Design for *Nursing Home Compare* Five-Star Quality Rating System:

Technical Users' Guide

October 2009

Introduction

The Centers for Medicare & Medicaid Services (CMS) has enhanced its *Nursing Home Compare* public reporting site to include a set of quality ratings for each nursing home that participates in Medicare or Medicaid. The ratings take the form of several "star" ratings for each nursing home. The primary goal in launching this rating system is to provide residents and their families with an easy way to understand assessment of nursing home quality, making meaningful distinctions between high and low performing nursing homes.

This document provides a comprehensive description of the design for the *Nursing Home Compare* Five-Star Rating System. This design was developed by CMS with assistance from Abt Associates, invaluable advice from leading researchers in the long term care field who comprised the project's Technical Expert Panel (TEP), and countless ideas contributed by consumer and provider groups. After extensive data analysis, we believe the Five-Star quality rating system on *Nursing Home Compare* offers a valuable improvement to the information available to consumers based on the best data currently available. The rating system features an overall five-star rating based on facility performance for three types of performance measures, each of which has its own associated five-star rating:

- ***Health Inspections - Measures based on outcomes from State health inspections:*** Facility ratings for the health inspection domain are based on the number, scope, and severity of deficiencies identified during the three most recent annual inspection surveys, as well as substantiated findings from the most recent 36 months of complaint investigations. All deficiency findings are weighted by scope and severity. This measure also takes into account the number of revisits required to ensure that deficiencies identified during the health inspection survey have been corrected.
- ***Staffing - Measures based on nursing home staffing levels:*** Facility ratings on the staffing domain are based on two measures: 1) RN hours per resident day; and 2) total staffing hours (RN+ LPN+ nurse aide hours) per resident day. Other types of nursing home staff such as clerical, administrative, or housekeeping staff are not included in these staffing numbers. These staffing measures are derived from the CMS Online Survey and Certification Reporting (OSCAR) system, and are case-mix adjusted based on the distribution of MDS assessments by RUG-III group.
- ***QMs - Measures based on MDS quality measures (QMs):*** Facility ratings for the quality measures are based on performance on 10 of the 19 QMs that are currently posted on the *Nursing Home Compare* web site. These include 7 long-stay measures and 3 short-stay measures.

In recognition of the multi-dimensional nature of nursing home quality, *Nursing Home Compare* displays information on facility ratings for each of these domains alongside the overall performance rating. Further, in addition to the overall staffing five-star rating mentioned above, a five-star rating for RN staffing is also displayed separately on the new NH Compare website, when users seek more information on the staffing component.

An example of the rating information included on *Nursing Home Compare* is shown in the figure below. Users of the web site can drill down on each domain to obtain additional details on facility performance.

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Step 2 - Choose Nursing Home to Compare — Print this page

Search Results

There are **4** Nursing Homes in **Virginia.**

Select up to 3 Nursing Homes from the results table below and select the "Compare" button to compare your selections in more detail.

Quality of Care Ratings

The number of stars shows how well the nursing homes perform.

Much Above Average	★★★★★
Above Average	★★★★
Average	★★★
Below Average	★★
Much Below Average	★

Your Search Criteria

You have selected the following criteria for your search:

State: Virginia

- Modify Search
- New Search

There are **281** nursing homes available in Virginia. Select one or more Nursing Homes, up to 3 in total, then click "**Compare**".

Icon Legend — **Facilities with Poor Survey Performance** - Special Focus Facility: This nursing home has a record of persistently poor survey performance, and has been selected for more frequent inspections and monitoring. To learn more, visit http://www.cms.hhs.gov website.

Choose up to 3 Facilities to Compare — Sort Table By: Overall Ratings — Sort

	Facility Name and General Information	Overall Ratings (What is this?)	Quality Measures (What is this?)	Health Inspections (What is this?)	Staffing (What is this?)	Program Participation	Total Number of Certified Beds	Type of Ownership	Continuing Care Retirement Community (What is this?)
☐	**Basic Spring** 5755 East Main Street Fairfax, VA 22031 (555) 555-0988 *Located in a Hospital* *Resident & Family Councils: Both*	★★★★★ 5 Stars	★★★★ 4 Stars	★★★★★ 5 Stars	★★★★ 4 Stars	Medicare and Medicaid	100	For Profit - Corporation	Yes
☐	**Lakefront View** 1980 West Pecos Road Fairfax, VA 22031 (555) 555-0988 *Resident & Family Councils: Both*	★★★★ 4 Stars	★★★★ 4 Stars	★★★ 3 Stars	★★★★ 4 Stars	Medicare and Medicaid	93	Non Profit - Corporation	Yes
☐	**Glencrest Gardens** 2012 West Southern Ave Fairfax, VA 22031 (555) 555-0988 *Resident & Family Councils: Both*	★★★ 3 Stars	★★★ 3 Stars	★★★ 3 Stars	★★★ 3 Stars	Medicare and Medicaid	89	Non Profit - Corporation	No
☐	**Holton Mills** (SFF) 2750 Lee Highway Fairfax, VA 22031 (555) 555-0988 *Resident & Family Councils: Resident*	★★ 2 Stars	★★ 2 Stars	★★ 2 Stars	★ 1 Star	Medicare	69	For Profit - Corporation	No

Choose up to 3 Facilities to Compare — Sort Table By: Overall Ratings — Sort

Last Updated: 07/11/2008

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A companion document to this Technical Users' Guide (*Nursing Home Compare* – Five Star Quality Rating System: Technical Users' Guide – State-Level Cut Point Tables) provides the data for the state-level cut points for the star ratings included in the health inspection and the quality measure domains. The data tables in the companion document will be updated monthly. Cut points for the staffing ratings and for the non-ADL QM ratings have been fixed and do not vary monthly. Data tables giving the cut points for those ratings are included in the Appendix of this Technical Users' Guide.

Methodology for Constructing the Ratings

Health Inspection Domain

Nursing homes that participate in the Medicare or Medicaid programs have an onsite standard ("comprehensive") survey annually *on average*, with no more than fifteen months elapsing between surveys for any one particular nursing home. Surveys are unannounced and are conducted by a team of health care professionals. State survey teams spend several days in the nursing home to assess whether the nursing home is in compliance with federal requirements. Certification surveys provide a comprehensive assessment of the nursing home, including assessment of such areas as medication management, proper skin care, assessment of resident needs, nursing home administration, environment, kitchen/food services, and resident rights and quality of life. Based on the most recent three standard surveys for each nursing home, results from any complaint investigations during the most recent three-year period, and any repeat revisits needed to verify that required corrections have brought the facility back into compliance, CMS' Five-Star quality rating system employs more than 200,000 records for the health inspection domain alone.

Scoring Rules

A health inspection score is calculated based on points assigned to deficiencies identified in each active provider's current health inspection survey and the two prior surveys, as well as deficiency findings from the most recent three years of complaints information and survey revisits.

- ***Health Inspection Results***: Points are assigned to individual health deficiencies according to their scope and severity – more points are assigned for more serious, widespread deficiencies, and fewer points for less serious, isolated deficiencies (see Table 1). If the deficiency generates a finding of substandard quality of care, additional points are assigned. If the status of the deficiency is "past non-compliance" and the severity is "immediate jeopardy" (i.e. 'J','K' or 'L'-level), then points associated with a 'G' level deficiency are assigned.Deficiencies from Federal Oversight and Life Safety surveys are not included in calculations for the Five-Star rating.
- ***Repeat Revisits - Number of repeat revisits required to confirm that correction of deficiencies have restored compliance***: No points are assigned for the first revisit; points are assigned only for the second, third, and fourth revisits and are proportional to the health inspection score (Table 2). If a provider fails to correct deficiencies by the time of the first revisit, then these additional revisit points are assigned up to 85 percent of the health inspection score for the fourth revisit. CMS experience is that providers that fail to demonstrate restored compliance with safety and quality of care requirements during the first revisit have lower quality of care than other nursing homes. More revisits are associated with more serious quality problems.

We calculate a total health inspection score for facilities based on their weighted deficiencies and number of repeat revisits needed. Note that a lower survey score corresponds to fewer deficiencies and revisits, and thus better performance on the health inspection domain. In calculating the total domain score, more recent surveys are weighted more heavily than earlier surveys; the most recent period (cycle 1) is assigned a weighting factor of 1/2, the previous period (cycle 2) has a weighting factor of 1/3, and the second prior survey (cycle 3) has a weighting factor of 1/6. The weighted time period scores are then summed to create the survey score for each facility.

Complaint surveys are assigned to a time period based on the calendar year in which the complaint survey occurred. Complaint surveys that occurred within the most recent 12 months receive a weighting factor of 1/2, those from 13-24 months ago have a weighting factor of 1/3, and those from 25-36 months ago have a weighting factor of 1/6. There are some deficiencies that appear on both standard and complaint surveys. To avoid potential double-counting, deficiencies that appear on complaint surveys that are conducted within 15 days of a standard survey (either prior to or after the standard survey) are only counted once. If the scope or severity differs on the two surveys, the highest scope-severity combination is used.

For facilities missing data for one period, the health inspection score is determined based on the periods for which data are available, using the same relative weights, with the missing (third) survey weight distributed proportionately to the existing two surveys. Specifically, when there are only two standard health surveys, the most recent receives 60 percent weight and the prior receives 40 percent weight. Facilities with only one standard health inspection are considered not to have sufficient data to determine a health inspection rating and are set to missing for the health inspection domain. For these facilities, no composite rating is assigned and no ratings are reported for the staffing or QM domains even if these ratings are available.

Table 1
Health Inspection Score: Weights for Different Types of Deficiencies

Severity	Scope		
	Isolated	**Pattern**	**Widespread**
Immediate jeopardy to resident health or safety	**J** 50 points* (75 points)	**K** 100 points* (125 points)	**L** 150 points* (175 points)
Actual harm that is not immediate jeopardy	**G** 20 points	**H** 35 points (40 points)	**I** 45 points (50 points)
No actual harm with potential for more than minimal harm that is not immediate jeopardy	**D** 4 points	**E** 8 points	**F** 16 points (20 points)
No actual harm with potential for minimal harm	**A** 0 point	**B** 0 points	**C** 0 points

Note: Figures in parentheses indicate points for deficiencies that are for substandard quality of care.

Shaded cells denote deficiency scope/severity levels that constitute substandard quality of care if the requirement which is not met is one that falls under the following federal regulations: 42 CFR 483.13 resident behavior and nursing home practices; 42 CFR 483.15 quality of life; 42 CFR 483.25 quality of care.

* If the status of the deficiency is “past non-compliance” and the severity is Immediate Jeopardy, then points associated with a ‘G-level” deficiency (i.e. 20 points) are assigned.

Source: Centers for Medicare & Medicaid Services

Table 2
Weights for Repeat Revisits

Revisit Number	Noncompliance Points
First	0
Second	50 percent of health inspection score
Third	70 percent of health inspection score
Fourth	85 percent of health inspection score

Rating Methodology

Health inspections are based on federal regulations, national interpretive guidance, and a federally-specified survey process. Federal staff train State surveyors and oversee State performance. The federal oversight includes quality checks based on a 5% sample of the State surveys, in which federal surveyors either accompany State surveyors or replicate the survey within 60 days of the State and then compare results. These control systems are designed to optimize consistency in the survey process. Nonetheless there remains some variation between States. Such variation derives from many factors, including:

- ***Survey Management:*** Variation between States in the skill sets of surveyors, supervision of surveyors, and the survey processes;
- ***State Licensure***: State licensing laws set forth different expectations for nursing homes and affect the interaction between State enforcement and federal enforcement (for example, a few States conduct many complaint investigations based on State licensure, and issue citations based on State licensure rather than on the federal regulations);
- ***Medicaid Policy:*** Medicaid pays for the largest proportion of long term care in nursing homes. State nursing home eligibility rules, payment, and other policies in the State-administered Medicaid program create differences in both quality of care and enforcement of that quality.

For the above reasons, CMS' Five-Star quality ratings on the health inspection domain are based on the relative performance of facilities within a State. This approach helps to control for variation between States. Facility ratings are determined using these criteria:

- The top 10 percent (lowest 10 percent in terms of health inspection deficiency score) in each State receive a five-star rating.
- The middle 70 percent of facilities receive a rating of two, three, or four stars, with an equal number (approximately 23.33 percent) in each rating category.
- The bottom 20 percent receive a one-star rating.

This distribution is based on CMS experience and input from the Project's TEP. The cut points are re-calibrated each month so that the distribution of star ratings within States remains relatively constant over time in an effort to reduce the likelihood that the rating process affects the health inspection process. However, the rating for a given facility is held constant unless new health inspection data (e.g. a new health inspection survey, new complaint information or a 2nd, 3rd or 4th revisit) become available. Thus, a facility's rating will not change from month to month without new survey information from the facility, regardless of changes in the State wide distribution due to new surveys in other facilities.

In the rare case that a State or territory has fewer than 5 facilities upon which to generate the cut points, the national distribution is used. Cut points for the health inspection ratings are available in the companion document to this Technical Users' Guide: *Nursing Home Compare* – Five Star Quality Rating System: Technical Users' Guide – State-Level Cut Point Tables. The data can be found in CP Table 1.

Staffing Domain

There is considerable evidence of a relationship between nursing home staffing levels, staffing stability, and resident outcomes. The CMS Staffing Study found a clear association between nurse staffing ratios and nursing home quality of care, identifying specific ratios of staff to residents below which residents are at substantially higher risk of quality problems.[1]

The rating for staffing is based on two case-mix adjusted measures:

1. Total nursing hours per resident day (RN+LPN+nurse aide hours)
2. RN hours per resident day

The source data for the staffing measures is CMS form CMS-671 (Long Term Care Facility Application for Medicare and Medicaid) from the Online Survey Certification and Reporting (OSCAR). The resident census is based on the count of total residents from CMS form CMS-672 (Resident Census and Conditions of Residents). The specific fields that are used in the RN, LPN, and nurse aide hours calculations are:

- RN hours: Includes registered nurses (tag number F41 on the CMS-671 form), RN director of nursing (F39), and nurses with administrative duties (F40).
- LPN hours: Includes licensed practical/licensed vocational nurses (F42)
- Nurse aide hours: Includes certified nurse aides (F43), aides in training (F44), and medication aides/technicians (F45)

Note that the OSCAR staffing data include both facility employees (full time and part time) and individuals under an organization (agency) contract or an individual contract. The OSCAR staffing data do not include "private duty" nursing staff who are reimbursed by a resident's family. Also not included are hospice staff and feeding assistants.

A set of exclusion criteria are used to identify facilities with unreliable OSCAR staffing data, and neither staffing data nor a staffing rating are reported for these facilities. The exclusion criteria are intended to identify facilities with unreliable OSCAR staffing data and facilities with outlier staffing levels.

The resident census, used in the denominator of the staffing calculations, uses data reported in block F78 of the CMS-672 form. This includes the total residents in the nursing facility and the number for whom a bed is being maintained on the day the nursing home survey begins (bed-holds). Bed-holds typically involve residents temporarily away in a hospital or on leave.

Case-mix Adjustment

The measures are adjusted for case-mix differences based on the Resource Utilization Group (RUG-III) case-mix system. Data from the CMS Staff Time Measurement Studies were used to measure the number of RN, LPN, and nurse aide minutes associated with each RUG-III group (using the 53 group version of

[1] Kramer AM, Fish R. "The Relationship Between Nurse Staffing Levels and the Quality of Nursing Home Care." Chapter 2 in Appropriateness of Minimum Nurse Staffing Ratios in Nursing Homes: Phase II Final Report. Abt Associates, Inc. Winter 2001.

RUG-III)[2]. Case- mix adjusted measures of hours per resident day were calculated for each facility for each staff type using this formula:

$$\text{Hours}_{\text{Adjusted}} = (\text{Hours}_{\text{Reported}}/\text{Hours}_{\text{Expected}}) * \text{Hours}_{\text{National Average}}$$

where $\text{Hours}_{\text{NationalAverage}}$ is the mean across all facilities of the reported hours per resident day for a given staff type. The expected values are based on the distribution of residents by RUG-III group in the quarter closest to the date of the most recent standard survey (when the staffing data were collected) and measures of the expected RN, LPN, and nurse aide hours that are based on data from the CMS 1995 and 1997 Staff Time Measurement Studies (see Table A1). The distribution of residents by RUG-III group is determined using the most recent MDS assessment for current residents of the nursing home on the last day of the quarter.

The data used in the RUG calculations are based on a summary of MDS information for residents currently in the nursing home. The MDS assessment information for each active nursing home resident is consolidated to create a profile of the most recent standard information for the resident. An active resident is defined as a resident who, on the last day of the quarter, has no discharge assessment and whose most recent MDS transaction is less than 180 days old (this allows for 93 days between quarterly assessments, 14 days for completion, 31 days for submission after completion, and about one month grace period for late assessments). The active resident information can represent a composite of items taken from the most recent comprehensive, full, quarterly, PPS, and admission MDS assessments. Different items may come from different assessments. The intention is to create a profile with the most recent standard information for an active resident, regardless of source of information. These data are used to place each resident in a RUG category.

For the Five-Star rating, a "draw" of the most recent RUG category distribution data is done for every nursing facility on the last business day of the last month of each quarter. The Five-Star rating makes use of the distribution for the quarter in which the staffing data were collected. For each facility, a "target" date that is 7 days prior to the most recent standard survey date is assigned. The rationale for this target is that the staffing data reported for OSCAR covers the two-week period prior to the survey, with 7 days being the midpoint of that interval. If RUG data are available for the facility for the quarter containing that survey "target" date, that quarter of RUG data is used for the case mix adjustment. In instances when the quarter of RUG data containing the survey target date is not available for a given facility, the quarter of available RUG data that is closest to that target date - either before or after – is selected. Closest is defined as having the smallest absolute value for the difference between the survey target date and the midpoint of the available RUG quarter(s).

Expected hours are calculated by summing the nursing times (from the CMS Time Study) connected to each RUG category across all residents in the category and across all categories. The hours are then divided by the number of residents included in the calculations. The result is the "expected" number of hours for the nursing home.

The "reported" hours are those reported by the facility on the CMS-671 form for their most recent survey, while the "national average" hours represent the unadjusted national mean of the reported hours across all facilities for December, 2008 (first used with the January 22, 2009 update of the website). These national averages will be held constant for an initial two-year period, after which CMS will review this decision.

[2] A case-mix index based on the Staff Time and Resource Intensity Verification (STRIVE) study will be utilized once these data are available. STRIVE is a national staff time measurement study that will provide data and analysis to update the Medicare Skilled Nursing Facility Prospective Payment System (SNF PPS).

	National average hours per resident per day
Total nursing staff	3.83862
Registered nurses	0.63989

The calculation of "expected", "reported", and "national average" hours are performed separately for RNs and for all staff delivering nursing care (RNs, LPNs, and CNAs). Adjusted hours are also calculated for both groups using the formula discussed earlier in this section.

A downloadable file that contains the "expected" and "reported" hours used in the staffing calculations is available at: http://www.cms.hhs.gov/CertificationandComplianc/13_FSQRS.asp . The file contains data for both RNs and total staff for each individual nursing home.

Scoring Rules

The two staffing measures are given equal weight. For each of RN staffing and total staffing, a 1 to 5 rating is assigned based on a combination of the percentile-based method (where percentiles are based on the distribution for freestanding facilities[3]) and staffing thresholds identified in the CMS staffing study (Table 3). For each facility, a total staffing score is assigned based on the combination of the two staffing ratings (Table 4).

The percentile cut points (data boundaries between each star category) were determined using the data available as of December 2008. The cut points will be held constant for an initial two-year period, after which CMS will review this decision. The advantage of fixed cut-points is that it better tracks facility improvement (or decline) over time. Nursing homes that seek to improve their staffing, for example, can ascertain the increased levels at which they would be afforded a higher star rating for the staffing domain.

[3] The distribution for freestanding facilities was used because of concerns about the reliability of staffing data for some hospital-based facilities.

Table 3:
Scoring Method and Thresholds[1] for Staffing Measures

Rating	Definition	Range (adjusted hours per resident day)	
		RN	Total
1	<25th percentile of distribution for freestanding facilities	<0.221	<2.998
2	at least 25th percentile but less than median of the distribution for freestanding facilities	≥0.221 - <0.298	≥2.998 - <3.376
3	greater than or equal to the median but less the 75th percentile of the distribution for freestanding facilities	≥0.298 - <0.402	≥3.376 – <3.842
4	greater than or equal to the 75th percentile of the distribution for freestanding facilities but less than the CMS staffing study threshold	≥0.402 – <0.550	≥3.842 – <4.080
5	at or exceeding the thresholds identified in the CMS staffing study[2]	≥ 0.550	≥ 4.080

[1]The cut points are based on data reported to CMS as of 11/4/2008 and are being maintained at that fixed baseline level for two years.

[2]Note that the 0.55 RN threshold was identified for potentially avoidable hospitalizations (short-stay measures); the 4.08 threshold is the sum of the NA (2.78) and licensed staff (1.30) threshold for long-stay measures.

Rating Methodology

Facility rating for overall staffing is based on the combination of RN and total nurse staffing (RNs, LPNs, LVNs, CNAs) ratings as shown in Table 4. To receive a five-star rating, facilities must meet both RN and total nursing thresholds from the CMS Staffing Study. Note that the columns 3 and 4 are identical as are rows 3 and 4, reflecting the equal weighting of the RN and total nurse staffing measures in the facility staffing rating.

Table 4
Staffing Points and Rating

RN rating and hours		Total staffing rating and hours (RN, LPN and aide)				
		1	**2**	**3**	**4**	**5**
		<25th percentile	≥25th percentile, < median	≥ median, <75th percentile	≥75th percentile, < 4.08 hours	≥4.08 hours
1	<25th percentile	1-star	1-star	2-stars	2-stars	3-stars
2	≥25th percentile, < median	1-star	2-stars	3-stars	3-stars	4-stars
3	≥ median, <75th percentile	2-stars	3-stars	4-stars	4-stars	4-stars
4	≥75th percentile, < 0.55 hours	2-stars	3-stars	4-stars	4-stars	4-stars
5	≥ 0.55 hours	3-stars	4-stars	4-stars	4-stars	5-stars

Quality Measure Domain

A set of quality measures has been developed from Minimum Data Set (MDS)-based indicators to describe the quality of care provided in nursing homes. These measures address a broad range of functioning and health status in multiple care areas. The facility rating for the QM domain is based on performance on a subset of 10 (out of 19) of the QMs currently posted on Nursing Home Compare. All measures have been validated and endorsed by the National Quality Forum. The measures were selected based on their validity and reliability, the extent to which the measure is under the facility's control, statistical performance, and importance.

Long-Stay Residents:

- Percent of residents whose need for help with daily activities has increased
- Percent of residents whose ability to move in and around their room got worse
- Percent of high risk residents with pressure sores
- Percent of residents who had a catheter inserted and left in their bladder
- Percent of residents who were physically restrained
- Percent of residents with urinary tract infection
- Percent of residents who have moderate to severe pain

Short-stay residents:

- Percent of residents with pressure ulcers (sores)
- Percent of residents who had moderate to severe pain
- Percent of residents with delirium

The long-stay measures are similar to those used for the Nursing Home Value-Based Purchasing (NHVBP) demonstration except that NHVBP does not include the urinary tract infection measure or pain measure. Note that the two ADL-related long-stay measures (percent of residents whose need for help with daily activities has increased, percent of residents whose ability to move about in and around their room got worse) are incidence measures that are based on change across two MDS assessments. The pressure ulcer measure does not activate until the 90-day assessment, thereby reducing the influence of pressure ulcers that may be present upon admission and affording the nursing home about 3 months to treat such present-on-admission sores before the measure takes effect for the resident in question. Table 5 contains more information on these measures. Technical specifications for the complete set of QMs are at: (http://www.cms.hhs.gov/NursingHomeQualityInits/Downloads/NHQIQMUsersManual.pdf). Specifications for the set of QMs used in the Five-Star System are included in the Appendix.

Ratings for five of the QMs (mobility, catheter, the long-stay pain measure, delirium, short-stay pressure ulcers) are risk adjusted, using resident-level covariates that adjust for factors associated with differences in the score for the QM. For example, the catheter risk-adjustment model is based on an indicator of bowel incontinence or pressure sores on the prior assessment. The risk-adjusted QM score is adjusted for the specific risk for that QM in the nursing facility. The risk-adjustment methodology is described in more detail in the Quality Measure Users Manual available on the CMS website referenced in the last paragraph. It is important to note that the regression models used in the risk adjustment are NOT refit each time the QMs are updated. It is assumed that the relationships do not change, so the coefficients from the most recent "fitting" of the model are used along with the most recent QM data. The covariates and the coefficients used in the risk-adjustment models are reported in Table A-2 in the Appendix.

Ratings for the QM domain are calculated using the three most recent quarters for which data are available. This time period specification was selected to increase the number of assessments available for calculating the QM rating, increasing the stability of estimates and reducing the amount of missing data. The adjusted three-quarter QM values for each of the 10 QMs used in the 5-star algorithm are computed as follows:

$$QM_{3Quarter} = [(QM_{Q1} * D_{Q1}) + (QM_{Q2} * D_{Q2}) + (QM_{Q3} * D_{Q3})]/(D_{Q1} + D_{Q2} + D_{Q3})$$

Where QM_{Q1}, QM_{Q2}, and QM_{Q3} correspond to the adjusted QM values for the three most recent quarters and D_{Q1}, D_{Q2}, and D_{Q3} are the denominators (number of eligible residents for the particular QM) for the same three quarters.

Please Note: As of October 2009 the QM data listed on Nursing Home Compare will represent an average of three quarters of data. This replaces the one quarter of QM data previously displayed and matches the data used for the Five-Star calculation.

Table 5
MDS-Based Quality Measures

Measure	Comments
Long-Stay Measures:	
Percent of residents whose need for help with daily activities has increased[1]	This is a change measure that reflects worsening performance on at least 2 late loss ADLs by one functional level or on one late loss ADL by more than one functional level compared to the prior assessment. The late loss ADLs are bed mobility, transfer, eating, and toileting. Maintenance of ADLs is related to an environment in which the resident is up and out of bed and engaged in activities. The CMS Staffing Study found that higher staffing levels were associated with lower rates of increasing dependence in activities of daily living.
Percent of residents whose ability to move about in and around their room got worse[1]	This is a change measure that reflects a worsening of locomotion self-performance by at least one functional level compared to the prior assessment. Residents who lose mobility may also lose the ability to perform other activities of daily living, like eating, dressing, or getting to the bathroom.
Percent of high-risk residents who have pressure sores	High-risk residents for pressure sores are those who are impaired in bed mobility or transfer, who are comatose, or who suffer from malnutrition. The QM Validation Study identified a number of nursing home care practices that were associated with lower pressure sore prevalence rates including more frequent scheduling of assessments for suspicious skin areas, observations on the environmental assessment of residents, and care practices related to how the nursing home manages clinical, psychosocial, and nutritional complications.
Percent of residents who have/had a catheter inserted and left in their bladder	Indwelling catheter use may result in complications, like urinary tract or blood infections, physical injury, skin problems, bladder stones, or blood in the urine.
Percent of residents who were physically restrained	A resident who is restrained daily can become weak, lose his or her ability to go to the bathroom without help, and develop pressure sores or other medical complications.
Percent of residents with urinary tract infection	Urinary tract infections can often be prevented through hygiene and drinking enough fluid. Urinary tract infections are relatively minor but can lead to more serious problems and cause complications like delirium if not treated.
Percent of residents with moderate to severe pain	This measure examines whether patients experienced moderate pain daily in the last 7 days or have horrible or excruciating pain at any frequency over the last 7 days. Many nursing home residents have poorly controlled pain, and this pain can be managed by nursing homes through appropriate medications and other types of therapy. Poor pain management can have a significant impact on resident quality of life.
Short-Stay Measures	
Percent of residents with pressure sores	This measure is based on the SNF-PPS 14-day assessment as compared to the 5-day SNF-PPS assessment. It includes residents who develop a new pressure sore between the assessments or who have a worsening of or failure to improve of an existing pressure sore.. Pressure sores can lead to complications such as skin and bone infections.
Percent of residents with moderate to severe pain	Using the SNF-PPS 14-day assessment, this measure examines whether patients experienced moderate pain daily in the last 7 days or have horrible or excruciating pain at any frequency over the last 7 days. Many nursing home residents have poorly controlled pain, and this pain can be managed by nursing homes through appropriate medications and other types of therapy. Poor pain management can have a significant impact on resident quality of life.
Percent of residents with delirium	Using the SNF-PPS 14-day assessment, this measure examines whether patients experienced at least one symptom of delirium in the past 7 days that represents a departure from usual functioning. Delirium is not a normal part of aging and residents with delirium should receive emergency medical attention. Facility practices can help prevent delirium.

[1]Indicates ADL QMs as referenced in scoring rules
Sources: Based on information from the AHRQ Measures Clearinghouse and the NHVBP Draft Design Report

Scoring Rules

Consistent with the specifications used for *Nursing Home Compare*, long-stay measures are included in the score if the measure can be calculated for at least 30 assessments (summed across three quarters of data to enhance measurement stability). Short-stay measures are included in the score only if data are available for at least 20 assessments.

For each measure, points are assigned based on the facility quintile. Based on input from the project's TEP, performance on the two ADL-related measures is weighted 1.6667 times as high as the other measures. This higher weighting reflects the greater importance of these measures to many nursing home residents and ensures that the two ADL measures count for 40 percent of the overall weight on the long-stay measures. Table 6 shows the points assigned for each category for the ADL QMs and for the other QMs. The points are summed across all QMs to create a total score for each facility. Note that the total possible score ranges between 0 and 136 points.

Note that the percentiles are based on the national distribution for all of the QMs except for the two ADL measures, for which percentiles are set on a State -specific basis using the State distribution. The two ADL measures are based on within-State quintile distributions because these two measures appear to be more affected by case-mix variation, particularly influenced by differences in State Medicaid policies governing long term care.

Cut points for the two ADL QMs are reset with each quarterly update of the QM data based on the State -specific distribution of these measures. Cut points for the other QMs will remain fixed at the baseline national values for a period of two years. Note that the cut points are determined prior to any imputation for missing data (see discussion below). Also, the State-specific cut points for the ADL QMs are created for State s/territories that have at least 5 facilities with a non-imputed value for that QM. In the rare case a State does not satisfy this criterion, the national distribution for that QM is used to set the cut points for that State. The cut points for the non-ADL QMs are shown in the Appendix (Table A3). The cut points for the two ADL QMs are calculated at the state level and are available in the companion document to this Technical Users' Guide: *Nursing Home Compare* – Five Star Quality Rating System: Technical Users' Guide – State-Level Cut Point Tables. The data can be found in CP Tables 2 and 3.

Table 6
Points received for QMs based on the QMs percentile[1]

	ADL QMs	Other QMs
$\leq 20^{th}$ percentile	20	12
$>20^{th}$ percentile and $\leq 40^{th}$ percentile	15	9
$>40^{th}$ percentile and $\leq 60^{th}$ percentile	10	6
$>60^{th}$ percentile and $\leq 80^{th}$ percentile	5	3
$>80^{th}$ percentile	0	0

[1]Note that percentiles are determined on a Statewide basis for ADL QMs and on a national basis for all other QMs.

Missing Data and Imputation

Some facilities have missing data for one or more QM, usually because of an insufficient number of residents available for calculating the QM. Missing values are imputed based on the Statewide average for the measure. The imputation strategy for these missing values depends on the pattern of missing data.

- For facilities that have data for at least four of the seven long-stay QMs, missing values are imputed based on the Statewide average for the measure. Points are assigned as shown in Table 6, meaning that facilities typically receive the middle number of points (10 for the ADL measures and 6 for the other measures) for QMs for which values are imputed.
- Similarly, for facilities with data on at least two out of three post-acute QMs, missing values are imputed based on the State average for the QM and points are assigned as shown in Table 6.
- The QM rating for facilities with data on three or fewer long-stay QMs is based on the short-stay measures only. Mean values for the missing long-stay QMs are not imputed.
- Similarly, the QM rating for facilities with data with zero or one short-stay QM is based on the long-stay measures only. Mean values for the missing short-stay QMs are not imputed.

Based on these rules, after imputation, facilities that receive a QM rating are in one of three categories:

- They have points for all of the QMs.
- They have points for only the 7 long-stay QMs (long-stay facilities).
- They have points for only the 3 short-stay QMs (short-stay facilities)
- No values are imputed for nursing homes with data on fewer than 4 long-stay QMs and fewer than 2 short-stay QMs. No QM rating is generated for these nursing homes.

So that all facilities are scored on the same 136 point scale, points are rescaled for long and short-stay facilities:

- If the facility has data for only the three short-stay measures (total of 36 possible points), its score is multiplied by 136/36.
- If the facility has data for only the seven long-stay measures (total of 100 possible points), its score is multiplied by 136/100.

For States or territories with a small number of facilities, it may be impossible to impute the State average for a particular QM for which a value would otherwise be imputed, because all the facilities in that State or territory are missing values for that QM. For example, a facility in the Virgin Islands may have information on all of its QMs except for one. In this rare case, the points the facility earned for the 9 QMs it does report are summed, then divided by the total number of points (in this case, 116) the facility could have received for having those 9 QMs, and finally, multiplied by 136 points to calculate its adjusted number of points.

Information on the frequency of imputation in the data at the time public reporting begins is provided in the Appendix (Table A4). Overall, 5.18 percent of facilities had data for one or more QM imputed, and most of these facilities had imputed data for only one QM. Less than 1 percent of facilities had imputed data for two or more QMs.

Overall Nursing Home Rating (Composite Measure)

Based on the five-star rating for the health inspection domain, the direct care staffing domain and the MDS quality measure domain, the overall five-star rating is assigned in five steps as follows:

Step 1: Start with the health inspection five-star rating.

Step 2: Add one star to the Step 1 result if staffing rating is four or five stars and greater than the health inspection rating; subtract one star if staffing is one star. The overall rating cannot be more than five stars or less than one star.

Step 3: Add one star to the Step 2 result if quality measure rating is five stars; subtract one star if quality measure rating is one star. The overall rating cannot be more than five stars or less than one star.

Step 4: If the Health Inspection rating is one star, then the Overall Quality rating cannot be upgraded by more than one star based on the Staffing and Quality Measure ratings.

Step 5: If the nursing home is a Special Focus Facility (SFF) that has not graduated, the maximum Overall Quality rating is three stars.

The rationale for upgrading facilities in Step 2 that receive either a four- or five-star rating for staffing (rather than limiting the upgrade to those with five stars) is that the criteria for the staffing rating is quite stringent. To earn four stars on the staffing measure, a facility must meet or exceed the CMS staffing study thresholds for RN or total staffing; to earn five stars on the staffing measure, a facility must meet or exceed the CMS staffing study thresholds for both RN and total staffing. However, requiring that the staffing rating be greater than the deficiency rating in order for the score to be upgraded ensures that a facility with four stars on deficiencies and four stars on staffing (and more than one star on MDS) does not receive a five-star overall rating.

The rationale for limiting upgrades in Step 4 is that two self-reported data domains should not significantly outweigh the rating from actual onsite visits from trained surveyors who have found very serious quality of care problems. And since the health inspection rating is heavily weighted toward the most recent findings, a one-star health rating reflects both a serious and recent finding.

The rationale for limiting the overall rating of a special focus facility in Step 5 is that the three data domains are weighted toward the most recent results and do not fully take into account the history of some nursing homes that exhibit a long history of “yo-yo” or “in and out” compliance with federal safety and quality of care requirements. Such history is a characteristic of the SFF nursing homes. While we wish the three individually-reported data sources to reflect the most recent data so that consumers can be aware that such facilities may be improving, we are capping the overall rating out of caution that the prior yo-yo pattern could be repeated. Once the facility graduates from the SFF initiative by sustaining improved compliance for about 12 months, we remove our cap for the former SFF nursing home, both figuratively and literally.

Our method for determining the overall nursing home rating does not assign specific weights to the survey, staffing, and QM domains. The survey rating is the most important dimension in determining the

overall rating, but, depending on their performance on the staffing and QM domains, a facility's overall rating may be up to two stars higher or lower than their survey rating.

If the facility has no survey deficiency rating, no overall rating is assigned. If the facility has no survey deficiency rating because it is too new to have two standard surveys, no ratings for any domain are displayed.

Change in Nursing Home Rating

Facilities may see a change in their overall rating for a number of reasons. Because the overall rating is based on three individual domains, a change in any one of the domains can affect the overall rating. A change in a domain can happen for several reasons.

New Data for the Facility

First of all, new data for the facility may change the rating. When a facility has a health inspection survey, either standard or as a result of a complaint, the deficiency data from the survey will become part of the calculation for the health inspection rating. The data will be included as soon as they become part of the CMS database. The timing for this may vary but depends on having a complete survey package for the state to upload to the database. Additional survey data may be added to the database because of complaint surveys or outcomes of revisits or IDRs. And these data may not be added in the same cycle as the standard survey data.

OSCAR staffing data are collected at the time of the health inspection survey, so new staffing data will be added for a facility approximately annually. The case-mix adjustment for the staffing data is based on MDS assessment data for the current residents of the nursing home on the last day of the quarter in which the staffing data were collected (the survey date). If the RUG data for the quarter in which the staffing data were collected are not available for a given facility, the quarter of available RUG data closest to the survey target date - either before or after – is selected. If the RUG data for the quarter in which the survey was conducted becomes available subsequently, the staffing rating will be recalculated to reflect these more appropriate data, and this might change the staffing rating. The staffing rating calculated using staffing data and RUG data from the same quarter will be held constant for a nursing home until new staffing data are collected for the facility.

Quality Measure data are updated on Nursing Home Compare on a quarterly basis, and the nursing home QM rating is updated at the same time. The updates occur mid-month in January, April, July, and October. Changes in the quality measures may change the star rating.

Changes in Data for Other Facilities

Because some of the cutpoints between star categories are based on percentile distributions that are not fixed, those cutpoints may vary slightly depending on the current facility distribution in the database. Cutpoints are fixed for the staffing measures (both RN and overall) and for all the QMs except the two ADL QMs being used (need for help with daily activities increased and ability to move about got worse).

The cutpoints for the health inspection rating are calculated on a state level as are the cutpoints for the two ADL QMs and these cutpoints are not fixed. If the distribution of facility ratings changes based on new data for a subset of facilities in the state, an individual facility (with no change in their data) may fall at a different percentile in the distribution than in the prior month, and may thus also have a different star rating.

Appendix

Table A1
RUG Based Case-Mix Adjusted Nurse and Aide Staffing Minute Estimates

1995-1997 Time Study Average Times (Minutes)					
RUG-53	Resident Specific Time + Non-Resident Specific Time Minutes				
Group	STAFF TYPE				Total Minutes
	RN	LPN	Nurse Total	AIDE	All Staff Types
REHAB & EXTENSIVE					
RUX	160.67	84.89	245.56	200.67	446.22
RUL	127.90	59.19	187.10	134.57	321.67
RVX	137.28	58.33	195.61	167.54	363.15
RVL	128.93	47.75	176.67	124.30	300.97
RHX	130.42	48.69	179.12	155.39	334.50
RHL	117.25	69.00	186.25	127.00	313.25
RMX	163.88	91.36	255.24	195.76	450.99
RML	166.61	62.68	229.29	147.07	376.36
RLX	116.87	55.13	172.00	132.63	304.63
REHABILITATION					
REHAB ULTRA HIGH					
RUC	100.75	46.03	146.78	174.86	321.64
RUB	84.12	34.94	119.06	123.13	242.19
RUA	64.98	39.49	104.47	97.91	202.38
REHAB VERY HIGH					
RVC	93.31	50.21	143.52	163.59	307.10
RVB	85.90	42.54	128.44	138.37	266.81
RVA	72.04	26.53	98.56	103.49	202.05
REHAB HIGH					
RHC	94.85	45.04	139.89	166.48	306.37
RHB	100.85	34.80	135.65	130.40	266.05
RHA	89.76	27.51	117.27	102.59	219.85
REHAB MEDIUM					
RMC	78.01	49.35	127.37	172.16	299.53
RMB	88.69	38.05	126.73	140.23	266.96
RMA	94.15	34.41	128.55	116.54	245.10
REHAB LOW					
RLB	69.38	46.52	115.91	196.33	312.24
RLA	60.88	33.02	93.89	124.29	218.18

Table A1
RUG Based Case-Mix Adjusted Nurse and Aide Staffing Minute Estimates

1995-1997 Time Study Average Times (Minutes)					
RUG-53	**Resident Specific Time + Non-Resident Specific Time Minutes**				
Group	**STAFF TYPE**				**Total Minutes**
	RN	**LPN**	**Nurse Total**	**AIDE**	**All Staff Types**
EXTENSIVE					
SE3	143.56	101.33	244.89	193.50	438.39
SE2	108.52	86.06	194.58	163.54	358.12
SE1	80.79	57.68	138.47	191.79	330.26
SPECIAL					
SSC	72.9	64.3	137.20	184.1	321.30
SSB	70.9	55.0	125.90	172.4	298.30
SSA	91.7	41.7	133.40	130.4	263.80
CLINICALLY COMPLEX					
CC2	85.2	42.50	127.70	191.1	318.80
CC1	55.7	57.70	113.40	176.9	290.30
CB2	61.5	41.80	103.30	159.0	262.30
CB1	59.0	36.20	95.20	147.3	242.50
CA2	58.8	43.30	102.10	130.3	232.40
CA1	59.7	37.60	97.30	103.3	200.60
IMPAIRED COGNITION					
IB2	40.0	32.0	72.00	137.2	209.20
IB1	39.0	32.0	71.00	130.0	201.00
IA2	38.0	27.0	65.00	100.0	165.00
IA1	33.0	26.0	59.00	96.0	155.00
BEHAVIOR					
BB2	40.0	30.0	70.00	136.0	206.00
BB1	38.0	28.0	66.00	130.0	196.00
BA2	38.0	30.0	68.00	90.0	158.00
BA1	34.0	25.0	59.00	73.5	132.50

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RUG-53	**Resident Specific Time + Non-Resident Specific Time Minutes**				
Group	**STAFF TYPE**				**Total Minutes**
	RN	**LPN**	**Nurse Total**	**AIDE**	**All Staff Types**
PHYSICAL FUNCTION					
PE2	37.0	32.0	69.00	184.8	253.80
PE1	37.0	29.4	66.40	181.6	248.00
PD2	36.0	25.0	61.00	170.0	231.00
PD1	36.0	27.6	63.60	160.0	223.60
PC2	25.6	32.8	58.40	154.4	212.80
PC1	45.1	20.6	65.70	124.2	189.90
PB2	28.0	36.8	64.80	80.6	145.40
PB1	27.5	27.7	55.20	93.9	149.10
PA2	31.9	30.6	62.50	72.9	135.40
PA1	28.2	29.8	58.00	72.8	130.80

Table A2
Coefficients for Risk-Adjustment Model

Quality Measure/Covariate	Constant (Intercept)	Coefficient
Percent of long-stay residents whose ability to move about in and around their room got worse	-1.98187	
Falls on prior assessment		0.31039
Extensive support/dependence in eating on prior assessment		0.42301
Extensive support/dependence in toileting on prior assessment		0.40746
Percent of long-stay residents who had a catheter inserted and left in their bladder	-2.91915	
Indicator of bowel incontinence on prior assessment		0.62826
Indicator of pressure sores on prior assessment		2.10187
Percent of long-stay residents with moderate to severe pain	-2.41206	
Indicator of independence or modified independence in daily decision making on the prior assessment		0.86700
Percent of short-stay residents with pressure ulcers (sores)	-2.66671	
Indicator of history of resolved pressure sore on the SNF PPS 5-day assessment		0.76163
Indicator of requiring limited or more assistance in bed mobility on the SNF PPS 5-day assessment		0.96908
		0.75814
Indicator of bowel incontinence at least one/week on the SNF PPS 5-day assessment		0.41386
Indicator of diabetes or peripheral vascular disease on the SNF PPS 5-day assessment		0.49302
Indicator of low body mass index on the SNF PPS 5-day assessment		
Percent of short-stay residents with delirium	-3.01425	
Indicator of no prior residential history preceding the current SNF stay for the patient		-0.30717

Source: http://www.cms.hhs.gov/NursingHomeQualityInits/Downloads/NHQIQMUsersManual.pdf

Table A3
National Quintile Cut points for Non-ADL QMs (1-05-2009)[1]

Quality Measure	20th percentile	40th percentile	60th percentile	80th percentile
LS: Moderate to Severe Pain	0.012075	0.02357	0.03868	0.06436
LS: High Risk Pressure Ulcers	0.065217	0.09639	0.12658	0.16667
LS: Indwelling Catheter	0.025751	0.04232	0.05841	0.08199
LS: Urinary Tract Infections	0.049853	0.07500	0.09859	0.12891
LS: Restraints	0.000000	0.01333	0.03663	0.07353
PA: Delirium	0.000000	0.00469	0.01405	0.03152
PA: Moderate to Severe Pain	0.083333	0.14865	0.21324	0.30303
PA: Pressure Ulcers	0.085687	0.12091	0.15623	0.20503

LS = Long-stay; PA = Post-acute

Quintiles for these cut points are used to assign points towards the QM summary score as follows:

- 12 points: $\leq 20^{th}$ percentile
- 9 points: $>20^{th}$ percentile and $\leq 40^{th}$ percentile
- 6 points: $>40^{th}$ percentile and $\leq 60^{th}$ percentile
- 3 points: $>60^{th}$ percentile and $\leq 80^{th}$ percentile
- 0 points: >80th percentile.

Table A4
Frequency of Imputation for MDS Quality Measure Included in Five-Star Rating (11/4/08)

	Frequency of Imputation[1] Number (Percent) of Nursing Homes
Individual Quality Measures	
ADL worsening	96 (0.62)
Long-stay pain	4 (0.03)
High-risk pressure ulcers	409 (2.62)
Catheter	0 (0.00)
Worsening locomotion	297 (1.91)
Urinary tract infections	0 (0.00)
Physical restraints	0 (0.00)
Post-acute delirium	7 (0.04)
Post-acute pain	0 (0.00)
Post-acute pressure ulcers	169 (1.08)
Number of long-stay QMs imputed	
None	14,937 (95.85)
One	517 (3.32)
Two	101 (0.65)
Three	29 (0.19)
Number of post-acute QMs imputed	
None	15,408 (98.87)
One	176 (1.13)
Total number of QMs imputed	
None	14,777 (94.82)
One	664 (4.26)
Two	111 (0.71)
Three	32 (0.21)

[1]Note that if more than 3 (of 7) long-stay QMs are missing then no long-stay measures are imputed; similarly if more than 1 (of 3) post-acute QMs is missing then no post-acute measures are imputed

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Table A5
Star Cut Points for MDS Quality Measure Summary Score (1-05-2009)

1 star	2 stars		3 stars		4 stars		5 stars
	lower	upper	lower	upper	lower	upper	
≤48	49	63	64	77	78	97	≥98

[1]Cutpoints for MDS Quality Measure Scores (which have a 0-136 point range) are set to achieve this distribution:

- 5 stars: ≥ 90th percentile;
- 4 stars: <90th percentile and ≥ 66.67th percentile
- 3 stars: <66.67th percentile and ≥ 43.33rd percentile
- 2 stars: <43.33rd percentile and ≥20th percentile
- 1 star: <20th percentile

Technical Specifications: Quality Measures Used in Five Star System

Measure Description	Measure Specifications	Covariates/Risk Adjustment
Residents whose need for help with daily activities has increased	***Numerator:*** Residents with worsening (increasing MDS item score) in Late-Loss ADL self performance at target relative to prior assessment. Residents meet the definition of Late-Loss ADL worsening when at least two of the following are true: 1. Bed mobility – [Level at target assessment (G1aA[t]] – [Level at previous assessment (G1aA[t-1])] > 0, or 2. Transfer - [Level at target assessment (G1bA[t]] – [Level at previous assessment (G1bA[t-1])] > 0, or 3. Eating - [Level at target assessment (G1hA[t]] – [Level at previous assessment (G1hA[t-1])] > 0, or 4. Toileting - [Level at target assessment (G1iA[t]] – [Level at previous assessment (G1iA[t-1])] > 0, **OR** at least one of the following is true: 1. Bed mobility – [Level at target assessment (G1aA[t]] – [Level at previous assessment (G1aA[t-1])] > 1, or 2. Transfer - [Level at target assessment (G1bA[t]] – [Level at previous assessment (G1bA[t-1])] > 1, or 3. Eating - [Level at target assessment (G1hA[t]] – [Level at previous assessment (G1hA[t-1])] > 1, or 4. Toileting - [Level at target assessment (G1iA[t]] – [Level at previous assessment (G1iA[t-1])] > 1. ***Denominator:*** All residents with a valid target and a valid prior assessment. ***Exclusions*:** Residents meeting any of the following conditions: 1. None of the four Late-Loss ADLs (G1aA, G1bA, G1hA, and G1iA) can show decline because each of the four have a value of 4 (total dependence) or a value of 8 (activity did not occur) on the prior assessment [t-1]. 2. The QM did not trigger (resident not included in the numerator) AND there is missing data on any one of the four Late-Loss ADLs (G1aA, G1bA, G1hA, or G1iA) on the target assessment [t] or prior assessment [t-1]. 3. The resident is comatose (B1 = 1) or comatose status is unknown (B1 = missing) on the target assessment. 4. The resident has end-stage disease (J5c = checked) or end-stage disease status unknown (J5c = missing) on the target assessment. 5. The resident is receiving hospice care (P1ao = checked) or hospice status is unknown (P1ao = missing) on the target assessment or the most recent full assessment. The P1ao value from the last full assessment is only considered if the target assessment is a quarterly assessment and the state quarterly assessment does not include P1ao.	

Measure Description	Measure Specifications	Covariates/Risk Adjustment
Residents whose ability to move in and around their room got worse	***Numerator*:** Residents whose value for locomotion self performance is greater at target relative to prior assessment (G1eA[t]>G1eA[t- 1]). ***Denominator:*** All residents with a valid target assessment and a valid prior assessment. ***Exclusions*:** Residents satisfying any of the following conditions: 1. The G1eA value is missing on the target assessment [t]. 2. The G1eA value is missing on the prior assessment [t-1] and the G1eA value shows some dependence on the target assessment (G1eA[t]>0). 3. The G1eA value on the prior assessment is 4 (total dependence) or 8 (activity did not occur). 4. The resident is comatose (B1 = 1) or comatose status is unknown (B1 = missing) on the target assessment. 5. The resident has end-stage disease (J5c = checked) or end-stage disease status is unknown (J5c = missing) on the target assessment. 6. The resident is receiving hospice care (P1ao = checked) or hospice status is unknown(P1ao = missing) on the target assessment or the most recent full assessment. The P1ao value from the last full assessment is only considered if the target assessment is a quarterly assessment and the state quarterly assessment does not include P1ao.	***Covariates:*** 1. Indicator of recent falls on the prior assessment: Covariate = 1 if J4a checked or J4b checked Covariate = 0 if J4a not checked AND J4b not checked 2. Indicator of extensive support or more dependence in eating on the prior assessment: Covariate = 1 if G1hA = 3,4, or 8 Covariate = 0 if G1hA = 0,1, or 2 3. Indicator of extensive support or more dependence in toileting on the prior assessment: Covariate = 1 if G1iA = 3,4, or 8 Covariate = 0 if G1iA = 0,1, or 2
High-risk residents with pressure ulcers	***Numerator:*** Residents with pressure sores (Stage 1-4) on target assessment (M2a >0 OR I3a-I3e = ICD-9 707.0*) who are defined as high risk (see denominator definition). ***Denominator:*** All residents with a valid target assessment and any one of the following high-risk criteria: 1. Impaired in bed mobility or transfer on the target assessment as indicated by G1aA = 3, 4, or 8 OR G1bA = 3, 4, or 8. 2. Comatose on the target assessment as indicated by B1 = 1. 3. Suffer malnutrition on the target assessment as indicated by I3a through I3e = 260, 261, 262, 263.0, 263.1, 263.2, 263.8, or 263.9. ***Exclusions:*** Residents satisfying any of the following conditions are excluded: 1. The target assessment is an admission (AA8a = 01) assessment. 2. The QM did not trigger (resident is not included in the QM numerator) AND the value of M2a is missing on the target assessment.	
Residents with a urinary tract infection	***Numerator*:** Residents with urinary tract infection on target assessment (I2j = checked). ***Denominator:*** All residents with a valid target assessment. ***Exclusions*:** Residents satisfying any of the following conditions: 1. The target assessment is an admission (AA8a = 01) assessment. 2. I2j is missing on the target assessment.	

Measure Description	Measure Specifications	Covariates/Risk Adjustment
Residents who have/had a catheter inserted and left in their bladder	***Numerator:*** Residents with indwelling catheters on target assessment (H3d = checked). ***Denominator:*** All residents with a valid target assessment. ***Exclusions:*** Residents satisfying any of the following conditions: 1. The target assessment is an admission (AA8a = 01) assessment. 2. H3d is missing on the target assessment.	***Covariates:*** 1. Indicator of bowel incontinence on the prior assessment: Covariate = 1 if H1a = 4 Covariate = 0 if H1a = 0,1,2, or 3 2. Indicator of pressure sores on the prior assessment: Covariate = 1 if M2a = 3 or 4 Covariate = 0 if M2a = 0, 1 or 2
Residents who were physically restrained	***Numerator:*** Residents who were physically restrained daily (P4c or P4d or P4e = 2) on target assessment. ***Denominator*:** All residents with a valid target assessment. ***Exclusions:*** Residents satisfying any of the following conditions: 1. The target assessment is an admission (AA8a = 01) assessment. 2. The QM did not trigger (resident is not included in the QM numerator) AND the value of P4c or P4d or P4e is missing on the target assessment.	
Residents who have moderate to severe pain	***Numerator:*** Residents with moderate pain at least daily (J2a=2 AND J2b=2) OR horrible/excruciating pain at any frequency (J2b=3) on the target assessment. ***Denominator:*** All residents with a valid target assessment. ***Exclusions:*** Residents satisfying any of the following conditions: 1. The target assessment is an admission (AA8a = 01) assessment. 2. Either J2a or J2b is missing on the target assessment. 3. The values of J2a and J2b are inconsistent on the target assessment. J2a and J2b are inconsistent if either (a) J2a = 0 and J2b is not blank, or (b) J2a >0 and J2b = blank.	***Covariates:*** 1. Indicator of independence or modified independence in daily decision making on the prior assessment: Covariate = 1 if B4 = 0 or 1. Covariate = 0 if B4 = 2 or 3.

Measure Description	Measure Specifications	Covariates/Risk Adjustment
Short-stay residents with delirium	***Numerator:*** Short-stay residents at SNF PPS 14-day assessment with at least one symptom of delirium that represents a departure from usual functioning (at least one B5a through B5f = 2). ***Denominator:*** All patients with a valid SNF PPS 14-day assessment (AA8b = 7). ***Exclusions*:** Patients satisfying any of the following conditions: 1. Patients who are comatose (B1 = 1) or comatose status is unknown (B1 = missing) on the SNF PPS 14-day assessment. 2. Patients with end-stage disease (J5c = checked) or end-stage disease status is unknown (J5c = missing) on the SNF PPS 14-day assessment. 3. Patients who are receiving hospice care (P1ao = checked) or hospice status is unknown (P1ao = missing) on the SNF PPS 14-day assessment. 4. The QM did not trigger (patient not included in the numerator) AND there is a missing value on any of the items B5a through B5f on the SNF PPS 14-day assessment.	***Covariates:*** 1. Indicator of NO prior residential history preceding the current SNF stay for the patient: Covariate = 1 if there is NO prior residential history indicated by the following condition being satisfied: a. There is a recent admission assessment (AA8a = 01) AND AB5a through AB5e are not checked (value 0) and AB5f is checked (value 1). Covariate = 0 if there is prior residential history indicated by either of the following conditions being satisfied: a. There is a recent admission assessment (AA8a = 01) AND any of the items AB5a through AB5e are checked (value 1) OR AB5f is not checked (value 0). b. There is no recent admission assessment (AA8a = 01).
Short-stay residents who had moderate to severe pain	***Numerator*:** Short-stay residents at SNF PPS 14-day assessment with moderate pain at least daily (J2a = 2 and J2b = 2) OR horrible/excruciating pain at any frequency (J2b = 3). ***Denominator:*** All patients with valid SNF PPS 14-day assessment (AA8b = 7). ***Exclusions*:** Patients satisfying any of the following conditions: 1. Either J2a or J2b is missing on the 14-day assessment. 2. The values of J2a and J2b are inconsistent on the 14-day assessment. J2a and J2b are inconsistent if either (a) J2a = 0 and J2b is not blank, or (b) J2a >0 and J2b = blank.	
Short-stay residents with pressure ulcers	***Numerator:*** Short-stay residents at SNF PPS 14-day assessment who satisfy either of the following conditions: 1. On the SNF PPS 5-day assessment, the patient had no pressure sores (M2a[t-1] = 0) AND, on the SNF PPS 14-day assessment, the patient has at least a Stage 1 pressure sore (M2a[t] = 1,2,3, or 4). 2. On the SNF PPS 5-day assessment, the patient had a pressure sore (M2a[t-1] = 1,2,3, or 4) AND on the SNF PPS 14-day assessment, pressure sores worsened or failed to improve (M2a[t]>= M2a[t-1]). ***Denominator:*** All patients with a valid SNF PPS 14-day assessment (AA8b = 7) AND a valid preceding SNF PPS 5-day assessment (AA8b = 1). ***Exclusions:*** Patients satisfying any of the following conditions: 1. M2a is missing on the 14-day assessment [t]. 2. M2a is missing on the 5-day assessment [t-1] and M2a shows presence of pressure sores on the 14-day assessment (M2a = 1,2,3, or 4)	***Covariates:*** 1. Indicator of history of resolved pressure sore on SNF PPS 5-day : Covariate = 1 if M3 = 1 Covariate = 0 if M3 = 0 2. Indicator of requiring limited or more assistance in bed mobility on the SNF PPS 5-day: Covariate = 1 if G1aA = 2,3,4, or 8 Covariate = 0 if G1aA =0 or 1 3. Indicator of bowel incontinence at least one/week on the SNF PPS 5-day: Covariate = 1 if H1a = 2,3, or 4 Covariate = 0 if H1a = 0 or 1 4. Indicator of diabetes or peripheral vascular disease on the SNF PPS 5-day: Covariate = 1 if I1a checked (value 1) OR I1j checked (value 1)