a range of data sources to calculate quality measures. The quality measures listed below were developed using Medicare claims data submitted for Medicare Fee-For-Service residents. Each measure is calculated using unique specifications and methodologies specific to the quality measure. Since these quality measures are claims-based there is no additional burden for providers pertaining to data collection or data submission requirements. Information regarding measure specifications and reporting details is publicly available and can be accessed on the SNF Quality Reporting Measures Information website[5]. Below are the Medicare claims-based measures included in the LTCH QRP and hyperlinks that provide information about each measure, including measure descriptions and definitions, specifications (e.g. numerator, denominator, exclusions, calculations), care setting, and risk-adjustment:

Potentially Preventable 30-Day Post-Discharge Readmission Measure for Skilled Nursing Facility Quality Reporting Program (CMS ID: S004.01)

The potentially preventable readmission (PPR) measure for the PAC SNF QRP estimates the risk-standardized rate of unplanned, potentially preventable readmissions for residents (Medicare fee-for-service [FFS] beneficiaries) who receive services in a SNF. This outcome measure reflects readmission rates for residents who are readmitted to a short-stay acute-care hospital or an LTCH with a principal diagnosis considered to be unplanned and *potentially preventable*.

This measure assesses PPR within a 30-day window following discharge from PAC SNF and was developed to meet the *resource use and other measures* domain as mandated by the IMPACT Act.

The measure calculates a risk-adjusted PPR rate for a SNF. This is derived by first calculating a standardized risk ratio -- the predicted number of readmissions at the PAC provider (facility) divided by the expected number of readmissions for the same residents if treated at the average PAC provider. The standardized risk ratio is then multiplied by the mean readmission rate in the population (i.e., all Medicare FFS residents included in the measure) to generate the PAC provider-level standardized readmission rate of potentially preventable readmissions. For this PPR measure, readmissions that are usually for planned procedures are not counted as being potentially preventable.

Specifications for this measure can be found on the CMS website:
https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/Measure-Specifications-for-FY17-SNF-QRP-Final-Rule.pdf

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[5] The SNF Quality Reporting Program Measures and Technical Information website can be found at the following link:
https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Skilled-Nursing-Facility-Quality-Reporting-Program/SNF-Quality-Reporting-Program-Measures-and-Technical-Information.html

Discharge to Community - Post Acute Care (PAC) Skilled Nursing Facility Quality Reporting Program (CMS ID: S005.01)

This claims-based outcome measure assesses successful discharge to the community from a PAC setting, with successful discharge to the community including no unplanned rehospitalizations and no death in the 31 days following discharge. Specifically, this measure reports a SNF's risk-standardized rate of Medicare FFS residents who are discharged to the community following a SNF stay, and do not have an unplanned readmission to an acute care hospital or LTCH in the 31 days following discharge to community, and who remain alive during the 31 days following discharge to community. Community, for this measure, is defined as home or self-care, with or without home health services, based on Patient Discharge Status Codes [01, 06, 81, 86]on the Medicare FFS claim.[6,7] This measure was developed to address the *resource use and other measures* domain as mandated by the IMPACT Act.

Specifications for this measure can be found on the CMS website:
https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/Measure-Specifications-for-FY17-SNF-QRP-Final-Rule.pdf

Medicare Spending Per Beneficiary (MSPB) - Post-Acute Care (PAC) Skilled Nursing Facility Quality Reporting Program (CMS ID: S006.01)

The MSPB-PAC SNF measure evaluates SNF resource use relative to the resource use of the national median of all SNF providers. Specifically, the measure assesses the Medicare spending performed by the SNF provider and other healthcare providers during an MSPB-PAC episode.

The measure is calculated as the ratio of the payment-standardized, risk-adjusted MSPB-PAC SNF Amount for each PAC SNF provider divided by the episode-weighted median MSPB-PAC SNF Amount across all PAC SNF providers.

Specifications for this measure can be found on the CMS website:
https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/2016_07_20_mspb_pac_ltch_irf_snf_measure_specs.pdf

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[6] National Uniform Billing Committee Official UB-04 Data Specifications Manual 2017, Version 11, July 2016, Copyright 2016, American Hospital Association.

[7] This measure only captures discharges to home and community based settings, not to institutional settings, and is consistent with both Medicaid regulations requiring home and community based settings to support integration, and also with the Americans with Disabilities Act (ADA). This definition is not intended to suggest that board and care homes, assisted living facilities, or other settings included in the definition of "community" for the purpose of this measure are the most integrated setting for any particular individual or group of individuals under the ADA and Section 504.

Chapter 3
Record Selection for Assessment-Based (MDS) Quality Measures

Section 1: Selection Logic for Key Data Elements Used to Construct Records

This section presents the **record selection** logic for some of the key data elements defined in **Chapter 1**, and used in **Section 2** of this Chapter to create Medicare Part A Stay-level record data. This includes:

- Record type
- Medicare Part A Stay sample
- Look-back scan
- Sort order

Record Type:

1. If A0310F = [01] (the record is an Entry Tracking Record), then record type = [1].

2. Else if A0310F = [99] (the record is not an Entry or Discharge), then:

   a. If the item subset code[8] is equal to NC (Comprehensive assessment), then record_type = [7].

   b. Else if the item subset code is equal to NQ (Quarterly assessment), then record_type = [6].

   c. Else if the item subset code is equal to NP (PPS assessment), then record_type = [5].

   d. Else if the item subset code is equal to NO ("other" OMRA assessment), then record type = [4].

   e. Else if the item subset code is equal to NS (Start-of-Therapy OMRA assessment), then record_type = [3].

   f. Else record_type = [2] (this condition should not occur).

3. Else if A0310F = [10] (Discharge-return not anticipated), then record_type = [8].

4. Else if A0310F = [11] (Discharge-return anticipated), then record_type = [9].

5. Else if A0310F = [12] (Death in Facility Tracking Record), then record_type = [10].

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[8] The item subset code is contained in the field ITM_SBST_CD.

Medicare Part A Stay Sample:

The Quality Measure Target Period for the quality measures is a **12-month (four quarters)** period. Sort all assessments in reverse date order as described below. A Medicare Part A Stay is defined as follows:

1. Starting with the most recent assessment **within the Quality Measure Target Period**, look for the most recent Medicare Part A Discharge Record (Part A PPS Discharge Assessment (A0310H = [1]) [stand-alone or combined with an OBRA Discharge Assessment]) or PPS 5-Day assessment (A0310B = [01]). If no Medicare Part A Discharge Record or PPS 5-Day assessment record is found in the Quality Measure Target Period, then the process for identifying SNF stays is complete. If there are Medicare Part A Discharge or Part A PPS Discharge (stand-alone or combined with an OBRA Discharge Assessment) records in the Quality Measure Target Period, then proceed as follows:

    1.1. If a Medicare Part A Discharge Record is found first, use the target date from this assessment (which may be a stand-alone Part A PPS Discharge Assessment or a Part A PPS Discharge Assessment combined with an OBRA Discharge Assessment) as the *end of a Medicare Part A Stay*.

        1.1.1. To identify the start of this Medicare Part A stay, scan earlier records for the most recent PPS 5-Day assessment (A0310B = [01]), OBRA Discharge Assessment (A0310F = [10, 11]), Death in Facility tracking record (A0310F = [12]), Part A PPS Discharge Assessment (A0310H = [1]) or Entry Tracking Record (A0310F = [01]), whichever is most recent. These records are referred to as "qualifying records" through the remaining steps described below for defining the Medicare Part A Stay Sample.

            1.1.1.1. If no qualifying record is found during this scan, then the process for identifying SNF stays is complete.

            1.1.1.2. If the first earlier qualifying record encountered is an Entry Tracking Record, then take the later of (a) the target date for this assessment or (b) the Start Date of Most Recent Medicare Stay (A2400B) from the Medicare Part A Discharge Record as the ***Medicare Part A Start of Stay date***. Code this stay as ***unmatched (staytype = [2])*** (Medicare Part A Discharge Record but no Medicare Part A Admission Record).

                1.1.1.2.1. If there is no earlier record before this Entry Tracking Record, then the process for identifying SNF stays is complete.

                1.1.1.2.2. If there is an earlier record before this Entry Tracking Record, then go back to step 1 and start with this earlier record to determine if there are additional Medicare Part A Stays that occurred earlier during the Quality Measure Target Period.

            1.1.1.3. If the first qualifying record encountered is an OBRA Discharge Assessment (A0310F = [10, 11]), a Death in Facility tracking record (A0310F = [12]), or a Part A PPS Discharge Assessment (A0310H =

[1]), then use the value of the Start Date of Most Recent Medicare Stay (A2400B) from the Medicare Part A Discharge Record as the *Medicare Part A Start of Stay date*. Code this stay as *unmatched (staytype = [2])* (Medicare Part A Discharge Record but no Medicare Part A Admission Record). Go back to step 1 and start with this same Discharge/Death in Facility Tracking Record to determine if there are additional Medicare Part A Stays that occurred earlier during the Quality Measure Target Period.

1.1.1.4. If the first qualifying record encountered is a PPS 5-Day assessment (A0310B = [01]) and it has a target date that is earlier than the date entered as the Start Date of Most Recent Medicare Stay (A2400B) on the Medicare Part A Discharge Record, take the value from A2400B from the Part A PPS Discharge Assessment as the *Medicare Part A Start of Stay date*. Code this stay as *unmatched (staytype = [2])* (Medicare Part A Discharge Record but no Medicare Part A Admission Record). Go back to step 1 and start with this same Part A 5-Day assessment record to determine if there are additional Medicare Part A Stays that occurred earlier during the Quality Measure Target Period.

1.1.1.5. If the first qualifying record encountered is a PPS 5-Day assessment (A0310B = [01]) and it has a target date that is on or after the date entered as the Start Date of Most Recent Medicare Stay (A2400B) on the Medicare Part A Discharge Record, take Start Date of Most Recent Medicare Stay (A2400B) from this PPS 5-Day assessment as *Medicare Part A Start of Stay date*. Save this stay as a *matched (staytype =[1])* stay.

1.1.1.5.1. If there is no earlier record before this PPS 5-Day assessment, then the process for identifying SNF stays is complete.

1.1.1.5.2. If there is an earlier record before this 5-Day assessment, then go back to Step 1 and start with this earlier record to determine if there are additional Medicare Part A Stays that occurred earlier during the Quality Measure Target Period.

1.1.1.5.3. For residents who do not have a Medicare-covered Stay (A2400A = [0]) and the Start Date of Most Recent Medicare Stay is missing (A2400B = [^]), these records are not included.

1.2. If a PPS 5-Day assessment (i.e. Medicare Part A Admission Record) is found first, take the value of the date entered as the Start Date of Most Recent Medicare Stay (A2400B) from this assessment as the *Medicare Part A Start of Stay date*. Take the A2400B date from this record and scan later records with the same A2400B date.

1.2.1. If a later record with the same A2400B date also has the End date of Most Recent Medicare Stay (A2400C) present, then take the earlier of the date in A2400C and the end of the quality measure selection period as the *Part A Stay*

end date. Code this stay as ***unmatched (staytype = [2])*** (Medicare Part A Admission Record but no Medicare Part A Discharge Record). Go back to step 1 to determine if there are additional Medicare Part A Stays that occurred earlier during the Quality Measure Target Period.

1.2.2. If there is no earlier record before the PPS 5-Day assessment record found first (identified in 1.2) then the process for identifying Medicare Part A Stays is complete.

1.2.3. If there is an earlier record before the PPS 5-Day assessment found first (identified in 1.2), then go back to Step 1 and start with this earlier record to determine if there are additional Medicare Part A Stays that occurred earlier during the Quality Measure Target Period.

1.3. Stop defining additional Medicare Part A Stays for the Quality Measure Target Period if one of the following occurs:

1.3.1. A Medicare Part A Discharge Record with a target date that falls earlier than the start of the Quality Measure Target Period is identified.

1.3.2. No Medicare Part A Discharge Record or PPS 5-Day assessment (A0310B = [01]) is identified in the set of assessments in the Quality Measure Target Period.

Note: If a resident has multiple Medicare Part A Stays within the Quality Measure Target Period, all Medicare Part A Stays that end in that Quality Measure Target Period are used. If a Medicare Part A Stay is ongoing at the end of the Quality Measure Target Period, it is not included in the Medicare Part A Stay sample for that target period. Only matched Medicare Part A Stays (***staytype = [1]***) will be included in the Medicare Part A Stay sample for the target period.

Look-Back Scan:

As stated in **Chapter 1**, qualifying RFAs for the **look-back scan** include the following assessments:

> A0310A = [01, 02, 03, 04, 05, 06] **or**
> A0310B = [01, 02, 03, 04, 05] **or**
> A0310F = [10, 11] **or**
> A0310H = [1]

To construct the records used in the look-back scan:

1. Include all assessments (a) on or after the Medicare Stay start date identified in the Medicare Part A Stay definition logic above and (b) on or before the Medicare Part A Stay end date identified in the Medicare Part A Stay definition logic, above.

2. All assessments in the Medicare Part A Stay are scanned to determine whether certain events or conditions occurred during the look-back period. These events and conditions are specified in the definitions of measures that utilize the look-back scan.

Sort Order:

The resident's assessment records included in the target period **must** be sorted by the following:

- State ID

- Facility Internal ID

- Resident Internal ID

- MDS Target Date (descending). This will cause assessment records to appear in reverse chronological order so that the most recent assessment records appear first. This will also ensure that Discharge or Death in Facility Tracking Records appear prior to the Admission Record (PPS 5-Day assessment).

- Record Type (descending)

- Assessment Internal ID (descending). The assessment internal ID is used as the final factor determining the sort order. This is based on the assumption that records later in the sequence will be submitted and processed later than other records. Determinant of the assumption that records that should be later in the sort sequence will be submitted and processed later than the other records. The record processing timestamp would be a slightly better field to use for this purpose, however, it is available only to users who have direct access to the ASAP database. The assessment internal ID was therefore adopted as a reasonable substitute for the timestamp so that all users would have access to the same sorting fields.

Section 2:   Selection Criteria to Create Medicare Part A Stay-Level Records

This section presents record selection criteria for SNF Medicare Part A Stays for quality measures that require Medicare Part A Stay-level record data to be included in the measure calculation and whose **target period is 12 months (four quarters).**

Measures included in this section:

- Percent of Residents or Patients with Pressure Ulcers that Are New or Worsened (Short Stay) (NQF #0678) (CMS ID: S002.01)

- Application of Percent of Residents Experiencing One or More Falls with Major Injury (NQF #0674) (CMS ID: S001.01)

- Application of Percent of Long-Term Care Hospital (LTCH) Patients With an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631) (CMS ID: S013.01)

The eligible Medicare Part A Stay-level records for these quality measures are selected as follows:

1. Select all Medicare Part A Stays that end, based on the target date of the Medicare Part A Discharge Record, within the target period.

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2. For each resident within each SNF:

   a. Sort the Medicare Part A Stays according to the sort order defined in **Section 1,** above.

   b. Using the Medicare Part A Stay sample selection method in **Section 1**, above, select all Medicare Part A Stays for the selection period, with a Medicare Part A Discharge Record with a target date within the target period. These are *target period resident Medicare Part A Stay records*. If a resident has multiple Medicare Part A Stays with a Medicare Part A Discharge Record with a target date within the target period, then include each qualifying resident Medicare Part A Stay in the measure.

For Application of Percent of Long-Term Care Hospital (LTCH) Patients With an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631) (CMS ID: S013.01) *only*, Complete the following steps:

3. Starting with Medicare Part A Stays where *staytype = [1]*, identify residents with complete and incomplete stays (varname = incomplete; *[1] = incomplete stay; [0] = complete stay*) for this measure. Both are included in this quality measure.

   a. Residents with **incomplete stays** *(incomplete = [1])* for this measure are identified based on:

      i. Unplanned discharge indicated by Type of Discharge (A0310G = [2]) [as indicated on an OBRA Discharge (*RFA: A0310F = [10, 11]*) that has a Discharge Date (A2000) that is on the same day or the day after the End Date of Most Recent Medicare Stay (A2400C)].

      OR

      ii. Discharge to an Acute hospital, Psychiatric hospital, or Long Term Care Hospital as indicated by Discharge Status (*A2100 = [03, 04, 09]*, respectively) [as indicated on an MDS Discharge (*RFA: A0310F = [10, 11]*) that has a Discharge Date (A2000) that is on the same day or the day after the End Date of Most Recent Medicare Stay (A2400C)].

      OR

      iii. The resident's death as indicated by Discharge Status (*A2100 = [08], Deceased*) or (*Entry/discharge reporting (A0310F = [12])*, [as indicated on an MDS tracking record (*RFA: A0310F = [12]*) (Death in Facility) that has a Discharge Date (A2000) that is on the same day or the day after the End Date of Most Recent Medicare Stay (A2400C)].

      OR

      iv. Medicare Part A Stay is less than 3 days as indicated by (End Date of Most Recent Medicare Stay (A2400C) minus (Start Date of Most Recent Medicare Stay (A2400B) < 3 days.

   b. All residents not meeting the criteria for incomplete stays *(incomplete = [0])* will be considered **complete stays.**

4. Apply the respective quality measure definition in **Chapter 7** to the eligible resident Medicare Part A Stay-level records from the target period.

a. Percent of Residents or Patients with Pressure Ulcers that Are New or Worsened (Short Stay) (NQF #0678) (CMS ID: S002.01), *Table 7-1*

b. Application of Percent of Residents Experiencing One or More Falls with Major Injury (NQF #0674) (CMS ID: S001.01), *Table 7-2*

c. Application of Percent of Long-Term Care Hospital (LTCH) Patients with an Admission and Discharge Functional Assessment and a Care Plan that Addressed Function (NQF #2631) (CMS ID: S013.01), *Table 7-3*

5. Refer to the respective tables in **Chapter 4** for data included in the CASPER Review and Correct reports and the CASPER QM reports.

    a. Percent of Residents or Patients with Pressure Ulcers that Are New or Worsened (Short Stay) (NQF #0678) (CMS ID: S002.01)

        i. CASPER Review & Correct reports are provided in *Table 4-1* for the quarterly rates and *Table 4-2* for the cumulative rates

        ii. CASPER QM reports *Table 4-3*

    b. Application of Percent of Residents Experiencing One or More Falls with Major Injury (NQF #0674) (CMS ID: S001.01)

        i. CASPER Review & Correct reports are provided in *Table 4-1* for the quarterly rates and *Table 4-2* for the cumulative rates

        ii. CASPER QM reports *Table 4-3*

    c. Application of Percent of Long Term Care Hospital (LTCH) Patients with an Admission and Discharge Functional Assessment and a Care Plan that Addresses Function (NQF #2631) (CMS ID: S013.01)

        i. CASPER Review & Correct reports are provided in *Table 4-1* for the quarterly rates and *Table 4-2* for the cumulative rates

        ii. CASPER QM Reports *Table 4-3*

6. Round off the percent value to the nearest first decimal. If the digit in the second decimal place is 5 or greater, add 1 to the first decimal place, otherwise leave the first decimal place unchanged. Drop all the digits following the first decimal place.

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Chapter 4
Certification and Survey Provider Enhanced Reports (CASPER) Data Selection for Assessment-Based (MDS) Quality Measures

The purpose of this chapter is to present the data selection criteria for the **CASPER Review and Correct Reports** and the **CASPER Quality Measure (QM) Reports** for quality measures that are included in the SNF QRP and are specific to those quality measures calculated using the MDS.

- **The CASPER Review and Correct Reports** contain facility-level measure information and are updated on a quarterly basis with data refreshed weekly as data become available.

  - These reports allow providers to obtain facility-level performance data for the past 12 months (four full quarters) **and are restricted to only the assessment-based measures**. The intent of this report is for providers to access reports prior to the quarterly data submission deadline to ensure accuracy of their data. This also allows providers to track cumulative quarterly data that includes data from quarters after the submission deadline ("frozen" data).

- **The CASPER QM Reports** are provided monthly and separated into two reports: one containing measure information at the facility-level and another at the resident-level, for a single reporting period. The intent of these reports is to enable tracking of quality measure data regardless of quarterly submission deadline ("freeze") dates.

  - The assessment-based (MDS) measures are updated monthly, at the facility- and resident-level, as data becomes available. The performance data contains the current quarter (may be partial) and the past three quarters.

  - The claims-based measures are updated annually at the facility-level only.

The CASPER Review and Correct Reports and the CASPER QM Reports can help identify data errors that affect performance scores. They also allow the providers to utilize the data for quality improvement purposes.

Section 1 contains the data selection for the assessment-based (MDS) quality measures for the CASPER Review and Correct Reports. Since the criteria and reporting periods for the CASPER QM Reports are consistent across the facility- and resident-level reports, **Section 2** of this chapter presents data selection information that can be applied to both the CASPER Resident-level QM Reports and the CASPER Facility-level QM Reports.

Section 1:   CASPER Review and Correct Reports

Below are the specifications for the CASPER Review and Correct Reports for quality measures presented in **Chapter 3**:

1. Quarterly reports contain quarterly rates and a cumulative rate.

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a. The quarterly rates will be displayed using up to one quarter of data.

b. The cumulative rates will be displayed using all data in the target period.

    i. **For all measures:** the cumulative rate is derived by including all stay-level records in the numerator for the target period, which do not meet the exclusion criteria, and dividing by all stay-level records included in the denominator for the target period.

c. The data will be frozen 4.5 months after the end of each quarter (data submission deadline).

d. The measure calculations for the quarterly rates and the cumulative rates are refreshed weekly.

2. Complete data (full target period) is available for previously existing quality measures. Only partial data will be available for new measures until a target period of data has accumulated. Once a target period of data has accumulated, as each quarter advances, the subsequent quarter will be added and the earliest quarter will be removed.

3. An illustration of the reporting timeline for the CASPER Review and Correct Reports for the following measures is provided in *Table 4-1* for the quarterly rates and *Table 4-2* for the cumulative rates:

a. Percent of Residents or Patients with Pressure Ulcers that Are New or Worsened (Short Stay) (NQF #0678) (CMS ID: S002.01)

b. Application of Percent of Residents Experiencing One or More Falls with Major Injury (NQF #0674) (CMS ID: S001.01)

c. Application of Percent of Long-Term Care Hospital (LTCH) Patients With an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631) (CMS ID: S013.01)

4. **Data calculation rule**: The calculations include resident Medicare Part A Stays with discharge dates through the end of the quarter.

Table 4-1
Data Included in the Quarterly Rates for the CASPER Review and Correct Reports for Assessment-Based (MDS) Quality Measures[9]

CASPER Review and Correct Report	Calculation Quarter	Includes Residents with the Following Discharge Dates:
Report 1, 2017	Quarter 1, 2017	January 1, 2017 - March 31, 2017
Report 2, 2017	Quarter 2, 2017	April 1, 2017 - June 30, 2017
Report 3, 2017	Quarter 3, 2017	July 1, 2017 - September 30, 2017
Report 4, 2017	Quarter 4, 2017	October 1, 2017 - December 31, 2017
Report 1, 2018	Quarter 1, 2018	January 1, 2018 - March 31, 2018

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[9] These are examples. Other time periods are available.

Table 4-2
Data Included in the Cumulative Rate for the CASPER Review and Correct Reports for Assessment-Based (MDS) Quality Measures[10]

CASPER Review and Correct Report	Quarters of Data Included in the Report	Discharge Dates Included in the Report
Report 1, 2017	Quarter 1, 2017	January 1, 2017 - March 31, 2017
Report 2, 2017	Quarter 1, 2017 - Quarter 2, 2017	January 1, 2017 - June 30, 2017
Report 3, 2017	Quarter 1, 2017 - Quarter 3, 2017	January 1, 2017 - September 30, 2017
Report 4, 2017	Quarter 1, 2017 - Quarter 4, 2017	January 1, 2017 - December 31, 2017
Report 1, 2018	Quarter 2, 2017 - Quarter 1, 2018	April 1, 2017 - March 31, 2018

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[10] These are examples. Other time periods are available.

Section 2: CASPER Quality Measure (QM) Reports

Below are the specifications for the CASPER QM Reports for measures presented in **Chapter 3.**
The same steps are used to generate both facility- and resident-level of reports.

1. Measures are calculated consistent with the methods in the previous section, **Chapter 4, Section 1.**

    a. Only the cumulative rates will be displayed using all data in the target period.

2. The illustration of the reporting timeline for the monthly CASPER QM Reports is provided in *Table 4-3*:

    a. Percent of Residents or Patients with Pressure Ulcers that Are New or Worsened (Short Stay) (NQF #0678) (CMS ID: S002.01)

    b. Application of Percent of Residents Experiencing One or More Falls with Major Injury (NQF #0674) (CMS ID: S001.01)

    c. Application of Percent of Long-Term Care Hospital (LTCH) Patients With an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631) (CMS ID: S013.01)

3. **Data calculation rule:** The calculations include resident Medicare Part A Stays with discharge dates through the end of the month.

Table 4-3
Data Included in the CASPER QM Reports for MDS Quality Measures[11]

CASPER QM Report Calculation Month	Discharges Through the Month of	Reporting Quarter	Discharge Dates Included in the Report
August 2017	July 2017	Quarter 3, 2017	October 1, 2016 – July 31, 2017
September 2017	August 2017	Quarter 3, 2017	October 1, 2016 – August 31, 2017
October 2017	September 2017	Quarter 4, 2017	October 1, 2016 – September 30, 2017
November 2017	October 2017	Quarter 4, 2017	January 1, 2017 - October 31, 2017
December 2017	November 2017	Quarter 4, 2017	January 1, 2017 - November 30, 2017
January 2018	December 2017	Quarter 1, 2017	January 1, 2017 - December 31, 2017
February 2018	January 2018	Quarter 1, 2018	April 1, 2017 – January 31, 2018
March 2018	February 2018	Quarter 1, 2018	April 1, 2017 – February 28, 2018
April 2018	March 2018	Quarter 2, 2018	April 1, 2017 – March 31, 2018
May 2018	April 2018	Quarter 2, 2018	July 1, 2017 – April 30, 2018
June 2018	May 2018	Quarter 2, 2018	July 1, 2017 – May 31, 2018
July 2018	June 2018	Quarter 3, 2018	July 1, 2017 – June 30, 2018

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[11] These are examples. Other time periods are available.

Chapter 5
Calculations for Assessment-Based (MDS) Measures That Are Not Risk-Adjusted

Section 1: Introduction

This chapter presents technical details regarding the unadjusted calculation of the SNF QRP quality measures and is applicable to the quality measures that are calculated based on a Medicare Part A Stay as a unit of analysis.

The quality measures are created from counts of SNF Medicare Part A Stays who meet certain criteria (e.g., falls resulting in major injury, new or worsened pressure ulcers). For example, SNF-level scores for the Falls With Major Injury quality measure are computed by: 1) counting residents with a Medicare Part A Stay in the facility who had a fall resulting in major injury during that stay and 2) computing the percent of residents in the facility who had valid MDS data and who experienced such a fall. The detailed logic for defining the resident-level outcomes for each quality measure is presented in **Chapters 3** and **4**, and in the Quality Measure Logical Specifications (**Chapter 6**) of this manual. This logic is listed under the "Numerator" entry for each quality measure.

Section 2: Steps Used in National Quality Measure Calculations

This section outlines the steps used to calculate the SNF QRP quality measures. The examples in the steps below use Q3 2015 as the last quarter in the target period. The dates associated with these steps would be updated, as appropriate, for subsequent quarterly releases of the quality measures.

Measure Calculation Steps:

1. *MDS Selection.* All MDS records for SNFs in Q4 2014 through Q3 2015 were selected.

2. *Medicare Part A Stay Creation.* Using the methodology described in **Chapter 3**, Medicare Part A Stays in SNFs were created from the available data. All Medicare Part A Stays with Medicare Part A end dates (as indicated in A2400C, End Date of Most Recent Medicare Stay) within the target period were retained.

3. *Medicare Part A Stay Sampling.* The measure sample is defined to provide data for SNF QRP quality measure calculations.

   a. "Current Period" Medicare Part A Stay Sample: Resident Medicare Part A Stays were included in this sample if they had a Medicare Part A Stay that ended within the target 12 months (4 quarters) of the target period (i.e., Q4 2014 and Q3 2015).

   b. "Current Year" Medicare Part A Stay Sample: The current year is the same as the current period for the Medicare Part A Stay sample.

4. *Resident-level Quality Measure Calculation Files.* At this point, Medicare Part A Stay-level quality measure calculation files were created, separately for each resident Medicare Part A

Stay sample, using the specified assessments for each resident Medicare Part A Stay as appropriate.

NOTE: The selection process used to identify complete and incomplete Medicare Part A Stays is discussed in **Chapter 3, Sections 2 and 3**. This approach was used for the measure *Application of Percent of Long-Term Care Hospital (LTCH) Patients With an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631) (CMS ID: S013.01)*.

5. *Resident-level Quality Measure Score Calculation.* Next, Medicare Part A Stay-level quality measure scores were calculated separately for each resident Medicare Part A Stay.

    a. Resident Medicare Part A Stay-level quality measure calculation (all quality measures):

        i. Exclusions: For each quality measure with exclusions, excluded resident Medicare Part A Stays were assigned a missing value for that quality measure.

        ii. Quality measure values: Does the resident Medicare Part A Stay meet the criteria for the quality measure numerator?

            1. If "Yes", then store a value of [1] for that quality measure in the resident Medicare Part A Stay-level quality measure calculation record appropriate to that resident for a sample.

            2. If "No", then store a value of [0] for that quality measure in the resident Medicare Part A Stay-level quality measure calculation record appropriate to that resident for a sample.

6. *Facility-level Observed Quality Measures Scores.* For all quality measures, the facility-level observed quality measure scores were calculated for the Current Period Medicare Part A Stay sample. These are the measures reported via CASPER that are not risk-adjusted.

    a. Numerator: For each quality measure, count the total number of resident Medicare Part A Stays that met the criteria for the QM numerator in each facility and sum for the SNF.

    b. Denominator: For each quality measure, count the total number of residents Medicare Part A Stays retained after applying exclusions for each facility and sum for the SNF.

    c. Facility-level observed quality measure scores: Divide the numerator by the denominator for each quality measure and nursing facility. Multiply by 100 to obtain a percent value.

7. *Final Facility-level Output File.* The final facility-level output files for the Current Period Medicare Part A Stay quality measures contain the following:

    a. Facility numerator counts

    b. Facility denominator counts

    c. Facility-level observed quality measure scores (reported for the unadjusted quality measures)

Chapter 6
Calculations for Assessment-Based (MDS) Measures That Are Risk-Adjusted

Section 1: Introduction

This chapter presents technical details regarding the risk-adjusted calculation of the SNF QRP quality measures (QMs) and is applicable to the QMs that are calculated based on a Medicare Part A Stay, as a unit of analysis.

The quality measures are created from counts of SNF residents who meet certain criteria (e.g., falls resulting in major injury, new or worsened pressure ulcers). For example, SNF-level scores for the falls quality measure are computed by: 1) counting residents with a Medicare Part A Stay in the facility who had a fall resulting in major injury during that stay and 2) computing the percent of residents in the facility who had valid MDS data and who experienced such a fall. The detailed logic for defining the resident-level outcomes for each quality measure is presented in **Chapters 3** and **4**, and in the Quality Measure Logical Specifications (**Chapter 6**) of this manual. This logic is listed under the "Numerator" entry for each quality measure.

A Note on Risk Adjustment

Risk adjustment refines the raw data to better reflect the issues that facilities should be able to address. Two complementary approaches to risk adjustment are applied to the quality measures.

One approach involves restricting the denominator to residents based on the presence or absence of certain criteria that are not under nursing facility control (e.g., outcome is evidenced on admission to the facility) or the outcome may be unavoidable (e.g., the resident has end-stage disease or is comatose). For each quality measure, the prevalence of the outcome across all residents in a nursing facility, after exclusions, is the *facility-level observed quality measure score*.

A second approach involves adjusting quality measure scores directly, using logistic regression. This method of adjustment employs *resident-level covariates* that are found to increase the risk of an outcome. Detailed specifications for resident-level covariates are presented **Chapter 7**, Quality Measure Logical Specifications. This approach involves the following steps:

- First, resident-level covariates are used in a logistic regression model to calculate a *resident-level expected quality measure score* (the probability that the resident will evidence the outcome, given the presence or absence of characteristics measured by the covariates). **Section 3** of this Chapter presents the details for calculating expected scores for residents.

- Then, an average of all resident-level expected quality measure scores for the nursing facility are calculated to create a *facility-level expected quality measure score.*

- The final *facility-level risk-adjusted quality measure score* is based on a calculation which combines the *facility-level expected score* and the *facility-level observed score*.

The details for calculating facility-level adjusted scores are presented in **Section 4** of this Chapter. The parameters used for each release of the quality measures are presented in **Appendix A**.

Currently only one of the assessment-based quality measures for the SNF setting is adjusted using resident level covariates for public reporting:

• Percent of Residents With Pressure Ulcers That Are New or Worsened (Short Stay) (NQF #0678) (CMS ID: S002.01)

Section 2:   Steps Used in National QM Calculations

This section outlines the steps used to calculate the assessment-based SNF QRP quality measures. The examples in the steps below use Q3 2015 as the last quarter in the target period. The dates associated with these steps would be updated, as appropriate, for subsequent quarterly releases of the quality measures.

Measure Calculation Steps[12]:

1. *MDS Selection.* All MDS records for SNFs in Q4 2014 through Q3 2015 are selected.

2. *Medicare Part A Stay Creation.* Using the methodology described in **Chapter 3**, Medicare Part A Stays in SNFs are created from the available data. All Medicare Part A Stays with Medicare Part A end dates (as indicated in A2400C, End Date of Most Recent Medicare Stay) within the target period are retained.

3. *Medicare Part A Stay Sampling.* The measure sample is defined to provide data for SNF QRP quality measure calculations.

    a. "Current Period" Medicare Part A Stay Sample: Resident Medicare Part A Stays are included in this sample if they have a Medicare Part A Stay that ended within the target 12 months (4 quarters) of the target period (i.e., Q4 2014 and Q3 2015).

    b. "Current Year" Medicare Part A Stay Sample: The current year is the same as the current period for the Medicare Part A Stay sample.

4. *Resident-level Quality Measure Calculation Files.* Using the specified assessments for each resident Medicare Part A Stay, as appropriate, Medicare Part A Stay-level quality measure calculation files are created separately for each resident Medicare Part A Stay sample.

    NOTE: The selection process used to identify complete and incomplete stays is discussed in **Chapter 3**, **Sections 2 and 3**.

5. *Resident-level Quality Measure Score and Covariate Calculation.* Next, resident Medicare Part A Stay-level quality measure scores and covariates are calculated separately for each short stay resident in a SNF.

    a. Resident Medicare Part A Stay-level quality measure calculation:

        i. Exclusions: For each quality measure with exclusions, excluded resident Medicare Part A Stays are assigned a missing value for that quality measure.

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[12] Steps 1-4 are the same as those described in **Chapter 5**.

ii. Quality measure values: does the resident Medicare Part A Stay meet the criteria for the quality measure numerator?

   1. If "Yes", then store a value of [1] for that quality measure in the resident Medicare Part A Stay-level quality measure calculation record appropriate to that resident for a sample.

   2. If "No", then store a value of [0] for that quality measure in the resident Medicare Part A Stay-level quality measure calculation record appropriate to that resident for a sample.

b. Resident-level covariate calculation:

   i. Resident exclusions: For each quality measure, excluded residents are assigned a missing value for that quality measure. Residents with missing covariate values are assigned a value of 0 for that covariate.

   ii. Covariate: does the resident meet the criterion for the covariate?

   1. If "Yes", then store a value of [1] for that covariate in the resident-level quality measure calculation record appropriate to that resident for a sample.

   2. If "No", then store a value of [0] for that covariate in the resident-level QM quality measure calculation record appropriate to that resident for a sample.

6. ***Logistic Regressions.*** With the resident-level files complete, and all relevant exclusions applied, logistic regressions for the risk-adjusted quality measures are estimated using the Current Year Medicare Part A Stay Sample.

   a. Input: Medicare Part A Stay resident-level file.

   b. Dependent variable: Does the quality measure meet the criteria for the measure? (Yes = 1, No = 0).

   c. Predictors: Resident-level covariates.

   d. Calculation of logistic regressions: (See **Section 3, Calculation of the Expected Quality Measure Score** in this Chapter).

   e. Output values: Logistic regression constant term and resident-level covariate coefficients for each of the quality measures. The resulting values are given in ***Table A-1*** of **Appendix A**.

7. ***Resident-level Expected Quality Measure Scores.*** For the QMs that are risk-adjusted, resident-level expected quality measure scores are calculated for each resident for the Medicare Part A Stay samples. (See **Section 3, Calculation of the Expected Quality Measure Score** in this Chapter for formulas).

   a. Input: Logistic regression constant term and resident-level covariate coefficients from the previous step for each risk-adjusted quality measure.

   b. Output values: Resident-level expected quality measure scores for each resident, for each of the risk-adjusted quality measures.

8. ***National Mean Quality Measures.*** National mean observed quality measures are needed for calculating the facility-level risk-adjusted quality measure scores below. The overall national

mean observed quality measure scores for the Medicare Part A Stay samples are calculated, for each risk-adjusted quality measure:

   a. Numerator: For each quality measure, count the total number of residents that met the criteria for numerator inclusions for the quality measure and sum for the nation.

   b. Denominator: For each quality measure, count the total number of residents retained after exclusions and sum for the nation. Note that the sample will include only those residents with non-missing data for the component covariates.

   c. Overall national mean observed quality measure score: Divide the numerator by the denominator.

9. *Facility-level Observed Quality Measure Scores.* For all quality measures, the facility-level observed QM scores are calculated for the Current Period Medicare Part A stay sample.

   a. Numerator: For each quality measure, count the total number of resident Medicare Part A stays that met the criteria for the quality measure numerator in each facility and sum for the SNF.

   b. Denominator: For each quality measure, count the total number of residents Medicare Part A stays retained after applying exclusions for each facility and sum for the SNF.

   c. Facility-level observed quality measure scores: Divide the numerator by the denominator for each quality measure and nursing facility.

10. *Facility-level Expected Quality Measure Scores.* The facility-level expected quality measure scores are calculated for the Current Period Medicare Part A Stay samples. This is done by averaging the resident-level expected QM scores for each quality measure within each nursing facility.

11. *Facility-level Risk-Adjusted Quality Measure Scores.* Finally, for the risk-adjusted QMs, the facility-level risk-adjusted QM scores are calculated for the Current Period Medicare Part A Stay samples.

   a. Input for each of the risk-adjusted quality measures:

        i. Facility-level observed quality measure scores

       ii. Facility-level expected quality measure scores

      iii. National mean observed quality measure scores

   b. Calculation: (See **Section 4, Calculation of the Risk-Adjusted** quality measure **Score** of this Chapter for formulas used in this calculation)

   c. Output: Facility-level risk-adjusted quality measure scores for the risk-adjusted quality measure

12. *Final Facility-level Output File.* The final facility-level output files for the Current Period Medicare Part A Stay quality measures contain the following:

   a. For all quality measures:

        i. Facility numerator counts

       ii. Facility denominator counts

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iii. Facility-level observed quality measure scores (reported for the unadjusted quality measures)

b. For the risk-adjusted quality measures: Facility-level risk-adjusted quality measure scores (reported for the adjusted quality measure scores)

Section 3: Calculation of the Expected Quality Measure Score

The resident-level expected score for a quality measure is an estimate of the likelihood that a resident will meet the criteria for the quality measure. This estimate is based on consideration of the resident-level covariates associated with the quality measure.

For the quality measures that are risk-adjusted with resident-level covariates, the resident-level expected quality measure score is calculated as an intermediate step to obtaining the risk-adjusted quality measure score for the facility. This section describes the technical details referred to in **Section 2** of this chapter.

Calculating Resident-level Expected QM Scores

For each of the risk-adjusted quality measures, a resident-level logistic regression is estimated. Data came from the Medicare Part A Stay samples described in **Section 2** of this chapter. The resident-level observed quality measure score is the dependent variable. The predictor variables are one or more resident-level covariates associated with the quality measure. Calculation of the quality measure and covariate scores is described in **Section 2** (Step 5) of this chapter.

Each logistic regression had the following form:

[1] $QM\ triggered\ (yes = 1, no = 0) = \beta_0 + \beta_1 * COV_1 + \beta_2 * COV_2 + \cdots + \beta_N * COV_N$

Where:

$\boldsymbol{\beta_0}$ = the logistic regression constant
$\boldsymbol{\beta_1}$ = the logistic regression coefficient for the first covariate
$\boldsymbol{COV_1}$ = the resident-level score for the first covariate
$\boldsymbol{\beta_2}$ = the logistic regression coefficient for the second covariate, where applicable
$\boldsymbol{COV_2}$ = the resident-level score for the second covariate, where applicable).
$\boldsymbol{\beta_N}$ = the logistic regression coefficient for the Nth covariate, where applicable
$\boldsymbol{COV_N}$ = the resident-level score for the Nth covariate, where applicable.
*Note, "N" represents the total number of covariates in the model.

Each resident's expected QM score could then be calculated with the following formula:

[2] $Resident\ level\ expected\ QM\ score = 1/[1 + e^{-x}]$

Where:

e = is the base of natural logarithms
x = a linear combination of the constant and the logistic regression coefficients times the covariate scores (from Formula [1], above). Note: A covariate score will be equal to 1 if the covariate criteria is met for that resident, and equal to 0 if the criteria is not met.

As an example, consider the actual calculation used for the expected score for the measure *Percent of Residents or Patients with Pressure Ulcers that Are New or Worsened (NQF #0678) (S002.01)*. The covariates for that QM are:

- Indicator of requiring limited or more assistance in bed mobility self-performance on the PPS 5-Day assessment

- Indicator of bowel incontinence at least occasionally on the PPS 5-Day assessment

- Have diabetes or peripheral vascular disease or peripheral arterial disease on the PPS 5-Day assessment

- Indicator of Low Body Mass Index, based on Height and Weight on the PPS 5-Day assessment

The equation used for this example (with the parameters from **_Table A-1_**[13]) is:

[3] $QMScore = 1/[1 + e^{-(\beta_0 + \beta_1 * bedmob + \beta_2 * bowel + \beta_3 * diabetes + \beta_4 * BMI)}]$

Where:

$\boldsymbol{\beta_0}$ = the logistic regression constant
$\boldsymbol{\beta_1}$ = the logistic regression coefficient for bed mobility
Bedmob = the resident-level covariate indicating the need for limited or more assistance in bed mobility
$\boldsymbol{\beta_2}$ = the logistic regression coefficient for bowel incontinence at least occasionally
bowel = the resident-level covariate indicating occasional bowel incontinence
$\boldsymbol{\beta_3}$ = the logistic regression coefficient for diabetes or peripheral vascular disease or peripheral arterial disease
diabetes = the resident-level covariate indicating diabetes or peripheral vascular disease in bed mobility
$\boldsymbol{\beta_4}$ = the logistic regression coefficient for low body mass index
BMI = the resident-level covariate indicating low body mass index.

The values for the covariate parameter for each of the *k* risk-adjustment coefficients (β_k) used for calculating the resident-level expected quality measure scores are presented in **_Table A-1_** of **Appendix A**.

Calculating Facility-level Expected Quality Measure Scores

Once an expected quality measure score has been calculated for all residents at risk, the facility-level expected quality measure score is simply the average of all resident-level scores for each of the risk-adjusted quality measures.

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[13] The regression constant (intercept) and coefficient values have been rounded to four decimal places. When applying these values to the equation to calculate QM scores, these intercept and coefficient values should be used; do not round to fewer than four decimal places. This is to ensure consistency and accuracy of measure calculations.

Section 4:   Calculation of the Risk-Adjusted Quality Measure Score

The risk-adjusted quality measure score is a facility-level quality measure score adjusted for the specific risk for that quality measure in the SNF. The risk-adjusted quality measure score can be thought of as an estimate of what the SNF's quality measure rate would be if the facility had residents with average risk.

The facility-level risk-adjusted score is calculated on the basis of

- The facility-level observed quality measure score,
- The facility-level average expected quality measure score, and
- The national average observed quality measure score.

The actual calculation of the risk-adjusted score uses the following equation:

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

Where:

> e = the base of natural logarithms
> Adj = the facility-level risk-adjusted quality measure score
> y = the product of Formula [5], below

[5] $y = ln\left(\frac{Obs}{1-Obs}\right) - ln\left(\frac{Exp}{1-Exp}\right) + ln\left(\frac{Nat}{1-Nat}\right)$

Where:

> Obs = the facility-level observed quality measure rate
> Exp = the facility-level expected quality measure rate
> Nat = the national observed quality measure rate (see *Table A-2* of **Appendix A**)
> ln = the natural logarithm
> e = the base of natural logarithms

Note that the risk-adjusted quality measure rate (*Adj*) is calculated differently in two special cases:

1. When Obs equals 0.00, then *Adj* is set to 0.00 (without using the equation).
2. When Obs equals 1.00, then *Adj* is set to 1.00 (without using the equation).

The adjusted quality measure score equation will produce risk-adjusted scores in the range of 0 to 1. These risk-adjusted scores can then be converted to percentages for ease of interpretation.

These risk-adjusted score calculations are applied to quality measures that use expected scores based on resident-level covariates (See **Section 3** of this chapter). The national average observed quality measure rates, required for these calculations, are presented in *Table A-2* of **Appendix A**.

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Chapter 7
Measure Logical Specifications for Assessment-Based (MDS) Quality Measures

Table 7-1
Percent of Residents or Patients with Pressure Ulcers that Are New or Worsened (Short Stay)
(NQF #0678) (CMS ID: S002.01)

Measure Description
This measure reports the percentage of Medicare Part A stays for residents with Stage 2-4 pressure ulcers that are new or worsened since admission.

Measure Specifications

If a resident has multiple Medicare Part A Stays during the target 12 months, then all stays are included in this measure.

Numerator

Medicare Part A Stays (*staytype = 1*) for which the discharge assessment indicates one or more new or worsened Stage 2-4 pressure ulcers compared to admission. This is determined by the following conditions on the target assessment (which may be a stand-alone Part A PPS Discharge, or Part A PPS Discharge combined with an OBRA Discharge Assessment).

1. Stage 2 (M0300B1) **-** (M0300B2) > 0, OR
2. Stage 3 (M0300C1) **-** (M0300C2) > 0, OR
3. Stage 4 (M0300D1) **-** (M0300D2) > 0

Denominator

Complete resident Medicare Part A Stays (*staytype = 1*) which is defined by a 5-day PPS assessment and a discharge assessment, which may be a stand-alone Part A PPS Discharge, or a Part A PPS Discharge combined with an OBRA Discharge Assessment, except those who meet the exclusion criteria.

Exclusions

1. Resident stay is excluded if data on new or worsened Stage 2, 3, and 4 pressure ulcers are missing at discharge, i.e.:

    a, Stage 2 (M0300B1= [-] or (M0300B2= [-]), AND
    b. Stage 3 (M0300C1= [-] or (M0300C2= [-]), AND
    c. Stage 4 (M0300D1= [-] or (M0300D2= [-])

Covariates

1. Indicator of requiring limited or more assistance in bed mobility self-performance on the PPS 5-Day assessment:
   Covariate = [1] if (G0110A1 = [2, 3, 4, 7, 8])
   Covariate = [0] if (G0110A1 = [0, 1, -])

2. Indicator of bowel incontinence at least occasionally on the PPS 5-Day assessment:
   Covariate = [1] if (H0400 = [1, 2, 3])
   Covariate = [0] if (H0400 = [0, 9, -, ^])

3. Have diabetes or peripheral vascular disease or peripheral arterial disease on the PPS 5-Day assessment:
   Covariate = [1] if one or both of the following are true:
      3.1.   (I0900 = [1] (checked))
      3.2.   (I2900 = [1] (checked))
   Covariate = [0] if [(I0900 = [0, -] (unchecked/unknown)) AND (I2900 = [0,-] (unchecked/unknown))]

4. Indicator of Low Body Mass Index, based on Height (K0200A) and Weight (K0200B) on the PPS 5-Day assessment:
   Covariate = [1] if BMI $\geq$ [12.0] and $\leq$ [19.0]
   Covariate = [0] if BMI < 12.0 or > 19.0 or if BMI cannot be computed because (K0200A = [0, -]) or (K0200B = [0, -])
   Where: BMI = (weight * 703 / height^2) = ((K0200B) * 703) / (K0200A^2)) and the resulting value is rounded to the first decimal place.

Table 7-2
Application of Percent of Residents Experiencing One or More Falls with Major Injury (Long Stay)
(NQF #0674) (CMS ID: S001.01)

Measure Description
This quality measure reports the percentage of patient/resident stays with where one or more falls with major injury (defined as bone fractures, joint dislocations, closed head injuries with altered consciousness, or subdural hematoma) were reported during the SNF, LTCH, or IRF stay.

Measure Specifications
If a resident has multiple Medicare Part A Stays during the target 12 months, then all stays are included in this measure.

Numerator

The number of Medicare Part A Stays (*staytype = 1*) with one or more look-back scan* assessments that indicate one or more falls that resulted in major injury (J1900C = [1, 2]).

Denominator

The number of Medicare Part A stays with one or more assessments that are eligible for a look-back scan (except those with exclusions).

Exclusions

A resident Medicare Part A Stay is excluded if none of the assessments that are included in the look-back scan has a usable response for items indicating the presence of a fall with major injury during the selected time window

(i.e., the occurrence of falls was not assessed; i.e., J1800 = [-]

The assessment indicated that a fall occurred; i.e., J1800 = [1] AND the number of falls with major injury was not assessed; i.e., J1900C = [-]

Covariates
None.

Table 7-3

Application of Percent of Long-Term Care Hospital (LTCH) Patients With an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631) (CMS ID: S013.01)

Measure Description
This quality measure reports the percent of all Skilled Nursing Facility (SNF) Part A residents with an admission and discharge functional assessment and a care plan that addresses function.

Measure Specifications

If a resident has multiple Medicare Part A stays during the target 12 months, then all stays are included in this measure.

Incomplete and Complete Patient Stays:

Incomplete SNF Medicare Part A Stay: Residents with incomplete stays (*incomplete = [1]*) are identified based on the following criteria using the specified data elements:

1. Unplanned discharge indicated by A0310G (Type of Discharge) = 2 (Unplanned discharge) [as indicated on an OBRA Discharge (RFA: A0310F = [10, 11]) that has a discharge date (A2000) that is on the same day or the day after the End Date of Most Recent Medicare Stay (A2400C)].
OR
2. Discharge to acute hospital, psychiatric hospital, long-term care hospital indicated by A2100 = [03, 04, 09]. [as indicated on an MDS Discharge (RFA: A0310F = [10, 11]) that has a discharge date (A2000) that is on the same day or the day after the End Date of Most Recent Medicare Stay (A2400C)].
OR
3. SNF PPS Part A stay less than 3 days ((A2400C minus A2400B) < 3 days)
OR
4. The resident death indicated by A2100 = [08] or A0310F = [12], [as indicated on an MDS tracking record (RFA: A0310F = [12]) that has a discharge date (A2000) that is on the same day or the day after the End Date of Most Recent Medicare Stay (A2400C)].

Complete Medicare Part A Stay: Medicare Part A Stays not meeting the definition of incomplete stays are considered complete Medicare Part A Stays (*incomplete = [0]*).

Numerator:

For residents with complete Medicare Part A Stays (*incomplete = [0])*, three criteria are required for inclusion in the numerator: (i) complete admission functional assessment data on the PPS 5-Day assessment, *and* (ii) a discharge goal for at least one self-care or mobility item on the PPS 5-Day assessment, *and* (iii) complete discharge functional assessment data on the Part A PPS Discharge Assessment.

For residents with incomplete Medicare Part A Stays (*incomplete = [1]*), collection of discharge functional status might not be feasible. Therefore, two criteria are required for inclusion in the numerator: (i) complete admission functional assessment data on the PPS 5-Day assessment, *and* (ii) a discharge goal for at least one self-care or mobility item on the PPS 5-Day assessment.

Measure Specifications

Specifications for complete admission functional assessment data:

For admission functional assessment data to be complete, each condition listed below **must** be met.

    1. GG0130A1. Eating = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
    2. GG0130B1. Oral hygiene = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
    3. GG0130C1. Toileting hygiene = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
    4. GG0170B1. Sit to lying = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
    5. GG0170C1. Lying to sitting on side of bed = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
    6. GG0170D1. Sit to stand = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
    7. GG0170E1. Chair/bed-to-chair transfer = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
    8. GG0170F1. Toilet transfer = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*

  For residents who are walking as indicated by GG0170H1=2, include items:
    9. GG0170J1. Walk 50 feet with two turns = [01, 02, 03, 04, 05, 06, 07, 09, 88] *and*
        GG0170K1. Walk 150 feet = [01, 02, 03, 04, 05, 06, 07, 09, 88]

  For residents who use a wheelchair as indicated by GG170Q1=1, include items:
    10. GG0170R1. Wheel 50 feet with two turns = [01, 02, 03, 04, 05, 06, 07, 09, 88] *and*
        GG0170RR1. Indicate the type of wheelchair/scooter used = [1, 2] *and*
        GG0170S1. Wheel 150 feet = [01, 02, 03, 04, 05, 06, 07, 09, 88] *and*
        GG0170SS1. Indicate the type of wheelchair/scooter used = [1, 2]

Specifications for a discharge goal (documenting a care plan that includes function):

For the discharge goal, at least one of the items listed below **must** have a valid code as specified.

    1. GG0130A2. Eating = [01, 02, 03, 04, 05, 06]; *or*
    2. GG0130B2. Oral hygiene = [01, 02, 03, 04, 05, 06]; *or*
    3. GG0130C2. Toileting hygiene = [01, 02, 03, 04, 05, 06]; *or*
    4. GG0170B2. Sit to lying = [01, 02, 03, 04, 05, 06]; *or*
    5. GG0170C2. Lying to sitting on side of bed = [01, 02, 03, 04, 05, 06]; *or*
    6. GG0170D2. Sit to stand = [01, 02, 03, 04, 05, 06]; *or*
    7. GG0170E2. Chair/bed-to-chair transfer = [01, 02, 03, 04, 05, 06]; *or*
    8. GG0170F2. Toilet transfer = [01, 02, 03, 04, 05, 06]; *or*
    9. GG0170J2. Walk 50 feet with two turns = [01, 02, 03, 04, 05, 06]; *or*
    10. GG0170K2. Walk 150 feet = [01, 02, 03, 04, 05, 06]; *or*
    11. GG0170R2. Wheel 50 feet with two turns = [01, 02, 03, 04, 05, 06]; *or*
    12. GG0170S2. Wheel 150 feet = [01, 02, 03, 04, 05, 06].

(continued)

Table 7-3 (continued)

Application of Percent of Long-Term Care Hospital (LTCH) Patients With an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function (NQF #2631) (CMS ID: S013.01)

Measure Specifications

Specifications for complete discharge functional assessment data:

For discharge functional assessment data to be complete, each condition listed below **must** be met. This only applies to residents with complete stays (discharge functional assessment data is not required for incomplete stays).

1. GG0130A3. Eating = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
2. GG0130B3. Oral hygiene = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
3. GG0130C3. Toileting hygiene = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
4. GG0170B3. Sit to lying = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
5. GG0170C3. Lying to sitting on side of bed = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
6. GG0170D3. Sit to stand = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
7. GG0170E3. Chair/bed-to-chair transfer = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
8. GG0170F3. Toilet transfer = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*

For residents who are walking as indicated by GG0170H3=2, include items:

9. GG0170J3. Walk 50 feet with two turns = [01, 02, 03, 04, 05, 06, 07, 09, 88]; *and*
   GG0170K3. Walk 150 feet = [01, 02, 03, 04, 05, 06, 07, 09, 88].

For residents who use a wheelchair as indicated by GG170Q3=1, include items:

10. GG0170R3. Wheel 50 feet with two turns = [01, 02, 03, 04, 05, 06, 07, 09, 88] *and*
    GG0170RR3. Indicate the type of wheelchair/scooter used = [1, 2] *and*
    GG0170S3. Wheel 150 feet = [01, 02, 03, 04, 05, 06, 07, 09, 88]) *and*
    GG0170SS3. Indicate the type of wheelchair/scooter used = [1, 2].

Denominator

The denominator is the number of Medicare PPS Part A Stays with a Medicare Part A Stay End Date (A2400C) during the measure target period.

Exclusions

There are no denominator exclusions for this measure.

Covariates

None.

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Appendix A:
Model Parameters

Table A-1
Logistic Regression Coefficients for the Percent of Residents or Patients with Pressure Ulcers That Are New or Worsened (NQF #0678) (CMS ID: S002.01)

Calculation Date	Constant (Intercept)	Resident-Level Covariates[14]
May 2, 2017	-6.1725	1. Covariate 1 (Impaired Mobility): 1.1671 2. Covariate 2 (Bowel Incontinence): 0.9226 3. Covariate 3 (Diabetes or PVD/PAD): 0.3005 4. Covariate 4 (Low BMI): 0.3912

Table A-2
National Observed QM Mean (NQF #0678) (CMS ID: S002.01)

Calculation Date	Target Period	National Observed QM Mean
May 2, 2017	October 1, 2016 through December 31, 2016	.0122654

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[14] The regression constant (intercept) and coefficient values have been rounded to four decimal places. When applying these values to the equation to calculate QM scores, these intercept and coefficient values should be used; do not round to fewer than four decimal places. This is to ensure consistency and accuracy of measure calculations.