Nursing Home Compare Quality Measure Technical Specifications

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Contents

PERCENTAGE OF SHORT-STAY RESIDENTS WHO WERE RE-HOSPITALIZED AFTER A NURSING HOME ADMISSION

Measure Name

The measure name is Percentage of Short-Stay Residents Who Were Re-Hospitalized after a Nursing Home Admission.

Purpose of Measure

If a nursing home sends many residents back to the hospital, it may indicate that the nursing home is not properly assessing or taking care of its residents who are admitted to the nursing home from a hospital.

This claims-based quality measure was first reported by CMS in April 2016, and integrated into the Five-Star Quality Rating System in July 2016. It reports the percentage of short-stay residents who were re-hospitalized after a nursing home admission. This section describes the specifications and risk-adjustment methodology for this measure.

Measure Description and Specifications

The short-stay re-hospitalization measure determines the percentage of all new admissions or readmissions to a nursing home from a hospital where the resident was re-admitted to a hospital for an inpatient or observations stay within 30 days of entry or reentry. Planned inpatient readmissions are excluded. Note that higher values of the short-stay re-hospitalization measure indicate worse performance on the measure.

See Table 1 for detailed specifications for the measure.

Numerator: The numerator for the measure is the number of nursing home stays [1] where the resident had one or more unplanned inpatient admissions or one or more outpatient claims for an observation stay within 30 days of entry/reentry. This includes inpatient or observation stays occurring after discharge from the nursing home but within the 30 day timeframe.

Planned inpatient readmissions are not counted in the numerator since they are not a signal of quality of care. A modified version of CMS's Planned Readmissions Algorithm is used to classify hospitalizations as planned or unplanned.[2] The algorithm developed to identify planned hospital admissions uses the principal discharge diagnosis category and all procedure codes for each readmission coded using the AHRQ CCS software. Unless the hospital readmission met the algorithm definition of planned, it is considered unplanned and counted as a hospital admission in the measure. If any of the procedures denoted as planned occurs in conjunction with a diagnosis that disqualifies a readmission from being

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[1] Note that a stay is defined as a set of contiguous days in a facility. A stay begins when a resident enters a nursing facility (i.e., based on the entry/reentry date from the MDS) and ends when the person leaves the nursing home (based on discharge date from the MDS, regardless of whether the discharge was planned or the resident was anticipated to return to the facility).

[2] We applied the same modified version of CMS's Planned Readmissions Algorithm use by RTI to calculate the SNFRM: Smith L, et al. Skilled Nursing Facility Readmission Measure (SNFRM) NQF #2510: All-Cause Risk-Standardized Readmission Measure. RTI International: Draft Technical Report. March, 2015. Accessed at: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/SNFRM-Technical-Report-3252015.pdf

considered planned, it is considered an unplanned hospital admission. The planned readmissions algorithm is based on two main principles:

1. Planned readmissions are those in which one of a pre-specified list of procedures took place or readmissions for one of the following took place: bone marrow, kidney, or other transplants. Planned diagnosis categories include maintenance chemotherapy and rehabilitation. Pregnancy diagnoses and procedures such as normal pregnancy, Cesarean section; forceps delivery, vacuum, and breech delivery are also considered planned. Readmissions to psychiatric hospitals or units are also classified as planned readmissions.

2. Admissions for acute illness or for complications of care are not classified as "planned." Even a typically planned procedure performed during an admission for an acute illness would not likely have been planned.

Note that observation stays are included in the measure regardless of their diagnosis.

Denominator: The measure includes Medicare fee-for-service enrollees[3] who entered or reentered the nursing home from a hospital, were not enrolled in hospice during their nursing home stay, and who were not identified as comatose based on the MDS admission assessment.

- Medicare fee-for-service enrollees are identified using the CMS Enrollment Database. Any stay that is for a beneficiary who was enrolled in a Medicare Advantage plan for any part of the stay or who was not enrolled in both Medicare Part A and B for any part of their stay is excluded.

- Stays that were preceded by an inpatient hospitalization are identified using stay dates linked to Medicare Part A claims. If the hospital discharge date is within one day of the stay start date, then the stay is defined as having been preceded by an inpatient hospitalization and is eligible to be included in the measure.

- We look at the 'from' and 'thru' dates on hospice claims. If these overlap the nursing home stay, then the stay is excluded.

The denominator for the measure is the number of eligible nursing home stays, after applying the exclusions described above.

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[3] Because the measure uses Medicare claims data, it can only be calculated for Medicare fee-for-service beneficiaries.

Table 1.   Percentage of Short-Stay Residents who were Re-hospitalized after a Nursing Home Admission

Measure Description	The percent of short-stay residents who entered or reentered the nursing home from a hospital and were re-admitted to a hospital for an unplanned inpatient stay or observation stay within 30 days of the start of the nursing home stay.
Numerator and Denominator Window	The numerator and denominator include stays that started over a 12-month period. The data are updated every six months (in April and October of each year), with a lag time of nine months (i.e., the data posted in April will include stays that started 9-21 months ago).
Numerator	The numerator includes nursing home stays for beneficiaries who: a) Met the inclusion and exclusion criteria for the denominator; AND b) Were admitted to a hospital for or an inpatient stay or outpatient observation stay within 30 days of entry/reentry to the nursing home, regardless of whether they were discharged from the nursing home prior to the hospital readmission. Note that inpatient hospitalizations and observation stays are identified using Medicare claims; AND c) The hospital readmission did not meet the definition of a planned hospital readmission (identified using principal discharge diagnosis and procedure codes on Medicare claims for the inpatient stay)
Denominator	Included in the measure are stays for residents who: a) Entered or reentered the nursing home within 1 day of discharge from an inpatient hospitalization (Note that inpatient rehabilitation facility and long-term care hospitalizations are not included). These hospitalizations are identified using Medicare Part A claims; AND b) Entered or reentered the nursing home within the target 12-month period
Denominator Exclusions	Short-stay residents are excluded if: a) The resident did not have Fee-for-Service Parts A and B Medicare enrollment for the entire risk period (measured as the month of the index hospitalization and the month after the month of discharge from the nursing home); OR b) The resident was ever enrolled in hospice care during their stay; OR c) The resident was comatose (B0100 =[01]) or missing data on comatose on the first MDS assessment after the start of the stay; OR d) Data were missing for any of the claims or MDS items used to construct the numerator or denominator; OR e) The resident did not have an initial MDS assessment to use in constructing covariates for risk-adjustment.
Covariates	See Tables 2 and 3 for the list of claims-based and MDS-based covariates included in the logistic regression for calculating the facilities' expected rates and the Appendix tables for the risk-adjustment model covariates.

Risk Adjustment

The goal of risk adjustment is to account for differences across nursing homes in patient demographic and clinical characteristics that might be related to the outcome but not to the quality of care provided by the nursing home. Thus, the covariates consist of conditions/diagnoses that were present at the start of the nursing stay. Covariates include both items from claims that preceded the start of the stay and information from the first Minimum Data Set 3.0 (MDS) assessment with a target date within 14 days of the beginning of the stay.

Claims-based covariates: Table 2 details the rationale for each of the final selected set of covariates constructed using Medicare claims and enrollment data and used in the risk-adjustment model of the short-stay re-hospitalization measure.

Table 2. **Covariates constructed from claims and used in the risk-adjustment model for Short-Stay Residents who were Re-hospitalized after a Nursing Home Admission**

Variable	Rationale
Age	Demographic characteristic that is often important for outcomes of nursing home residents and associated with higher frailty and increasing number of comorbidities.
Sex	Demographic characteristic that is important for predicting hospital readmission for the nursing home population.
Length of stay during the hospitalization preceding the nursing home stay	Patients who are hospitalized for longer periods of time may require more complex care because they are often sicker. In addition, bed rest from prolonged hospitalizations often leads to deconditioning and functional impairment.
Any time spent in the intensive care unit (ICU) during the hospitalization preceding the nursing stay	ICU stays are an important indicator of medical severity and a predictor of PAC resource use.
Ever enrolled in Medicare under Disability coverage	This is an indicator of overall patient complexity, as qualification for Medicare because of disability requires the presence of serious chronic medical conditions that limit the ability to work.
ESRD	This factor has been identified as a risk factor in prior studies of outcomes among nursing home residents.
Number of acute care hospitalizations in the 365 days before the beginning of the nursing stay	More hospitalizations in the previous year may be associated with declining health and increased complexity of care
Principal diagnosis as categorized using AHRQ's single-level CCS	First diagnosis from the Medicare claim corresponding to the prior proximal hospitalization as coded by AHRQ's CCS
Outcome-specific Comorbidity Index	Patients with multiple or more severe comorbidities will tend to be frailer, putting them at increased risk for being readmitted to a hospital. This Index is based on the clinical conditions included in the Charlson Comorbidity Index and captures the complexity beyond the linear additivity of the individual comorbidities. See the sub-section below for more details.

MDS-based covariates: For each measure, Abt Associates' internal clinical/MDS expert identified a list of MDS items most likely to increase or decrease the likelihood of the outcome and unrelated to the quality of care received while a resident. These MDS items were included in the final model if they were statistically significant predictors of the outcome after adjusting for the claims-based variables, regardless of whether they were positively or negatively associated with the outcome. These items span multiple domains: functional status, clinical conditions, clinical treatments, and clinical diagnoses. Items included in the risk adjustment model are listed in Table 3.

Table 3. Covariates constructed from the MDS items and used in the final risk-adjustment model for Short-Stay Residents who were Re-hospitalized after a Nursing Home Admission

Category	MDS Item
Functional status	Dependence in eating (G0110H) Walks in room independently or with supervision or limited assistance (G0110C) Wandering once or more in the past week (E0900) Walks in corridor independently or with supervision or limited assistance (G0110D) Wanders *and* walks in room or corridor independently or with supervision or limited assistance (E0900 and G0110D) Two-person support needed with one or more ADLs (G0110A – G0110J) Cognitive status not completely intact (C0100 – C1000) Cognitive assessment missing (C0100 and C0600) Acute change in mental status (C1600) Rarely makes self-understood by others (B0700) Fell in the last month (J1700A) Fell in the past two to six months (J1700B) Rejected care for past four to seven days (E0800) Coughing or choking during meals or when swallowing medications (K0100C)
Clinical conditions	End-stage prognosis (J1400) Venous/Arterial ulcer present (M1030) Infection of the foot (M1040A) Diabetic foot ulcer (M1040B) Internal bleeding (J1550D) Dehydrated (J1550C) Daily pain (J0400) Surgical wound (M1040E) Total bowel incontinence (H0400) Shortness of breath with exertion (J1100) Shortness of breath when sitting at rest (J1100) Shortness of breath when lying flat (J1100)
Clinical treatments	Parenteral/IV feeding (K0500A) Feeding tube (K0500B) Insulin (N0350A) Dialysis (O0100J) Ostomy care (H0100C) Oxygen therapy (O0100C) Chemotherapy for cancer (O0100A) Radiation for cancer (O0100B) Tracheostomy (O0100E) IV medications (O0100H) Ventilator or respirator (O0100F) Transfusions (O0100I) Antibiotic received (N0400F)

Category	MDS Item
Clinical diagnoses	Anemia (I0200) Septicemia (I2100) Diabetes mellitus (I2900) Respiratory failure (I6300) Viral hepatitis (I2400) Heart failure (I0600) Alzheimer's disease (I4200) Non-Alzheimer's dementia (I4800) Cancer (I0100) Pneumonia (I2000) Urinary tract infection (I2300) Seizure disorder or epilepsy (I5400) Ulcerative Colitis/Crohn's disease/inflammatory bowel disease (I1300) Wound infection other that foot (I0250)
Other	Returned to the nursing home following hospitalization (A1700 and A1800) First assessment was for significant change in status (A0310A)

Comorbidity index: The risk-adjustment model includes an outcome-specific comorbidity index to partially adjust facility-level rates for the case-mix of residents at the facility with respect to comorbidity status at the start of the residents' stay. The comorbidity index is based on the 17 ICD-9-CM based disease condition categories initially developed by Charlson/Deyo.[4] Using the ICD-9-CM coding algorithm developed by Quan et al.,[2] we identified the Charlson comorbidities in any of the 21 diagnosis coding fields on all acute hospitalizations claims in the 365 days preceding the patient's nursing home stay. Weights were calculated for each diagnosis indicator through logistic regression of the short-stay re-hospitalization measure, using all available nursing home stays after a hospital discharge for the time period covered by the measure. The comorbidity index includes only the subset of the 17 ICD-9 based disease conditions for which the logistic regression coefficient was significant at a probability level of 0.05 or better. The appropriate coefficients were used to create a comorbidity index value for each nursing home stay, and these values were used in the logistic regression risk-adjustment model.

Measure Calculations

Observed rate: The actual (observed) rate for a nursing home is calculated as the number of stays where the resident met the numerator criteria divided by the total number of stays that met the denominator criteria in the year.

Expected rate: The risk adjustment model is estimated using logistic regression. The results from the logistic regression are used to calculate the probability of the outcome for each nursing home stay. This probability can be interpreted as the patient's risk of that outcome given their profile. The expected rate for each nursing home is the average probability across all nursing home stays from the hospital at that nursing home in the past year. Note that while the measure is updated on Nursing Home Compare every

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[4]   Quan H, Sundararajan V, Halfon P, et al. Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. Medical Care 2005;43(11):1130-1139. The 17 conditions categories include: Myocardial infarction, chronic heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic obstructive pulmonary disease, rheumatoid arthritis, ulcers, mild liver disease, diabetes mellitus, diabetes with sequalae, paralysis, chronic renal disease, cancer, moderate to severe liver disease, metastatic cancer, and HIV/AIDS.

six months (in April and October of each year), the logistic regression coefficients used to calculate the probability, including the weights used to calculate the outcome-specific comorbidity index, will be updated every 12 months (in April of each year). The coefficients estimated for the most recent period (April 2016) are reported in Appendix Table A.

Risk-standardized rate: To obtain the risk-standardized rate for any nursing home, the observed rate is divided by the expected rate which is then multiplied by the nationally observed rate – i.e., the sum of all nursing home stays where the resident met the numerator criteria divided by the sum of all nursing home stays that met the denominator criteria in the year.

$$\frac{Observed\ Rate}{Expected\ Rate} \times National\ Rate = Risk\ Standardized\ Rate$$

PERCENTAGE OF SHORT-STAY RESIDENTS WHO HAVE HAD AN OUTPATIENT EMERGENCY DEPARTMENT VISIT

Measure Name

The measure name is Percentage of Short-Stay Residents Who Have had an Outpatient Emergency Department Visit.

Purpose of Measure

If a nursing home often sends many of its residents to the emergency department (ED), it may indicate that the nursing home is not properly assessing or taking care of its residents who are admitted to the nursing home from a hospital. Better preventative care and access to physicians and nurse practitioners in an emergency may reduce rates of ED visits.

This claims-based quality measure was first reported by CMS in April 2016, and integrated into the Five-Star Quality Rating System in July 2016. It reports the percentage of short-stay residents who had an outpatient ED visit after a nursing home admission. This section describes the specifications and risk-adjustment methodology for this measure.

Measure Description and Specifications

The short-stay outpatient ED visit measure determines the percentage of all new admissions or readmissions to a nursing home from a hospital where the resident had an outpatient ED visit (i.e., an ED visit not resulting in an inpatient hospital admission) within 30 days of entry or reentry. Note that higher values of the short-stay outpatient ED visit measure indicate worse performance on the measure.

See Table 4 for detailed specifications for the measure.

Numerator: The numerator for the measure is the number of nursing home stays[5] where the resident had one or more outpatient claims for an ED visit within 30 days of entry/reentry. This includes outpatient ED visits occurring after discharge from the nursing home but within the 30 day timeframe. Note that outpatient ED visits are included in the measure regardless of their diagnosis.

Outpatient ED visits are not counted in the numerator if the 'thru' date on the outpatient claim for the ED visit was equal to the 'from' date on an outpatient claim for an observation stay or an inpatient claim for an unplanned hospitalization.[6] In other words, ED visits that were billed as an outpatient event but resulted in admission to a hospital for an observation stay or an unplanned inpatient stay would not be "double-counted" across the short-stay outpatient ED visit measure and the short-stay re-hospitalization measure, which also being added to Nursing Home Compare.

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5   Note that a stay is defined as a set of contiguous days in a facility. A stay begins when a resident enters a nursing facility (i.e., based on the entry/reentry date from the MDS) and ends when the person leaves the nursing home (based on discharge date from the MDS, regardless of whether the discharge was planned or the resident was anticipated to return to the facility).

6   See the specifications for the short-stay residents who were re-hospitalized after a nursing home admission measure for the description of planned versus unplanned hospital admissions.

Denominator: The measure includes Medicare fee-for-service enrollees[7] who entered or reentered the nursing home from a hospital, were not enrolled in hospice during their nursing home stay, and who were not identified as comatose based on the MDS admission assessment.

- Medicare fee-for-service enrollees are identified using the CMS Enrollment Database. Any stay that is for a beneficiary who was enrolled in a Medicare Advantage plan for any part of the stay or who was not enrolled in both Medicare Part A and B for any part of their stay is excluded.

- Stays that were preceded by an inpatient hospitalization are identified using stay dates linked to Medicare Part A claims. If the hospital discharge date is within one day of the stay start date, then the stay is defined as having been preceded by an inpatient hospitalization and is eligible to be included in the measure.

- We look at the 'from' and 'thru' dates on hospice claims. If these overlap the nursing home stay, then the stay is excluded.

The denominator for the measure is the number of eligible nursing home stays, after applying the exclusions described above.

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[7] Because the measure uses Medicare claims data, it can only be calculated for Medicare fee-for-service beneficiaries.

Table 4.   Percentage of Short-Stay Residents who have had an Outpatient Emergency Department Visit

Measure Description	The percent of short-stay residents who entered or reentered the facility from a hospital, visited an emergency department within 30 days of the start of the stay, and this visit did not result in an inpatient or observation stay.
Numerator and Denominator Window	The numerator and denominator include stays that started over a 12-month period. The data are updated every six months (in April and October of each year), with a lag time of nine months (i.e., the data posted in April will include stays that started 9-21 months ago).

Numerator	The numerator includes nursing home stays for beneficiaries who:
	    a) Met the inclusion and exclusion criteria for the denominator; AND
	    b) Was admitted to an emergency department within 30 days of entry/reentry to the nursing home, regardless of whether they were discharged from the nursing home prior to the emergency department visit. These emergency department visits are identified using Medicare Part B claims; AND
	    c) Were not admitted to a hospital for an inpatient stay or observation stay immediately after the visit to the emergency department inpatient and observation stays are determined using Medicare Parts A and B claims.

Denominator	Included in the measure are stays for residents who:
	    a) Entered or reentered the nursing home within 1 day of discharge from an inpatient hospitalization (Note that inpatient rehabilitation facility and long-term care hospitalizations are not included). These hospitalizations are identified using Medicare Part A claims; AND
	    b) Entered or reentered the nursing home within the target 12-month period

Denominator Exclusions	Short-stay residents are excluded if:
	    a) The resident did not have Fee-for-Service Parts A and B Medicare enrollment for the entire risk period (measured as the month of the index hospitalization and the month after the month of discharge from the nursing home); OR
	    b) The resident was ever enrolled in hospice care during their nursing home stay; OR
	    c) The resident was comatose (B0100 =[01]) or missing data on comatose on the first MDS assessment after the start of the stay; OR
	    d) Data were missing for any of the claims or MDS items used to construct the numerator or denominator; OR
	    e) The resident did not have an initial MDS assessment to use in constructing covariates for risk-adjustment.

Covariates	See Tables 5 and 6 for the list of claims-based and MDS-based covariates included in the logistic regression for calculating the facilities' expected rates and the Appendix tables for the risk-adjustment model covariates.

Risk Adjustment

The goal of risk adjustment is to account for differences across nursing homes in patient demographic and clinical characteristics that might be related to the outcome but not to the quality of care provided by the nursing home. Thus, the covariates consist of conditions/diagnoses that were present at the start of the nursing home stay. Covariates include both items from claims that preceded the start of the stay and information from the first Minimum Data Set 3.0 (MDS) assessment with a target date within 14 days of the beginning of the stay.

Claims-based covariates: Table 2 details the rationale for each of the final selected set of covariates constructed using Medicare claims and enrollment data and used in the risk-adjustment model of the short-stay outpatient ED visit measure.

Table 5.   Covariates constructed from claims and used in the risk-adjustment model for Short-Stay Residents who have had an Outpatient Emergency Department Visit

Variable	Rationale
Age	Demographic characteristic that is often important for outcomes of nursing home residents and associated with higher frailty and increasing number of comorbidities.
Sex	Demographic characteristic that is important for predicting ED visits and hospital readmissions for the nursing home population.
Length of stay during the hospitalization preceding the nursing home stay	Patients who are hospitalized for longer periods of time may require more complex care because they are often sicker. In addition, bed rest from prolonged hospitalizations often leads to deconditioning and functional impairment.
Any time spent in the intensive care unit (ICU) during the hospitalization preceding the nursing home stay	ICU stays are an important indicator of medical severity and a predictor of PAC resource use.
Ever enrolled in Medicare under Disability coverage	This is an indicator of overall patient complexity, as qualification for Medicare because of disability requires the presence of serious chronic medical conditions that limit the ability to work.
ESRD	This factor has been identified as a risk factor in prior studies of outcomes among nursing home residents.
Number of acute care hospitalizations in the 365 days before the beginning of the nursing home stay	More hospitalizations in the previous year may be associated with declining health and increased complexity of care
Principal diagnosis as categorized using AHRQ's single-level CCS	First diagnosis from the Medicare claim corresponding to the prior proximal hospitalization as coded by AHRQ's CCS
Outcome-specific Comorbidity Index	Patients with multiple or more severe comorbidities will tend to be frailer, putting them at increased risk for being readmitted to a hospital. This Index is based on the clinical conditions included in the Charlson Comorbidity Index and captures the complexity beyond the linear additivity of the individual comorbidities. See the sub-section below for more details.

MDS-based covariates: For each measure, Abt Associates' internal clinical/MDS expert identified a list of MDS items most likely to increase or decrease the likelihood of the outcome and unrelated to the quality of care received while a resident. These MDS items were included in the final model if they were statistically significant predictors of the outcome after adjusting for the claims-based variables, regardless of whether they were positively or negatively associated with the outcome. These items span multiple domains: functional status, clinical conditions, clinical treatments, and clinical diagnoses. Items included in the risk adjustment model are listed in Table 6.

Table 6. Covariates constructed from the MDS items and used in the final risk-adjustment model for Short-Stay Residents who have had an Outpatient Emergency Department Visit

Category	MDS Item
Functional status	Walks in room independently or with supervision or limited assistance (G0110C) Walks in corridor independently or with supervision or limited assistance (G0110D) Wandering once or more in the past week (E0900) Two-person support needed with one or more ADLs (G0110A – G0110J) Cognitive status not completely intact (C0100 – C1000) Cognitive assessment missing (C0100 and C0600) Acute change in mental status (C1600) Rarely makes self-understood by others (B0700) Rarely understands others (B0800) Fell in the last month (J1700A) Fell in the past two to six months (J1700B) Rejected care for past four to seven days (E0800)
Clinical conditions	End-stage prognosis (J1400) Venous/Arterial ulcer present (M1030) Internal bleeding (J1550D) Dehydrated (J1550C) Daily pain (J0400) Surgical wound (M1040E) Shortness of breath with exertion (J1100) Shortness of breath when sitting at rest (J1100)
Clinical treatments	Parenteral/IV feeding (K0500A) Feeding tube (K0500B) Insulin (N0350A) Dialysis (O0100J) Ostomy care (H0100C) Radiation for cancer (O0100B) Oxygen therapy (O0100C) Tracheostomy (O0100E) Ventilator or respirator (O0100F) Transfusions (O0100I) Isolation or quarantine for active infectious disease (00100M) Anticoagulant received (N0400E) Antibiotic received (N0400F) Speech therapy (O0400A4) Respiratory therapy (O0400D2)
Clinical diagnoses	Anemia (I0200) Asthma, COPD, chronic lung disease (I6200) Cancer (I0100) Respiratory failure (I6300) Viral hepatitis (I2400) Heart failure (I0600) Orthostatic hypotension (I0800) Pneumonia (I2000) Urinary tract infection (I2300) Seizure disorder or epilepsy (I5400)
Other	First assessment was for significant change in status (A0310A)

Comorbidity index: The risk-adjustment model includes an outcome-specific comorbidity index to partially adjust facility-level rates for the case-mix of residents at the facility with respect to comorbidity status at the start of the residents' stay. The comorbidity index is based on the 17 ICD-9-CM based disease condition categories initially developed by Charlson/Deyo.[8] Using the ICD-9-CM coding algorithm developed by Quan et al.,[2] we identified the Charlson comorbidities in any of the 21 diagnosis coding fields on all acute hospitalizations claims in the 365 days preceding the patient's nursing home stay. Weights were calculated for each diagnosis indicator through logistic regression of the short-stay outpatient ED visit measure, using all available nursing home stays after a hospital discharge for the time period covered by the measure. The comorbidity index includes only the subset of the 17 ICD-9 based disease conditions for which the logistic regression coefficient was significant at a probability level of 0.05 or better. The appropriate coefficients were used to create a comorbidity index value for each nursing home stay, and these values were used in the logistic regression risk-adjustment model.

Measure Calculations

Observed rate: The actual (observed) rate for a nursing home is calculated as the number of stays where the resident met the numerator criteria divided by the total number of stays that met the denominator criteria in the year.

Expected rate*:* The risk adjustment model is estimated using logistic regression. The results from the logistic regression are used to calculate the probability of the outcome for each nursing home stay. This probability can be interpreted as the patient's risk of that outcome given their profile. The expected rate for each nursing home is the average probability across all nursing home stays from the hospital at that nursing home in the past year. Note that while the measure is updated on Nursing Home Compare every six months (in April and October of each year), the logistic regression coefficients used to calculate the probability, including the weights used to calculate the outcome-specific comorbidity index, will be updated every 12 months (in April of each year). The coefficients estimated for the most recent period (April 2016) are reported in Appendix Table C.

Risk-standardized rate*:* To obtain the risk-standardized rate for any nursing home, the observed rate is divided by the expected rate which is then multiplied by the nationally observed rate—i.e., the sum of all nursing home stays where the resident met the numerator criteria divided by the sum of all nursing home stays that met the denominator criteria in the year.

$$\frac{Observed\ Rate}{Expected\ Rate} \times National\ Rate = Risk\ Standardized\ Rate$$

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[8]   Quan H, Sundararajan V, Halfon P, et al. Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. Medical Care 2005;43(11):1130-1139. The 17 conditions categories include: Myocardial infarction, chronic heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic obstructive pulmonary disease, rheumatoid arthritis, ulcers, mild liver disease, diabetes mellitus, diabetes with sequalae, paralysis, chronic renal disease, cancer, moderate to severe liver disease, metastatic cancer, and HIV/AIDS.

PERCENTAGE OF SHORT-STAY RESIDENTS WHO WERE SUCCESSFULLY DISCHARGED TO THE COMMUNITY

Measure Name

The measure name is Percentage of Short-Stay Residents who were Successfully Discharged to the Community.

Purpose of Measure

Many nursing home residents enter skilled nursing facilities for rehabilitation services. For many short-stay patients, return to the community is the most important outcome associated with nursing home care. If a nursing home discharges few residents back to the community successfully, it may indicate that the nursing home is not properly assessing its residents who are admitted to the nursing home from a hospital or not adequately preparing them for transition back to the community.

This claims-based quality measure was first reported by CMS in April 2016, and integrated into the Five-Star Quality Rating System in July 2016. It reports the percentage of short-stay residents who were successfully discharged to the community after a nursing home admission. This section describes the specifications and risk-adjustment methodology for this measure.

Measure Description and Specifications

The short-stay successful community discharge measure determines the percentage of all new admissions to a nursing home from a hospital where the resident was discharged to the community within 100 calendar days of entry and for 30 subsequent days, they did not die, were not admitted to a hospital for an unplanned inpatient stay, and were not readmitted to a nursing home. Note that lower values of the short-stay successful community discharge measure indicate worse performance on the measure.

See Table 7 for detailed specifications for the measure.

Numerator: The numerator for the measure is the number of nursing home episodes[9] where the resident was discharge to the community within 100 calendar days of entry, and the resident did not die, did not have a claim for an unplanned inpatient admission,[10] and did not enter/reenter a nursing home within 30 days of discharge to the community.

Note that outpatient emergency department visits, outpatient observation stays, and planned inpatient admission are not counted as failed community discharges.

Denominator: The measure includes Medicare fee-for-service enrollees[11] who entered the nursing home from a hospital, were not a resident of the nursing home in the previous 30 days, were not enrolled in

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[9]   Note that an episode is defined as a period of time spanning one or more stays in a facility. An episode begins when a resident is admitted to a nursing facility and ends when the person is discharged from the nursing home and did not return for at least 30 days.

[10]   See the specifications for the short-stay residents who were re-hospitalized after a nursing home admission measure for the description of planned versus unplanned hospital admissions.

[11]   Because the measure uses Medicare claims data, it can only be calculated for Medicare fee-for-service beneficiaries.

hospice during their nursing home stay, and were not identified as comatose based on the MDS admission assessment.

- By definition, a nursing home episode begins when a resident is admitted to a nursing home and ends when a resident is discharged from the nursing home and does not return for at least 30 days.

- Medicare fee-for-service enrollees are identified using the CMS Enrollment Database. Any episode that is for a beneficiary who was enrolled in a Medicare Advantage plan for any part of the episode or who was not enrolled in both Medicare Part A and B for any part of their episode is excluded.

- Episodes that were preceded by an inpatient hospitalization are identified using episode dates linked to Medicare Part A claims. If the hospital discharge date is within one day of the episode start date, then the episode is defined as having been preceded by an inpatient hospitalization and is eligible to be included in the measure.

- We look at the 'from' and 'thru' dates on hospice claims. If these overlap the nursing home episode, then the episode is excluded.

The denominator for the measure is the number of eligible nursing home episodes, after applying the exclusions described above.

Table 7.   Percentage of Short-Stay Residents who were Successfully Discharged to the Community

Measure Description	The percent of short-stay residents admitted to the nursing home from a hospital who were discharged to the community with 100 calendar days of the start of the episode, and who remained in the community for 30 consecutive days following discharge to the community.
Numerator and Denominator Window	The numerator and denominator include episodes that started over a 12-month period. The data are updated every six months (in April and October of each year), with a lag time of nine months (i.e., the data posted in April will include episodes that started 9-21 months ago).
Numerator	The numerator includes nursing home episodes for beneficiaries who: a) Met the inclusion and exclusion criteria for the denominator; AND b) Had a discharge assessment indicating discharge to the 'community' (A2100 = [01]) within 100 calendar days of the start of the episode; AND c) Was not admitted to a nursing home within 30 days of the community discharge, as determined from Medicare claims; AND d) Did not have an unplanned inpatient hospital stay within 30 days of the community discharge, as determined from the principal diagnosis and procedure codes on Medicare claims; AND e) Did not die within 30 days of the community discharge, as determined from the Medicare Enrollment DataBase.
Denominator	Included in the measure are episodes for residents who: a) Entered the nursing home within 1 day of discharge from an inpatient hospitalization (Note that inpatient rehabilitation facility and long-term care hospitalizations are not included). These hospitalizations are identified using Medicare Part A claims; AND b) Entered the nursing home within the target 12-month period

Denominator Exclusions	Short-stay residents are excluded if: a) The resident did not have Fee-for-Service Parts A and B Medicare enrollment for the entire risk period (measured as the month of the index hospitalization and the month after the month of discharge from the nursing home); OR b) The resident was ever enrolled in hospice care during their nursing home episode; OR c) The resident was comatose (B0100 =[01]) or missing data on comatose on the first MDS assessment after the start of the episode; OR d) Data were missing for any of the claims or MDS items used to construct the numerator or denominator; OR e) The resident did not have an initial MDS assessment to use in constructing covariates for risk-adjustment.
Covariates	See Tables 8 and 9 for the list of claims-based and MDS-based covariates included in the logistic regression for calculating the facilities' expected rates and the Appendix tables for the risk-adjustment model covariates.

Risk Adjustment

The goal of risk adjustment is to account for differences across nursing homes in patient demographic and clinical characteristics that might be related to the outcome but not to the quality of care provided by the nursing home. Thus, the covariates consist of conditions/diagnoses that were present at the start of the nursing home episode. Covariates include both items from claims that preceded the start of the episodes and information from the first Minimum Data Set 3.0 (MDS) assessment with a target date within 14 days of the beginning of the episode.

Claims-based covariates: Table 2 details the rationale for each of the final selected set of covariates constructed using Medicare claims and enrollment data and used in the risk-adjustment model of the short-stay successful discharge to the community measure.

Table 8   **Covariates constructed from claims and used in the risk-adjustment model for Short-Stay Residents who were Successfully Discharged to the Community**

Variable	Rationale
Age	Demographic characteristic that is often important for outcomes of nursing home residents and associated with higher frailty and increasing number of comorbidities.
Sex	Demographic characteristic that is important for predicting outcomes for the nursing home population.
Length of stay during the hospitalization preceding the nursing home stay	Patients who are hospitalized for longer periods of time may require more complex care because they are often sicker. In addition, bed rest from prolonged hospitalizations often leads to deconditioning and functional impairment.
Any time spent in the intensive care unit (ICU) during the hospitalization preceding the nursing home stay	ICU stays are an important indicator of medical severity and a predictor of PAC resource use.
Ever enrolled in Medicare under Disability coverage	This is an indicator of overall patient complexity, as qualification for Medicare because of disability requires the presence of serious chronic medical conditions that limit the ability to work.

Variable	Rationale
ESRD	This factor has been identified as a risk factor in prior studies of outcomes among nursing home residents.
Number of acute care hospitalizations in the 365 days before the beginning of the nursing home stay	More hospitalizations in the previous year may be associated with declining health and increased complexity of care
Principal diagnosis as categorized using AHRQ's single-level CCS	First diagnosis from the Medicare claim corresponding to the prior proximal hospitalization as coded by AHRQ's CCS
Outcome-specific Comorbidity Index	Patients with multiple or more severe comorbidities will tend to be frailer, putting them at increased risk for being readmitted to a hospital. This Index is based on the clinical conditions included in the Charlson Comorbidity Index and captures the complexity beyond the linear additivity of the individual comorbidities. See the sub-section below for more details.

MDS-based covariates: For each measure, Abt Associates' internal clinical/MDS expert identified a list of MDS items most likely to increase or decrease the likelihood of the outcome and unrelated to the quality of care received while a resident. These MDS items were included in the final model if they were statistically significant predictors of the outcome after adjusting for the claims-based variables, regardless of whether they were positively or negatively associated with the outcome. These items span multiple domains: functional status, clinical conditions, clinical treatments, and clinical diagnoses. Items included in the risk adjustment model are listed in Table 9.

Table 9. Covariates constructed from the MDS items and used in the final risk-adjustment model for Short-Stay Residents who were Successfully Discharged to the Community

Category	MDS Item
Functional status	Medicare RUG IV Hierarchical Group (Z0100A) Vision Impairment (B1000) Makes self-understood by others (B0700) Ability to understand others (B0800) Cognitive impairment based on the BIMS scale (C0500 and C0600) Cognitive assessment missing (C0500 and C0600) Any signs or symptoms of delirium (C1300) Major Depression (CMS quality measure) Major Depression not assessed (CMS quality measure) Any potential indicators of psychosis or behavioral symptoms (E0100 and E0200) Rejected care in the past seven days (E0800) Dependence in bed mobility (G0110A) Dependence in transfer (G0110B) Dependence in walking in room (G0110C) Dependence in walking in corridor (G0110D) Dependence in locomotion on unit (G0110E) Locomotion on unit missing (G0110E) Dependence in dressing (G0110G) Dependence in eating (G0110H) Dependence in toilet use (G0110I) Toilet use missing (G0110I) Dependence in personal hygiene (G0110J) ADL Summary score interacted with cognitive impairment based on BIMS scale ADL Summary score missing Depending in bathing (G0120) Balance moving from standing to seated position (G0300A) Balance walking (G0300B) Balance turning around (B0300C) Balance moving on and off toilet (B0300D) Fell in the last month (J1700A) Fell in the past two to six months (J1700B) Acute change in mental status (C1600) Wandering once or more in the past week (E0900)
Clinical conditions	Urinary Incontinence (H0300) Bowel Incontinence (H0400) Weight loss (K0300) Shortness of breath with exertion (J01100A) Shortness of breath when sitting at rest (J01100B) Shortness of breath when lying flat (J01100C) Any swallowing disorder (K0100) Wound infection (I2500) Hemiplegia (I4900) Paraplegia (I5000) Quadriplegia (I5100) Multiple Sclerosis (I5200) Huntington's disease (I5250) Parkinson's disease (I5300) Seizure disorder or epilepsy (I5400) Surgical wound (M1040E) Infection of the foot (M1040A) Diabetic foot ulcer (M1040B) Any condition related to ID/DD status (A1550)

Category	MDS Item
Clinical treatments	Maximum number of injections (N0300 and N0350A) Chemotherapy for cancer (O0100A) Radiation for cancer (O0100B) Oxygen therapy (O0100C) Suctioning (O0100D) Ventilator or respirator (O0100F) IV medications (O0100H) Transfusions (O0100I) Dialysis (O0100J) Parenteral/IV feeding, feeding tube, or mechanically altered diet (K0500A–C) Antipsychotics received (N0400A)
Clinical diagnoses	Cancer (I0100) Anemia (I0200) Asthma, COPD, chronic lung disease (I6200) Heart failure (I0600) Hypertension (I0700) Pneumonia (I2000) Septicemia (I2100) Urinary tract infection (I2300) Viral hepatitis (I2400) Diabetes mellitus (I2900) Hyperkalemia (I3200) Hip fracture (I3900) Other fracture (I4000) Alzheimer's disease (I4200) Non-Alzheimer's dementia (I4800) CVA, TIA, or stroke (I4500) Malnutrition (I5600) Anxiety disorder (I5700) Manic depression (I5900) Psychotic disorder (I5950) Schizophrenia (I6000)
Other	Married (A1200) Interpreter needed (A1100) Resident expects to remain in the facility or to be discharged to another facility or institution (Q300A) Entered facility from a psychiatric hospital (A1800)

Comorbidity index: The risk-adjustment model includes an outcome-specific comorbidity index to partially adjust facility-level rates for the case-mix of residents at the facility with respect to comorbidity status at the start of the residents' stay. The comorbidity index is based on the 17 ICD-9-CM based disease condition categories initially developed by Charlson/Deyo.[12] Using the ICD-9-CM coding algorithm developed by Quan et al.,[2] we identified the Charlson comorbidities in any of the 21 diagnosis coding fields on all acute hospitalizations claims in the 365 days preceding the patient's nursing home episode. Weights were calculated for each diagnosis indicator through logistic regression of the short-stay

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[12]   Quan H, Sundararajan V, Halfon P, et al. Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. Medical Care 2005;43(11):1130-1139. The 17 conditions categories include: Myocardial infarction, chronic heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic obstructive pulmonary disease, rheumatoid arthritis, ulcers, mild liver disease, diabetes mellitus, diabetes with sequalae, paralysis, chronic renal disease, cancer, moderate to severe liver disease, metastatic cancer, and HIV/AIDS.

successful discharge to the community measure, using all available nursing home episodes after a hospital discharge for the time period covered by the measure. The comorbidity index includes only the subset of the 17 ICD-9 based disease conditions for which the logistic regression coefficient was significant at a probability level of 0.05 or better. The appropriate coefficients were used to create a comorbidity index value for each nursing home episode, and these values were used in the logistic regression risk-adjustment model.

Measure Calculations

Observed rate: The actual (observed) rate for a nursing home is calculated as the number of episodes where the resident met the numerator criteria divided by the total number of stays that met the denominator criteria in the year.

Expected rate: The risk adjustment model is estimated using logistic regression. The results from the logistic regression are used to calculate the probability of the outcome for each nursing home episode. This probability can be interpreted as the patient's risk of that outcome given their profile. The expected rate for each nursing home is the average probability across all nursing home episodes from the hospital at that nursing home in the past year. Note that while the measure is updated on Nursing Home Compare every six months (in April and October of each year), the logistic regression coefficients used to calculate the probability, including the weights used to calculate the outcome-specific comorbidity index, will be updated every 12 months (in April of each year). The coefficients estimated for the most recent period (April 2016) are reported in Appendix Table E.

Risk-standardized rate: To obtain the risk-standardized rate for any nursing home, the observed rate is divided by the expected rate which is then multiplied by the nationally observed rate – i.e., the sum of all nursing home episodes where the resident met the numerator criteria divided by the sum of all nursing home episodes that met the denominator criteria in the year.

$$\frac{Observed\ Rate}{Expected\ Rate} \times National\ Rate = Risk\ Standardized\ Rate$$

PERCENTAGE OF SHORT-STAY RESIDENTS WHO MADE IMPROVEMENTS IN FUNCTION

Measure Name

The name of the measure is Percentage of Short-stay Residents Who Made Improvements in Function.

Purpose of Measure

Short-stay residents frequently have limitations in their physical functioning because of factors including but not limited to illness, hospitalization, or surgery. The purpose of the Percentage of Short-stay Residents Who Made Improvements in Function measure is to determine, among short-stay nursing home residents who are discharged from the nursing home, the percentage of residents who gain more independence in transfer, locomotion, and walking during their episodes of care. The measure assesses the percentage of short-stay nursing home residents of all ages with improved independence on these mobility functions (i.e., transfer: self-performance; locomotion on unit: self-performance; walk in corridor: self-performance) from the earliest initial assessment (admission or 5-day assessment) to the discharge assessment (specifically, the discharge assessment when return to the nursing home is not anticipated).

This MDS-based quality measure was first reported by CMS in April 2016, and integrated into the Five-Star Quality Rating System in July 2016. This section describes the specifications for this measure.

Measure Description and Specifications

The short-stay improvements in function measure assesses the percentage of short-stay residents whose independence in three mobility functions (i.e., transfer, locomotion, and walking) increases over the course of the nursing home care episode. The measure excludes residents in a coma and those at the end of life (identified by hospice use and life expectancy of less than 6 months), because these residents may not be expected to increase independence on these three mobility functions during their care episode. The measure also excludes residents who have no impairment on these three mobility items on the prior (i.e., admission or 5-day) assessment, because these residents will not be able to demonstrate improvement on the discharge assessment. Residents with missing data on any of the three mobility items on the prior or discharge assessment also are excluded from the measure, because a change score cannot be calculated for these residents. Additionally, residents with an unplanned discharge are excluded because they may not have had the opportunity to benefit from therapeutic interventions the nursing home would have provided, which may have helped the residents increase transfer, locomotion, and walking independence.

The Minimum Data Set (MDS) 3.0 items used to calculate the measure, including the specifications for the numerator, denominator, denominator exclusions, and covariates for risk adjustment, are presented in Table 10.

Short-stay measures include all residents who have resided in the facility for an episode of 100 days or fewer as of the end of the target period. A target period is the span of time that defines the measure reporting period (e.g., a calendar quarter). An episode is a time period spanning one or more stays, beginning with admission and ending with either discharge or the end of the target period (whichever comes first).

Numerator: The numerator for the measure is the number of nursing home episodes[13] where the resident had a negative mid-loss activities of daily living (MLADL) change score; where the MLADL score is defined as the sum of transfer: self-performance, locomotion on unit: self-performance, and walk in corridor: self-performance.

Denominator: The measure includes all short-stay residents who have a valid discharge (return not anticipated) assessment and a valid preceding 5-day assessment, who were not identified as comatose, as having a prognosis of less than 6 months, in hospice care, or as having a MLADL score greater than or equal to 1 based on the 5-day or admission assessment, and who did not have an unplanned discharge during the care episode.

The denominator for the measure is the number of eligible nursing home episodes, after applying the exclusions described above.

Risk Adjustment

Several resident characteristics and clinical conditions can influence the increase in independence made by short-stay residents on transfer, locomotion, and walking during their episodes of care regardless of the quality of care provided by the nursing home. To adjust for these resident characteristics and conditions, the measure includes covariates based on residents' status on the prior assessment for age, cognitive impairment, heart failure, stroke, hip or other fracture, and long-form activities of daily living (LFADL) scale scores. By accounting for differences in resident characteristics that may independently affect independence in transfer, locomotion, and walking, risk-adjustment permits fairer comparisons of the performance of nursing homes that serve residents with different characteristics and clinical conditions.

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[13]   Note that an episode is defined here as a period of time spanning one or more stays in a facility. An episode begins when a resident is admitted to a nursing facility and ends when the person is discharged from the nursing home.

Table 10. Percentage of Short-stay Residents Who Made Improvements in Function

Measure Description	The percent of short-stay nursing home residents who made functional improvements on mid-loss ADLs during their complete episode of care.
Numerator and Denominator Window	The numerator and denominator include all short-stay residents who have resided in the nursing home for an episode of 100 days or fewer as of the end of the target period (e.g., calendar quarter). The data are updated every quarter.
Numerator	The numerator includes nursing home episodes for beneficiaries who: a) Met the inclusion and exclusion criteria for the denominator; AND b) Have a change in performance score that is negative ([Discharge] – [5-day or admission assessment < 0), using the earlier assessment if resident has both a 5-day (A0310B) and admission (A0310A) assessment. Note that performance is calculated as the sum of G0110B1 (transfer: self-performance), G0110E1 (locomotion on unit: self-performance, and G0110D1 (walk in corridor: self-performance), with 7s (activity occurred only one or twice) and 8s (activity did not occur) recoded to 4s (total dependence).
Denominator	Included in the measure are episodes for residents who: a) Have a valid discharge assessment (A0310F); AND b) Have a valid preceding 5-day assessment (A0310B) OR admission assessment (A0310B)
Denominator Exclusions	Long-stay residents are excluded if: a) The resident was comatose (B0100 =[01]) on the 5-day assessment; OR b) Had life expectancy of less than 6 months on the 5-day or admission assessment; OR c) Was in Hospice (O0100K2=[1]) on the 5-day or admission assessment; OR d) Had no impairment (sum of G0110B1, G0110D1 and G0110E1 = 0) on the 5-day or admission assessment; OR e) Had an unplanned discharge during the care episode (A0310G=[02]); OR f) Data were missing for any of the MDS items used to construct the numerator or denominator
Covariates	From the 5-day or admission assessment: • Age (<=54, 55-84, or >84) (A0900) • Gender (A0800) • Severe cognitive impairment (C0500, C0700, and C1000) • Long-form ADL Scale (G0110A1 + G0110B1 + G0110E1 + G0110G1 + G0110H1 + G0110I1 + G0110J1) (categorized by tercile in the quarter) • Heart failure (I0600) • CVA, TIA, or stroke (I4500) • Hip fracture (I3900) • Other fracture (I4000)

PERCENTAGE OF LONG-STAY RESIDENTS WHOSE ABILITY TO MOVE INDEPENDENTLY WORSENED

Measure Name

The name of the measure is Percentage of Long-stay Residents Whose Ability to Move Independently Worsened. We refer to this measure as the long-stay locomotion measure.

Purpose of Measure

The long-stay locomotion measure evaluates the quality of nursing home care with regard to the loss of independence in locomotion among individuals who have been residents of the nursing home for more than 100 days. Loss of independence in locomotion is itself an undesirable outcome. Additionally, it increases risks of hospitalization, pressure ulcers, musculoskeletal disorders, pneumonia, circulatory problems, constipation, and reduced quality of life. Residents who have declined in independence in locomotion also require more staff time than those who are more independent.[14,15,16,17]

This MDS-based quality measure was first reported by CMS in April 2016, and integrated into the Five-Star Quality Rating System in July 2016. This section describes the specifications for this measure.

Measure Description and Specifications

The long-stay locomotion measure assesses the percentage of long-stay residents who experienced a decline in independence in locomotion. The measure includes all long-stay residents except those for whom the measure cannot be calculated, and those for whom a decline in independence in locomotion does not necessarily indicate poor quality of care.

The Minimum Data Set (MDS) 3.0 items used to calculate the measure, including the specifications for the numerator, denominator, denominator exclusions, and covariates for risk adjustment, are presented in Table 11 below.

Numerator: The numerator for the measure is the number of long-stay residents who had a decline in locomotion on unit: self-performance since their prior MDS assessment.

Denominator: The measure includes all long-stay residents who have a qualifying MDS assessment during the target period (e.g., calendar quarter) and at least one qualifying prior assessment. Qualifying assessments include: (annual, quarterly, significant change, significant correction, PPS (14-, 30-, 60-, or

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[14] Centers for Medicare and Medicaid Services (CMS): MDS Public Quality measure/ Indicator Report. Baltimore, MD: CMS 2008.

[15] Degenholtz, H.B., Rosen, J., Castle, N., Mittal, V., and Liu, D: The association between changes in health status and nursing home resident quality of life. Gerontologist 48(5):584-592, 2008. PubMed External Web Site Policy.

[16] Nursing home quality initiative. Overview. Baltimore, MD: U.S. Department of Health and Human Services, Centers for Medicare & Medicaid Services (CMS), 2004 Jan 20. 3 p.

[17] Colorado Foundation for Medical Care: Development, Maintenance, and Implementation of Nursing Home Quality Measures. Environmental Scan: Review of the Literature, Clinical Guidelines, and Other Sources of Information Pertinent to the CMS Publicly Reported Nursing Home Quality Measures. Englewood, CO: Colorado Foundation for Medical Care, 2007.

90-day), or discharge assessment with or without return anticipated. A discharge assessment does not count as a qualifying prior assessment.

The denominator for the measure is the number of long-stay residents in the target period, after applying the exclusions described above.

Table 11.   Percentage of Long-stay Residents Whose Ability to Move Independently Worsened

Measure Description	The percent of long-stay nursing home residents who experienced a decline in independence in locomotion
Numerator and Denominator Window	The numerator and denominator include all long-stay residents who have resided in the nursing home for longer than 100 days as of the end of the target period (e.g., calendar quarter). The data are updated every quarter.
Numerator	The numerator includes long-stay nursing home residents who: a) Met the inclusion and exclusion criteria for the denominator; AND b) Have a decline in locomotion when comparing their target assessment with the prior assessment. A decline is identified by an increase of one or more points on the "locomotion on unit: self-performance" item (G0110E1) between the target assessment and the prior assessment, with 7s (activity occurred only one or twice) and 8s (activity did not occur) recoded to 4s (total dependence)
Denominator	Included in this measure are long-stay residents who: a) Have a qualifying MDS 3.0 assessment during the target period. Qualifying MDS 3.0 assessments include annual, quarterly, significant change, or significant correction (A0310A = [02, 03, 04, 05, 06]), PPS 14-, 30-, 60-, or 90-day assessment (A0310B = [02, 03, 04, 05]), or discharge assessment with or without return anticipated (A0310F = [10, 11]) b) Have at least one qualifying prior assessment which include admission, annual, quarterly, significant change, or significant correction (A0310A = [01, 02, 03, 04, 05, 06]), or PPS 5-, 14-, 30-, 60-, or 90-day assessment (A0310B = [01, 02, 03, 04, 05])
Denominator Exclusions	Long-stay residents are excluded if: a) The resident was comatose (B0100 = [01]) on the prior assessment; OR b) Had prognosis of less than 6 months (J1400 = [1]) on the prior assessment; OR c) Was in hospice (O0100K2 = [1]) on the prior assessment; OR d) Did not have prognosis of less than 6 months and did not have hospice on prior assessment (J1400 ≠ [1] and O0100K2 ≠ [1]) and had a missing value on either indicator (J1400 = [-] or O0100K2 = [-]) e) Was totally dependent in locomotion on prior assessment (G0110E1 = [4, 7, 8]; OR f) Was missing data on locomotion on target or prior assessment (G0110E1 = [-])
Covariates	From the prior assessment: Eating (self-performance): Needs help (G0110H1) Eating (self-performance): Dependence (G0110H1) Toileting (self-performance): Needs help (G0110I1) Toileting (self-performance): Dependence (G0110I1) Transfer (self-performance): Needs help (G0110B1) Transfer (self-performance): Dependence (G0110B1) Walking in corridor (self-performance): Independence (G0110D1) Walking in corridor (self-performance): Needs some help (G0110D1) Walking in corridor (self-performance): Needs more help (G0110D1) Severe cognitive impairment (C0500, C0700, and C1000) Linear age (A0900) Gender (A0800) Positive vision change score calculated from prior assessment to latest assessment with non-missing value after prior assessment (B1000) No oxygen use on prior assessment (O0100C2 = [0]) and oxygen use on latest assessment with non-missing value after prior assessment (O0100C2 = [1])

PERCENTAGE OF LONG-STAY RESIDENTS WHO RECEIVED AN ANTIANXIETY OR HYPNOTIC MEDICATION

Measure Name

The name of the measure is Percentage of Long-stay Residents Who Received an Antianxiety or Hypnotic Medication.

Purpose of Measure

The use of antianxiety and hypnotic medications among older adults has been linked to increased risk of adverse outcomes such as cognitive impairment, delirium, falls, and fractures.[18] The long-stay antianxiety or hypnotic medication use measure assesses the percentage of long-stay residents in a nursing home who receive antianxiety or hypnotic medications. The measure is intended to prompt nursing homes to re-examine their prescribing patterns in order to encourage practice consistent with clinical recommendations and guidelines (i.e., preventing and stopping long-term use of benzodiazepine). During a target period, it is expected that facilities may have residents receiving antianxiety and hypnotic medications for a short term who have appropriate clinical indications or are under a gradual dose reduction program.

This MDS-based quality measure was first reported by CMS in April 2016, and integrated into the Five-Star Quality Rating System in July 2016. This section describes the specifications for this measure.

Measure Description and Specifications

The long-stay antianxiety or hypnotic medication use measure assesses the percentage of long-stay residents in a nursing home who receive antianxiety or hypnotic medications. This QM excludes residents who are receiving hospice care or have a life expectancy of less than 6 months at the time of target assessment.

The MDS 3.0 items used to calculate this measure, including the specifications for the numerator, denominator, and exclusions, are presented in Table 12 below.

Long-stay measures include all residents who have resided in the nursing home for an episode of at least 101 days as of the end of the target period (e.g., a calendar quarter). An episode is a period of time spanning one or more stays, beginning with an admission and ending with either a discharge or the end of the target period (whichever comes first).

Numerator: The numerator for the measure is the number of long-stay residents who received antianxiety medications or hypnotic medications as indicated on the target assessment.

Denominator: The measure includes all long-stay residents who have target assessment, except those where life expectancy is less than 6 months, the resident is receiving hospice care, or data on antianxiety or hypnotics use is missing.

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[18] American Geriatrics Society 2012 Beers Criteria Update Expert Panel: American Geriatrics Society updated Beers Criteria for potentially inappropriate medication use in older adults. J Am Geriatr Soc. 60(4):616-31, 2012. Available from http://www.guideline.gov/content.aspx?id=37706.

The denominator for the measure is the number of long-stay residents in the target period, after applying the exclusions described above.

Table 12. Percentage of Long-stay Residents Who Received an Antianxiety or Hypnotic Medication

Measure Description	The percent of long-stay nursing home residents who receive antianxiety or hypnotic medications.
Numerator and Denominator Window	The numerator and denominator include all long-stay residents who have resided in the nursing home for longer than 100 days as of the end of the target period (e.g., calendar quarter). The data are updated every quarter.
Numerator	The numerator includes long-stay nursing home residents with a target assessment where: a) Antianxiety medications are received (N0410B = [1, 2, 3, 4, 5, 6, 7]) b) Hypnotic medications are received (N0410D = [1, 2, 3, 4, 5, 6, 7])
Denominator	All long-stay residents with a target assessment are included in the measure.
Denominator Exclusions	Long-stay residents are excluded if: a) The resident was comatose (B0100 =[01]) on the prior assessment; OR b) Had life expectancy of less than 6 months (J1400 = [1]) on the target assessment: OR c) Was in Hospice (O0100K2=[1]) on the target assessment; OR d) Antianxiety medications received item was missing on target assessment (N0410B = [-]); OR e) Hypnotic medications received item was missing on target assessment (N0410D = [-])
Covariates	None