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

Technical Users' Guide

December 2008

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 will also have its own associated five-star rating:

- ***Health Inspections - Measures based on outcomes from State health inspections:*** Facility ratings for the health inspection domain will be 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 major 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* will display 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 will also be 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 SFF **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

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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, 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.
- ***Repeat Revisits - Number of repeat revisits required to confirm that correction of deficiencies at scope and severity level F or greater have restored compliance***: No points are assigned for the first revisit; points are assigned only for the second, third, and fourth revisits (Table 2). If a provider fails to correct major deficiencies by the time of the first revisit, then these additional revisit points are assigned up to a total of 100 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 is assigned a weighting factor of 1/2, the previous period has a weighting factor of 1/3, and the second prior survey has a weighting factor of 1/6. The weighted time period scores are then summed to create the survey score for each facility.

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.

Source: Centers for Medicare & Medicaid Services

Table 2
Weights for Repeat Revisits

Revisit Number	Noncompliance Points
First	0
Second	50 points
Third	75 additional points
Fourth	100 additional points

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 will be re-calibrated each month so that the distribution of star ratings within States remains fixed over time in an effort to reduce the likelihood that the rating process will affect the health inspection process. As a consequence, however, it is possible for a facility's rating to change from month to month even without a new survey in that facility because of new surveys in other facilities that affect the State wide distribution. In the rare case that a State has fewer than 5 facilities upon which to generate the cut points, the national distribution is used. Cut points for the initial data that will be displayed when the five-star website becomes active are shown in the Appendix (Table A1).

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

[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.

The source data for the staffing measures is the Online Survey Certification and Reporting (OSCAR) System. The data are subject to the same exclusion criteria as is currently used on *Nursing Home Compare,* and as such the data exclude facilities with unreliable OSCAR staffing data and facilities with outlier staffing levels. Note that the OSCAR staffing data include both facility employees and contracted staffing agency hours. Consistent with the specifications on *Nursing Home Compare,* the RN measure includes hours for RN directors of nursing and nurses with administrative duties. Nurse aide hours include nurse aides in training and medication aides.

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 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 average case-mix across four quarters of RUG III data.

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) will be determined using the most recent 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, will be able to ascertain the increased levels at which they would be afforded a higher star rating for the staffing domain.

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[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).

[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 Proposed Staffing Measures

Rating	Definition	Range (adjusted hours per resident day) RN	Total
1	<25th percentile of distribution for freestanding facilities	<0.220	<2.946
2	at least 25th percentile but less than median of the distribution for freestanding facilities	0.220-0.297	2.946-3.316
3	greater than or equal to the median but less the 75th percentile of the distribution for freestanding facilities	0.298-0.403	3.317 – 3.774
4	greater than or equal to the 75th percentile of the distribution for freestanding facilities but less than the CMS staffing study threshold	0.404-0.549	3.775 – 4.079
5	at or exceeding the thresholds identified in the CMS staffing study[2]	≥ 0.550	≥ 4.080

[1]Except for the top cut point (to achieve a five-star rating), the cut points shown are based on the distribution in the test data. The cut points that will be used at the time public reporting begins are based on data reported to CMS as of 11/4/2008, are shown in the Appendix (Table A2), and will be 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 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.

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	≥4.08
1	<25th percentile	★	★	★★	★★	★★★
2	≥25th percentile, < median	★	★★	★★★	★★★	★★★★
3	≥ median, <75th percentile	★★	★★★	★★★★	★★★★	★★★★
4	≥75th percentile, < 0.55	★★	★★★	★★★★	★★★★	★★★★
5	≥ 0.55 hours	★★★	★★★★	★★★★	★★★★	★★★★★

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 about in and around their room got worse
- Percent of high risk residents who have 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 with moderate to severe pain

Short-stay residents:

- Percent of residents with pressure ulcers (sores)
- Percent of residents with 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 QMs are available on the CMS website at: (http://www.cms.hhs.gov/NursingHomeQualityInits/Downloads/NHQIQMUsersManual.pdf).

Ratings for the QM domain will be 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.

Table 5
MDS-Based Quality Measures

Measure	Comments
Long-Stay Measures:	
Percent of residents whose need for help with daily activities has increased[1]	Maintenance of ADLs is also 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 measures nursing home rules/practices related to use of mobility aides. 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	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	Using a catheter 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 by themselves, 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 are in moderate to severe pain every day 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.

Table 5
MDS-Based Quality Measures

Short-Stay Measures	
Percent of residents with pressure sores	Pressure sores can lead to complications such as skin and bone infections.
Percent of residents with moderate to severe pain	This measure examines whether patients are in moderate to severe pain every day 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	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 will be 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 will be 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 will be used to set the cut points for that State. The cut points that will be used when public reporting begins are shown in the Appendix (Tables A4-A6).

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

	ADL QMs	Other QMs
<20th percentile	20	12
20th - <40th percentile	15	9
40th - <60th percentile	10	6
60th - <80th	5	3
80th percentile or greater	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 will be imputed based on the Statewide average for the measure. Points are assigned as shown in Table 6, meaning that facilities will 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 only on the short-stay measures. 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 only on the long-stay measures. Mean values for the missing short-stay QMs are not imputed.

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

- They will have points for all of the QMs.
- They will have points only for the 7 long-stay QMs (long-stay facilities).
- They will have points only for 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 will be generated for these nursing homes.

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

- If the facility has data only for 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 "% Long stay residents with ADL worsening." If no facility in the Virgin Islands has information on that QM, then the State average cannot be imputed. Instead, the points the facility earned for the 9 QMs it does report will be 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 A8). Overall, 5.18 percent of facilities had at 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.

Rating Methodology

Once the summary QM score is computed for each facility as described above, the five-star QM rating is assigned based on the nationwide distribution of these scores, as follow:

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

The cut points associated with these star ratings will be held constant for a period of two years, allowing the distribution of the QM rating to change over time. The cut points are shown in the Appendix (Table A7).

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 deficiency 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 MDS rating is five stars; subtract one star if MDS 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) will 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 will be assigned. If the facility has no survey deficiency rating because it is too new to have two standard surveys, no ratings for any domain will be displayed.

Appendix

Table A1. Star Cut points for Health Inspections – by State – (11-04-2008)[1]

State	1/2 star (80th percentile)	2/3 star (56.66 percentile)	3/4 star (33.33 percentile)	4/5 star (10th percentile)	Number of facilities	*=National Cut points Used[2]
Alaska	68.000	48.667	33.333	27.333	15	
Alabama	73.500	42.667	25.333	10.667	230	
Arkansas	165.333	102.667	70.333	39.000	230	
Arizona	97.333	56.000	36.667	18.667	132	
California	92.000	58.000	39.333	20.000	1247	
Colorado	113.333	78.667	51.333	22.000	210	
Connecticut	81.333	55.333	36.667	19.333	241	
District of Columbia	216.667	160.333	64.000	32.000	18	
Delaware	114.667	85.333	62.667	34.667	43	
Florida	82.667	55.333	38.667	20.000	678	
Georgia	68.000	37.667	23.333	10.000	358	
Guam	86.000	48.667	28.000	10.667	1	*
Hawaii	62.000	32.000	25.333	11.333	46	
Iowa	65.333	36.667	22.000	6.667	444	
Idaho	109.833	68.667	46.667	20.667	75	
Illinois	89.000	46.000	24.667	8.000	784	
Indiana	123.833	73.333	44.667	14.667	505	
Kansas	146.667	82.667	50.667	22.000	338	
Kentucky	74.667	35.333	20.000	8.667	287	
Louisiana	109.333	66.667	38.667	17.333	283	
Massachusetts	60.667	34.000	18.667	6.000	433	
Maryland	98.667	62.667	40.667	15.333	229	
Maine	84.000	44.667	29.333	10.667	112	
Michigan	110.667	75.333	48.333	24.000	417	
Minnesota	80.167	54.333	37.667	19.333	389	
Missouri	105.667	60.667	35.333	13.333	511	
Mississippi	75.333	40.000	21.333	8.000	200	
Montana	83.333	54.000	28.667	13.333	91	
North Carolina	50.667	27.333	15.333	6.667	419	
North Dakota	33.333	20.667	12.667	8.000	83	

State	1/2 star (80th percentile)	2/3 star (56.66 percentile)	3/4 star (33.33 percentile)	4/5 star (10th percentile)	Number of facilities	*=National Cut points Used[2]
Nebraska	76.000	50.000	32.000	12.000	221	
New Hampshire	59.333	32.667	14.000	4.000	78	
New Jersey	69.333	35.333	22.000	7.333	361	
New Mexico	145.333	82.167	43.333	14.667	69	
Nevada	64.667	53.333	32.667	16.000	48	
New York	63.333	30.000	16.333	7.333	650	
Ohio	58.833	35.333	20.000	6.667	945	
Oklahoma	144.333	90.000	57.333	34.000	318	
Oregon	79.333	46.000	22.000	8.000	138	
Pennsylvania	56.000	31.333	17.333	8.000	705	
Puerto Rico	373.833	287.667	213.667	124.667	7	
Rhode Island	39.333	21.667	12.000	4.000	85	
South Carolina	82.333	44.000	25.333	11.333	175	
South Dakota	41.667	26.000	16.000	7.000	110	
Tennessee	72.667	41.333	24.000	12.000	317	
Texas	93.333	49.333	29.333	11.333	1108	
Utah	45.000	32.667	15.333	3.000	90	
Virginia	64.667	41.333	23.333	9.333	275	
Virgin Islands	86.000	48.667	28.000	10.667	1	*
Vermont	68.667	51.667	42.000	17.667	40	
Washington	100.667	54.000	28.667	10.667	237	
Wisconsin	74.333	39.333	22.000	7.333	388	
West Virginia	93.333	68.000	36.000	18.000	130	
Wyoming	108.667	79.333	60.000	25.333	39	

Table A1. Star Cut points for Health Inspections – by State – (11-04-2008)[1]

[1]Cutpoints for Health Inspection Scores used as follows: 5 stars: ≤ 10th percentile; 4 stars: >10th percentile and ≤ 33.33rd percentile; 3 stars: >33.33rd percentile and ≤ 56.66th percentile; 2 stars: >56.66th percentile and ≤80th percentile; 1 star: >80th percentile

[2]Cutpoints based on national distribution are used when fewer than 5 facilities in State /territory have data available

Table A2. National Cut points for Staffing Measures (11-04-2008)[1]

Staff type	1/2 points (25th percentile)	2/3 points (50th percentile)	3/4 points (75th percentile)	4/5 points (CMS staffing study)
RN	0.221	0.298	0.402	0.550
Total	2.998	3.376	3.842	4.080

[1]Cutpoints for RN five-star and Total staffing (RN, LPN, and CNA) used as follows based on case-mix adjusted hours per resident day: 5 points: ≥ CMS staffing study threshold; 4 points: <CMS staffing study threshold and ≥75th percentile; 3 points: <75th percentile and ≥50th percentile (median); 2 points: <50th percentile and ≥25th percentile; 1 point: <25th percentile. The RN staffing five-star is then simply assigned as 1 star per point. The overall Staffing (combined RN and total staffing) five-star rating is constructed as shown in Table A3.

Table A3. Assignment of Staffing five-star Rating Based on RN and Total Staffing Ratings

		Total staffing rating and hours (RN, LPN and aide)				
		1	**2**	**3**	**4**	**5**
RN rating and hours		<25th percentile	≥25th percentile and < median	≥ median and <75th percentile	≥75th percentile and < CMS staffing study threshold	≥ CMS staffing study threshold
1	<25th percentile	★	★	★★	★★	★★★
2	≥25th percentile & <median	★	★★	★★★	★★★	★★★★
3	≥ median & <75th percentile	★★	★★★	★★★★	★★★★	★★★★
4	≥75th percentile & <CMS staffing study threshold	★★	★★★	★★★★	★★★★	★★★★
5	≥ CMS staffing study threshold	★★★	★★★★	★★★★	★★★★	★★★★★

Table A4. National Quintile Cut points for Non-ADL QMs (11-04-2008)[1]

Quality Measure	20th percentile	40th percentile	60th percentile	80th percentile
LS: Moderate to Severe Pain	0.02198	0.04294	0.06944	0.11364
LS: High Risk Pressure Ulcers	0.06623	0.09722	0.12745	0.16738
LS: Indwelling Catheter	0.02899	0.04808	0.06731	0.09325
LS: Urinary Tract Infections	0.05000	0.07458	0.09821	0.12844
LS: Restraints	0.00000	0.01493	0.03865	0.07813
PA: Delirium	0.00000	0.00806	0.02326	0.05128
PA: Moderate to Severe Pain	0.08537	0.14925	0.21429	0.30508
PA: Pressure Ulcers	0.10000	0.14474	0.18852	0.25000

LS = Long-stay; PA = Post-acute

[1]Quintiles for these cut points used to assign points towards the summary score as follows: 12 points: ≤20th percentile; 9 points: >20th percentile and ≤40th percentile; 6 points: >40th percentile and ≤60th percentile; 3 points: >60th percentile and ≤80th percentile; 0 points: >80th percentile.

Table A5. Quintile Cut points for ADL QM Late Loss ADL Worsening (11-04-2008)

State	20th percentile	40th percentile	60th percentile	80th percentile	Number of facilities	*=National Cut points Used
Alaska	0.08163	0.12717	0.14286	0.19167	11	
Alabama	0.07576	0.10180	0.12883	0.17241	223	
Arkansas	0.08333	0.11454	0.14689	0.19192	218	
Arizona	0.08571	0.11551	0.15789	0.21642	121	
California	0.05263	0.08264	0.11538	0.16667	1123	
Colorado	0.09524	0.13077	0.17355	0.22222	199	
Connecticut	0.11475	0.14378	0.18421	0.21930	237	
District of Columbia	0.08772	0.10337	0.15886	0.20952	17	
Delaware	0.11246	0.14745	0.17332	0.22768	40	
Florida	0.08416	0.10914	0.13636	0.17526	657	
Georgia	0.09554	0.12389	0.15615	0.20000	342	
Guam	0.08898	0.12340	0.15966	0.20767	0	*
Hawaii	0.06228	0.11111	0.16204	0.19903	38	
Iowa	0.09211	0.11594	0.14724	0.18333	422	
Idaho	0.09375	0.14286	0.17808	0.20388	69	
Illinois	0.08108	0.11782	0.14773	0.20175	718	
Indiana	0.16667	0.20661	0.24419	0.28727	476	
Kansas	0.09388	0.12685	0.16098	0.20145	325	
Kentucky	0.09700	0.14922	0.19389	0.23635	265	
Louisiana	0.13343	0.18547	0.22009	0.26327	265	
Massachusetts	0.10296	0.13052	0.15801	0.19221	420	
Maryland	0.09583	0.12757	0.15702	0.20245	217	
Maine	0.10370	0.13699	0.16667	0.20548	109	
Michigan	0.08295	0.11374	0.14634	0.19692	399	
Minnesota	0.10909	0.13636	0.16352	0.20219	382	
Missouri	0.07453	0.10497	0.13402	0.17582	484	
Mississippi	0.10040	0.13188	0.16445	0.21618	190	
Montana	0.10309	0.12766	0.17033	0.21196	84	
North Carolina	0.17031	0.20769	0.24306	0.28516	392	
North Dakota	0.12583	0.14961	0.18349	0.21111	79	
Nebraska	0.10610	0.14014	0.16909	0.21227	215	
New Hampshire	0.12397	0.15789	0.18644	0.23109	76	
New Jersey	0.08197	0.10455	0.12782	0.15094	339	

Table A5. Quintile Cut points for ADL QM Late Loss ADL Worsening (11-04-2008)

State	20th percentile	40th percentile	60th percentile	80th percentile	Number of facilities	*=National Cut points Used
New Mexico	0.12610	0.16578	0.20209	0.23850	65	
Nevada	0.16667	0.18919	0.22302	0.29630	43	
New York	0.07836	0.09790	0.12109	0.15517	639	
Ohio	0.08571	0.11881	0.15179	0.19048	907	
Oklahoma	0.06299	0.09155	0.11934	0.16129	303	
Oregon	0.04673	0.07821	0.10465	0.14035	134	
Pennsylvania	0.14417	0.18333	0.22051	0.26364	656	
Puerto Rico	0.08898	0.12340	0.15966	0.20767	0	*
Rhode Island	0.08487	0.11410	0.14412	0.17522	85	
South Carolina	0.07692	0.10695	0.14521	0.19079	163	
South Dakota	0.12316	0.14689	0.17963	0.20909	110	
Tennessee	0.08721	0.11364	0.14286	0.18421	298	
Texas	0.08898	0.12037	0.15254	0.19620	1042	
Utah	0.07303	0.11340	0.15079	0.20952	78	
Virginia	0.13149	0.16414	0.19786	0.24419	260	
Virgin Islands	0.08898	0.12340	0.15966	0.20767	1	*
Vermont	0.14863	0.17404	0.20942	0.25825	40	
Washington	0.08594	0.11047	0.14352	0.17949	226	
Wisconsin	0.09827	0.13061	0.16129	0.19580	377	
West Virginia	0.12821	0.16981	0.20313	0.26437	117	
Wyoming	0.11565	0.14414	0.16667	0.21693	36	

LS = Long-stay
[1]Quintiles for these cut points used to assign points towards the summary score as follows: 20 points: ≤20th percentile; 15 points: >20th percentile and ≤40th percentile; 10 points: >40th percentile and ≤60th percentile; 5 points: >60th percentile and ≤80th percentile; 0 points: >80th percentile.

Table A6. Quintile Cut points for ADL QM Worsening Locomotion (11-04-2008)

State	20th percentile	40th percentile	60th percentile	80th percentile	Number of facilities	*=National Cut points Used
Alaska	0.07527	0.11538	0.12057	0.19588	8	
Alabama	0.07813	0.10217	0.13081	0.16583	220	
Arkansas	0.07692	0.10638	0.13568	0.17143	217	
Arizona	0.08285	0.10965	0.14349	0.19936	115	
California	0.06061	0.09559	0.13393	0.18033	1087	
Colorado	0.07975	0.11594	0.16471	0.21622	198	
Connecticut	0.09677	0.13968	0.17568	0.21495	236	
District of Columbia	0.08434	0.09677	0.09890	0.13855	16	
Delaware	0.10969	0.15402	0.18462	0.22485	40	
Florida	0.07547	0.10360	0.12879	0.16532	646	
Georgia	0.08400	0.11754	0.14203	0.19210	340	
Guam	0.08143	0.11628	0.15152	0.20330	0	*
Hawaii	0.07000	0.14194	0.17931	0.21809	33	
Iowa	0.07752	0.11111	0.13559	0.17699	418	
Idaho	0.09259	0.14474	0.18182	0.22581	69	
Illinois	0.07143	0.11238	0.14676	0.18616	710	
Indiana	0.09920	0.14012	0.19093	0.24323	475	
Kansas	0.08197	0.12295	0.15254	0.19780	323	
Kentucky	0.08642	0.12302	0.16216	0.22807	252	
Louisiana	0.06786	0.08846	0.11765	0.14919	264	
Massachusetts	0.10938	0.14324	0.17773	0.21231	415	
Maryland	0.09574	0.13260	0.17127	0.23256	213	
Maine	0.15957	0.19565	0.22581	0.28846	107	
Michigan	0.08854	0.11888	0.14773	0.18987	391	
Minnesota	0.10849	0.13830	0.17005	0.20909	381	
Missouri	0.05970	0.09167	0.12000	0.15741	483	
Mississippi	0.08242	0.10812	0.13713	0.18608	190	
Montana	0.09859	0.13462	0.16568	0.21053	84	
North Carolina	0.09091	0.12903	0.17544	0.24413	386	
North Dakota	0.10448	0.14414	0.16923	0.20946	78	
Nebraska	0.10256	0.13478	0.17054	0.20513	212	
New Hampshire	0.12068	0.16273	0.19414	0.23146	75	
New Jersey	0.08000	0.10435	0.13402	0.16234	333	

Table A6. Quintile Cut points for ADL QM Worsening Locomotion (11-04-2008)

State	20th percentile	40th percentile	60th percentile	80th percentile	Number of facilities	*=National Cut points Used
New Mexico	0.10268	0.16279	0.19340	0.23780	64	
Nevada	0.12500	0.19469	0.24398	0.29592	42	
New York	0.08741	0.11321	0.13793	0.18325	633	
Ohio	0.08421	0.11561	0.15132	0.19355	902	
Oklahoma	0.04651	0.06883	0.09474	0.12950	302	
Oregon	0.06667	0.09091	0.11180	0.16049	129	
Pennsylvania	0.17701	0.22086	0.25294	0.31111	646	
Puerto Rico	0.08143	0.11628	0.15152	0.20330	0	*
Rhode Island	0.09459	0.11594	0.14027	0.15854	82	
South Carolina	0.09267	0.12156	0.14713	0.20000	160	
South Dakota	0.11056	0.13966	0.17084	0.20479	110	
Tennessee	0.08531	0.11123	0.13427	0.17331	295	
Texas	0.06195	0.09091	0.12121	0.16667	1032	
Utah	0.07407	0.10976	0.14516	0.21429	77	
Virginia	0.11966	0.15566	0.20679	0.25000	254	
Virgin Islands	0.08143	0.11628	0.15152	0.20330	1	*
Vermont	0.14963	0.19775	0.26078	0.28811	40	
Washington	0.09244	0.12579	0.16000	0.20455	222	
Wisconsin	0.09569	0.12299	0.15470	0.19444	376	
West Virginia	0.10112	0.14679	0.18421	0.22549	114	
Wyoming	0.10542	0.13159	0.16250	0.19315	35	

LS = Long-stay
[1]Quintiles for these cut points used to assign points towards the summary score as follows: 20 points: ≤20th percentile; 15 points: >20th percentile and ≤40th percentile; 10 points: >40th percentile and ≤60th percentile; 5 points: >60th percentile and ≤80th percentile; 0 points: >80th percentile.

Table A7. Star Cut points for MDS Quality Measure Summary Score (11-04-2008)

1/2 star 20th percentile	2/3 star 43.33rd percentile	3/4 star 66.67th percentile	4/5 star (90th percentile)
49	64	78	99

[1]Cutpoints for MDS Quality Measure Scores (which have a 0-136 point range) used as follows: 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.

Table A8. Frequency of Imputation for MDS Quality Measure included in five-star Rating
(data reported through 11/04/08; N=15,584 nursing homes)

	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.