



Quality of Patient Care Star Ratings Methodology

What Are Star Ratings?

Consumer research has shown that summary quality measures and the use of symbols, such as stars, to represent performance are valuable to consumers. Star ratings can help consumers more quickly identify differences in quality and make use of the information when selecting a health care provider. In addition to summarizing performance, star ratings can also help home health agencies (HHAs) identify areas for improvement. They are useful to consumers, consumer advocates, health care providers, and other stakeholders, when updated regularly to present the most current information available.

Why Star Ratings for Home Health?

In order to provide home health care consumers with a summary quality measure in an accessible format, CMS published a quality of care star rating for HHAs on Home Health Compare (HHC) starting in 2015. This is part of CMS' plan to adopt star ratings across all [Medicare.gov](http://www.Medicare.gov) Compare websites. Star ratings are currently publicly displayed on Nursing Home Compare, Physician Compare, Dialysis Facility Compare, the Medicare Advantage Plan Finder, and Hospital Compare.

Public reporting is a key driver for improving health care quality by supporting consumer choice and incentivizing provider quality improvement. CMS reports process, outcome and patient experience of care quality measures on the HHC website, to help consumers and their families make choices about who will provide their home health care. The Quality of Patient Care Star Rating is an additional measure available on the website. Several alternative methods of calculating the Quality of Patient Care Star Ratings were considered, borrowing from the methods used for other care settings, such as nursing homes, dialysis facilities, and managed care.

Special Open Door Forums, Stakeholder Input, and Ongoing Maintenance

A Special Open Door Forum (SODF) on "Adding Star Ratings to Home Health Compare" was held on December 17, 2014 to describe the proposed calculation. After considering numerous comments and suggestions made during the SODF and received from stakeholders after the SODF, several adjustments were made to the methodology, including the use of half stars in reporting. The updated methodology was presented in a second SODF on February 5, 2015 to solicit additional stakeholder input. Based on the feedback, the Quality of Patient Care Star Ratings methodology was revised to remove the process measure "Pneumococcal Vaccine Ever Received" from the calculation.

Ongoing monitoring and stakeholder input has led to various updates and improvements to the Quality of Patient Care Star Rating, including:

- As of the April 2018 HHC refresh, the "Influenza Vaccination Ever Received" measure was removed from the calculation algorithm. This decision was proposed in an October



10, 2017 Medicare Learning Network call and the finalized after reviewing public comment on December 14, 2017.

- As of the April 2019 HHC refresh, the “Drug Education on All Medications Provided to Patient/Caregiver during All Episodes of Care” will be removed and the “Improvement in Management of Oral Medications” measure added. This change was proposed in a June 26, 2018 Medicare Learning Network call and finalized after reviewing public comment on October 3, 2018.

It is anticipated that the methodology will continue to evolve and be refined over time, and CMS continues to welcome stakeholder feedback in its ongoing efforts to improve the Quality of Patient Care Star Ratings.

Selecting Measures for Inclusion in the Quality of Patient Care Star Ratings

The Quality of Patient Care Star Ratings methodology includes eight (8) of the reported process and outcome quality measures on HHC. Measures included in star rating calculation were chosen based on the following criteria:

1. The measure should apply to a substantial proportion of home health patients, and have sufficient data to report for a majority of HHAs.
2. The measure should show a reasonable amount of variation among home health agencies, and it should be possible for a HHA to show improvement in performance.
3. The measure should have high face validity and clinical relevance.
4. The measure should be stable and not show substantial random variation over time.

Based on these criteria, the measures below were selected for inclusion. Appendix A provides more detail about the initial measure selection process.

Process Measures	Outcome Measures
1. Timely Initiation of Care	2. Improvement in Ambulation 3. Improvement in Bed Transferring 4. Improvement in Bathing 5. Improvement in Pain Interfering With Activity 6. Improvement in Dyspnea 7. Improvement in Management of Oral Medications
	8. Acute Care Hospitalization

The “Influenza Immunization Received for the Current Flu Season” and “the “Drug Education on All Medications Provided to Patient/Caregiver during All Episodes of Care” were initially selected based on these criteria. Input from technical experts and other stakeholders supported their removal, which occurred as of the April 2018 and April 2019 HHC refresh, respectively. The Improvement in Management of Oral Medications measure was added as of the April 2019 HHC refresh.



Which HHAs Receive Quality of Patient Care Star Ratings?

All Medicare-certified HHAs are eligible to receive a Quality of Patient Care Star Rating. HHAs must have at least 20 complete quality episodes for a measure for it to be reported on HHC. (Completed episodes are paired start or resumption of care and end of care OASIS assessments. To be counted, the episode end date must be within the 12-month reporting period regardless of admission date.) For a star rating to be calculated, an HHA must have reported data for 5 of the 8 measures used in the calculation.

Reporting Period

When the Quality of Patient Care Star Rating was first published on HHC in July 2015, the ratings incorporated OASIS quality measurement data from episodes ending January 1, 2014 through December 31, 2014. For the Acute Care Hospitalization measure, claims data from October 1, 2013 to September 30, 2014 was used.

Starting in the October 2017 HHC refresh, the reporting period for OASIS quality measures moved from a 6- to a 9-month lag to accommodate the Review and Correct timeline. Thus, for the October 2017 HHC refresh, OASIS and claims measures used data from January 1, 2016 to December 31, 2016.

Starting with the January 2019 HHC refresh, claims measures reporting moved to annual updates; thus, the Acute Care Hospitalization measure has a reporting period of January 1, 2017 to December 31, 2017 until the January 2020 HHC refresh when it will be updated to a reporting period of January 1, 2018 to December 31, 2018. The OASIS-based measures will continue to be based on data with a 9-month lag (July 1, 2017 to June 30, 2018 for the April 2019 HHC refresh).

Quality of Patient Care Star Ratings Calculation

The methodology for calculating the Quality of Patient Care Star Ratings is based on a combination of individual measure rankings and the statistical significance of the difference between the performance of an individual HHA on each measure (risk-adjusted, if an outcome measure) and the performance of all HHAs. Each HHA's quality measure scores are compared to the national agency median, and its rating is adjusted to reflect the differences relative to other agencies' quality measure scores. These adjusted ratings are then combined into one overall rating that summarizes agency performance across all individual measures.

The specific steps are as follows:

1. First, all HHAs' scores on each of the 8 quality measures are sorted low to high and divided into 10 approximately equal size groups (deciles) of agencies.¹ For all measures, except acute care hospitalization, a higher measure value means a better score.

¹ The cut points for the deciles are generated in SAS® using the RANK procedure.



2. Each HHA’s score on each measure is then assigned its decile location, e.g. bottom tenth, top tenth, etc., as a preliminary rating. Each decile is assigned an initial rating from 0.5 to 5.0 in 0.5 increments (e.g., 0.5, 1.0, 1.5, 2.0, etc.)
3. The initial rating is then adjusted according to the statistical significance of the difference between the agency’s individual quality measure score and the national agency median for that quality measure. Because all the measures are proportions (e.g., proportion of patients who improved in getting in and out of bed), the calculation uses a binomial significance test.
 - If the agency’s initial rating for a measure is anything other than a 2.5 or 3 (the two middle decile categories), and the binomial test of the difference yields a probability value greater than .05 (meaning that the difference between the agency score and the national agency median is not considered statistically significant), the initial rating is adjusted to the next half star level closer to the middle categories. The results of this transformation are referred to as the “adjusted ratings.”
4. To obtain one overall score for each HHA, the adjusted ratings are averaged across the 8 measures and rounded to the nearest 0.5. An overall star rating is then assigned to each agency so that ratings will range from 1.0 to 5.0 in half star increments (see table below). Thus, there are 9 star categories, with 3.0 stars being the middle category in this distribution.

Overall score after averaging across QMs and rounding to the nearest half star	Quality of Patient Care Star Rating
4.5 and 5.0	5.0 ★★★★★
4.0	4.5 ★★★★★
3.5	4.0 ★★★★★
3.0	3.5 ★★★★★
2.5	3.0 ★★★★★
2.0	2.5 ★★★★★
1.5	2.0 ★★★★★
1.0	1.5 ★★★★★
0.5	1.0 ★



Distribution of the Quality of Patient Care Star Ratings Across HHAs

The Quality of Patient Care Star Ratings methodology was applied to the HHC data for Calendar Year 2017. Table 1 shows the distribution of ratings across all HHAs when the methodology was applied. The percent of agencies with an overall rating of 1 star is less than 1 percent, while the percent of HHAs receiving 5 stars is over 5.0 percent. Fewer than 20 percent of agencies fall into the middle star category of 3 (18.67%), with an approximately equal percentage (18.43%) receiving 3.5 stars.

Table 1: Distribution of Overall Quality of Patient Care Star Ratings Using CY 2017 Data

Quality of Patient Care Star Rating	Percent
	0.53
	4.20
	11.06
	14.65
	18.67
	18.43
	15.26
	11.41
	5.79

Appendix B provides information about the stability of Quality of Patient Care Star Ratings over time when the methodology is applied to successive years of historical data

Frequently Asked Questions

CMS continues to welcome stakeholder comments and suggestions on the Quality of Patient Care Star Ratings methodology. A “Frequently Asked Questions” document is posted on the CMS website (<http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HomeHealthQualityInits/HHOIHomeHealthStarRatings.html>) and will be updated as additional questions are received.



Appendix A: Initial Evaluation of Measures for Inclusion in the Quality of Patient Care Star Ratings Calculation

Twenty-two of the 27 measures that were reported on HHC in 2014 were considered for inclusion in the Quality of Patient Care Star Ratings. The criteria used to evaluate measures for inclusion in the calculation were:

1. applicability to a substantial proportion of home health patients, and reported for a majority of HHAs;
2. a reasonable amount of variation among HHAs, and potential for improvement in performance;
3. face validity and clinical relevance; and
4. stability over time.

Table A.1 lists the 22 potential measures for inclusion with the following relevant statistics: the number of HHAs with data in CY2013; the number of patient episodes of care for which each measure is applicable; national rates and distribution among HHAs; and stability as measured by the correlation of HHA scores between CY2012 and CY2013.

Most of the candidate measures met the criteria of applicability to the home health population and ability to report for most HHAs. One process measure, “Heart Failure Symptoms Addressed,” and one outcome measure, “Surgical Wound Healing,” did not meet an acceptable threshold for these criteria.

The criteria of variability in performance and opportunity to show improvement was assessed by comparing the 20th percentile and 80th percentile columns, as shown in Table A.1. Of the thirteen process measures, eight had very little room for improvement, as indicated by an average HHA rate of ninety-five percent or more, a similarly high 20th percentile value and an 80th percentile value of 100 percent. The process measure, “Foot Care and Education for Patients with Diabetes,” was almost as “topped out” as the other eight measures, and was marginal with respect to the number of home health agencies with enough data to report. Based on the combination of criteria, this measure was also eliminated from consideration.

Although the OASIS-based outcome measure “Improvement in Oral Medication Management” was not topped out, it was excluded from consideration in favor of the inclusion of the Drug Education measure. After applying the first three measure selection criteria, the remaining measures included four process measures, five OASIS-based outcome measures, and two claims-based utilization outcome measures. To apply the final criterion, stability over time, we correlated HHA scores of these remaining measures (shown in the last column of Table A.1) for calendar years 2012 and 2013. All of the remaining measures showed positive correlations between 2012 scores and 2013 scores, and the correlations for the process and OASIS-based outcome measures were all in the .60 to .80 range. Based on this, all four process measures and five OASIS-based outcome measures were proposed for inclusion in Quality of Patient Care Star Ratings. After stakeholders expressed concern over the inclusion of two vaccine measures in the ratings calculation (and representing 20% of the measures used,) one process measure (Pneumococcal Vaccine Ever Received) was removed. As for the two claims-based measures, the year-to-year correlations were more modest. Only one of these claims-based measures, “Acute Care Hospitalization,” was included in the



Quality of Patient Care Star Ratings, because reducing potentially avoidable hospital use is an important national policy goal.



Table A.1: Characteristics of Home Health Compare Quality Measures¹

Home Health Compare Quality Measure	HHAs with Data	Episodes of Care (Thousands)	National Rate (Pct)	Median HHA Rate	20th Percentile	80th Percentile	Correlation 2012 with 2013
Timely Initiation of Care ²	10,426	6,095	92	93	85	97	0.699
Drug Education on all Meds Provided to Pt/Caregiver ²	10,423	6,038	93	96	88	99	0.717
Fall Risk Assessment	10,240	5,410	98	100	98	100	0.468
Depression Assessment	10,421	6,061	98	99	96	100	0.819
Influenza Vaccine Received for Current Flu Season ²	10,047	3,838	72	75	58	86	0.762
Pneumococcal Vaccine Ever Received	10,399	5,940	71	75	51	88	0.787
Foot Care and Education for Patients With Diabetes	9,103	2,110	94	97	91	100	0.659
Pain Assessment	10,438	6,123	99	99	98	100	0.751
Pain Intervention/Treatment	10,223	4,978	98	100	98	100	0.685
Heart Failure Symptoms Addressed	4,189	440	98	100	96	100	0.391
Pressure Ulcer Prevention Intervention	8,723	2,519	96	99	94	100	0.645
Pressure Ulcer Prevention in Plan of Care	8,937	2,621	97	99	96	100	0.672
Pressure Ulcer Risk Assessment	10,438	6,123	99	99	96	100	0.786
Improvement In Ambulation ²	9,562	4,087	61	59	49	67	0.689
Improvement In Bed Transferring ²	9,389	3,804	57	59	42	64	0.720
Improvement In Bathing ²	9,625	4,190	67	66	55	75	0.740
Improvement In Pain Interfering With Activity ²	9,486	3,451	68	67	54	79	0.776
Improvement In Dyspnea ²	9,263	2,996	65	64	46	75	0.787
Surgical Wound Healing	4,587	689	89	92	86	96	0.544
Improvement In Oral Medication Management	9,134	3,086	51	49	37	58	0.725
Emergent Care Without Hospital Admission	9,301	2,775	12	12	15	9	0.310
Acute Care Hospitalization ²	9,301	2,775	16	15	18	12	0.220

¹ All statistics apply to calendar year 2013, except for the last two measures, which apply to Q4 2012 – Q3 2013. The correlations are between CY 2012 and CY 2013, except for the last two measures, which are between Q4 2011-Q3 2012 and Q4 2012 – Q3 2013.

² Measure selected for inclusion in star rating calculation.



Appendix B: Initial Analysis of Stability of the Ratings

To assess the stability of the Quality of Patient Care Star Ratings from year to year, the ratings were also calculated using the HHC data for 2012. A statistical measure of inter-rater agreement (a Kappa coefficient) was used to test the stability of ratings between the two years. Table B-1 below shows the ratings comparison from year to year for those agencies in which ratings could be calculated for both years. Using the current methodology, 42% of HHAs had no change in rating, 44% changed by $\frac{1}{2}$ star, 11% changed by 1 star, 2% by $1\frac{1}{2}$ stars, about 0.6 percent changed by 2 to 3 stars, and no HHAs changed by 3.5 stars or more. The very small number of HHAs that gained or lost two or more stars suggest that the Quality of Patient Care Star Ratings are fairly stable from year to year. The weighted Kappa (which takes into account not only the number of HHAs that change ratings, but also the numerical magnitude of changes) is 0.5603, showing good agreement between the 2012 star ratings and the 2013 Quality of Patient Care Star Ratings.



Table B-1: Year-to-Year Stability of Overall Quality of Patient Care Star Ratings – CY2012 vs. CY2013

Overall Star Rating 2013	Overall Rating 2012 1 Star	Overall Rating 2012 1.5 Stars	Overall Rating 2012 2 Stars	Overall Rating 2012 2.5 Stars	Overall Rating 2012 3 Stars	Overall Rating 2012 3.5 Stars	Overall Rating 2012 4 Stars	Overall Rating 2012 4.5 Stars	Overall Rating 2012 5 Stars	Overall Rating 2012 Total	Percent
1	0	4	0	0	0	0	0	0	0	4	0.05%
1.5	2	37	60	31	4	2	0	0	0	136	1.55%
2	2	43	290	255	81	24	7	1	0	703	8.02%
2.5	0	19	196	603	441	107	25	6	1	1398	15.94%
3	0	14	75	423	912	474	125	26	6	2055	23.43%
3.5	0	1	27	135	541	913	403	76	8	2104	23.99%
4	0	0	4	35	158	416	570	190	33	1406	16.03%
4.5	0	1	4	13	37	96	214	290	68	723	8.24%
5	0	0	0	0	5	13	27	88	107	240	2.74%
Total	4	119	656	1495	2179	2045	1371	677	223	8769	100.00%
Percent	0.05%	1.36%	7.48%	17.05%	24.85%	23.32%	15.63%	7.72%	2.54%	100.00%	

Frequency Missing = 3035