July 2022

Specifications for the Skilled Nursing Facility Value-Based Purchasing (SNF VBP) Program Total Nursing Hours per Resident Day Measure

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Total Nursing Hours per Resident Day (Total Nurse Staffing Measure)—Beginning with the FY 2026 SNF VBP Program Year

Measure Description

The Total Nurse Staffing measure is a structural measure that uses auditable electronic data reported to CMS's Payroll Based Journal (PBJ) system to calculate total nursing hours per resident day. The denominator for the measure is a count of daily resident census derived from Minimum Data Set, Version 3.0 (MDS 3.0) resident assessments. The measure is case-mix adjusted based on the distribution of MDS assessments by Resource Utilization Groups, version IV (RUG-IV groups).

Numerator

The numerator is the total nursing hours (**RN + LPN + nurse aide hours**). The source for total nursing hours is CMS's Payroll-based Journal (PBJ) system. RN hours include RN director of nursing, registered nurses with administrative duties, and registered nurses. LPN hours include licensed practical/vocational nurses with administrative duties and licensed practical/ vocational nurses. Nurse aide hours include certified nurse aides, aides in training, and medication aides/technicians. The nurse staffing hours reported through PBJ are aggregated (summed) across all days in the quarter, including both weekdays and weekends.

These data are submitted quarterly and are due 45 days after the end of each reporting period. Only data submitted and accepted by the deadline are used by CMS for staffing calculations. The resident census is based on a daily resident census measure that is calculated by CMS using MDS assessments.

The specific PBJ job codes that are used in the RN, LPN, and nurse aide hour calculations are:

- RN hours: Includes RN director of nursing (job code 5), registered nurses with administrative duties (job code 6), and registered nurses (job code 7).
- LPN hours: Includes licensed practical/licensed vocational nurses with administrative duties (job code 8) and licensed practical/vocational nurses (job code 9)
- Nurse aide hours: Includes certified nurse aides (job code 10), aides in training (job code 11), and medication aides/technicians (job code 12)

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

For more information about data submission requirements, please see: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Staffing-Data-Submission-PBJ

Denominator

The denominator of the measure is a count of daily resident census, derived from MDS resident assessments. The daily MDS census is aggregated (summed) across all days in the quarter.

The daily resident census, used in the denominator of the reported nurse staffing ratios, is derived from MDS resident assessments and is calculated as follows:

1. Identify the reporting period (quarter) for which the census will be calculated.

2. Extract MDS assessment data for all residents of a facility beginning one year prior to the reporting period to identify all residents that *may* reside in the facility (i.e., any resident with an MDS assessment may still reside in the facility).
3. Identify discharged/deceased residents using the following criteria:
    a. If a resident has an MDS Discharge assessment or Death in Facility tracking record, use the date reported on that assessment and assume that the resident no longer resides in the facility as of the date of discharge/death on the last assessment. In the case of discharges, if there is a subsequent admission assessment, then assume that the resident re-entered the facility on the entry date indicated on the entry assessment.
    b. For any resident with an interval of 150 days or more with no assessments, assume the resident no longer resides in the facility as of the 150th day from the last assessment. (This assumption is based on the requirement for facilities to complete MDS assessments on all residents at least quarterly.) If no assessment is present, assume the resident was discharged, but the facility did not transmit a Discharge assessment.

Denominator Exclusions

A set of exclusion criteria are used to identify facilities with highly improbable staffing data and these facilities are excluded. The exclusion criteria are as follows:

- Total nurse staffing, aggregated over all days in the quarter that the facility reported both residents and staff is excessively low (<1.5 hours per resident day).
- Total nurse staffing, aggregated over all days in the quarter that the facility reported both residents and staff is excessively high (>12 hours per resident day).
- Nurse aide staffing, aggregated over all days in the quarter that the facility reported both residents and staff is excessively high (>5.25 hours per resident day).

Case Mix Adjustment

CMS adjusts the reported staffing ratios for case-mix, using the Resource Utilization Group (RUG-IV) case-mix system. The CMS Staff Time Resource Intensity Verification (STRIVE) Study measured the average number of RN, LPN, and nurse aide minutes associated with each RUG-IV group (using the 66- group version of RUG-IV). We refer to these as "case-mix hours".

CMS calculates case-mix adjusted hours per resident day for each facility for each staff type using this formula:

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

The reported hours are those reported by the facility through PBJ as described above. National average hours for a given staff type represent the national mean of case-mix hours across all facilities active on the last day of the quarter that submitted valid nurse staffing data for the quarter. The national average hours are updated every quarter and will be available in the State US Averages table in the Provider Data Catalog on CMS.gov (https://data.cms.gov/provider-data/).

The case-mix values for each facility are based on the daily distribution of residents by RUG-IV group in the quarter covered by the PBJ reported staffing and estimates of daily RN, LPN, and nurse aide hours from the CMS STRIVE Study (see Table A-1). Specifically, case-mix nurse staffing hours per resident day for a given facility are calculated as follows:

1. The MDS is used to assign a RUG-IV group to each resident for each day in the quarter. The method is similar to that used for calculating the daily MDS census and is described below.
2. This information is aggregated to generate a count of residents in each of the 66 RUG-IV groups in the facility for each day in the quarter. RUG-IV groups that are not represented on a given day are assigned a count of zero. Residents for whom there is insufficient MDS information to assign a RUG-IV category are not included.
3. Based on the number of residents in each RUG-IV group, case-mix total nursing are calculated by multiplying by nursing time estimates for each RUG-IV group from the STRIVE study (See Appendix Table A-1).
4. Aggregate case-mix nursing for the quarter are calculated by summing across all days and RUG-IV groups. These are the numerators in the calculations of case-mix total nursing per resident day. The denominator for these calculations is the count of the total number of resident-days in the quarter for which there is a valid RUG-IV group.
5. Case-mix total nursing per resident day for each nursing home are calculated by dividing aggregate case-mix hours (total nursing) by the number of resident-days.

To determine the number of residents in each RUG-IV grouping for each day of the quarter for each nursing home, the same algorithm is used as that used to generate the daily MDS census (with slight adjustment to count RUG-IV groupings specifically, instead of just counting residents):

1. Identify the reporting period (quarter) for which the RUG groupings will be collected.
2. Extract MDS assessment data (including RUG-IV group) for all residents of a facility beginning one year prior to the reporting period to identify all residents that *may* reside in the nursing home (i.e., any resident with an MDS assessment may still reside in the nursing home).
3. Identify discharged/deceased residents using the following criteria:
    a. If a resident has an MDS Discharge assessment or Death in Facility tracking record, use the date reported on that assessment and assume that the resident no longer resides in the facility as of the date of discharge/death on the last assessment. In the case of discharges, if there is a subsequent admission assessment, then assume that the resident re-entered the facility on the entry date indicated on the admission assessment.
    b. For any resident with an interval of 150 days or more with no MDS assessments, assume the resident no longer resides in the facility as of the 150th day from the last assessment. (This assumption is based on the requirement for facilities to complete MDS assessments on all residents at least quarterly). If no assessment is present, assume the resident was discharged, but the facility did not transmit a Discharge assessment.

For any particular date, residents whose assessments do not meet the criteria in #3 above prior to that date are assumed to reside in the nursing home. The count of these residents is the census for that particular day. The RUG-IV group assigned to those residents on their most recent assessments as of that date are used to determine the RUG-IV distribution for that nursing home on that date. The calculations of "case-mix", "reported", and "national average" hours are made separately for RNs and for all nursing staff. Adjusted hours are also calculated for both groups using the formula provided earlier in this section.

A downloadable file that contains the "case-mix", "reported" and "adjusted" hours used in the staffing calculations is included in the nursing home Provider Information data table available in the Provider Data Catalog on CMS.gov (https://data.cms.gov/provider-data/).

MDS assessments for a given resident are linked using the Resident Internal ID. The Resident Internal ID is a unique number, assigned by the Quality Improvement Evaluation System (QIES)

Assessment Submission and Processing (ASAP) system, which identifies a resident. The combination of state and Resident Internal ID uniquely identifies a resident in the national repository. The process by which the Resident Internal ID is created is described by the *MDS 3.0 Provider User's Guide - Appendix B* (https://qtso.cms.gov/system/files/qtso/Users_AppB.pdf). The following MDS items are used to define the Resident Internal ID:

- State ID
- Facility Internal ID (QIES ASAP system number)
- Social Security Number (SSN)
- Last Name
- First Name
- Date of Birth
- Gender

Therefore, in order to achieve an accurate census, it is imperative that, in addition to having complete assessment data for each resident including discharge assessment data, residents are assigned correct Resident Internal IDs. To facilitate this, providers must ensure that MDS items, in particular the items indicated above, are entered correctly on each assessment. Providers must also carefully monitor the Final Validation Report, generated upon MDS submission, for any errors. Providers should work with their State RAI Coordinator or State Automation Coordinator to correct any errors that arise during assessment submission. In addition to using their Final Validation Report to validate the file structure and data content of each successful MDS submission, providers can monitor their MDS data using additional Certification and Survey Provider Enhanced Reports (CASPER) Reports. There are CASPER Reports for MDS Census Summary (returns resident count per day), MDS Census Detail (returns list of Resident Internal IDs counted per day), Admissions, Discharges, Duplicate Residents, Errors, and Daily Rosters, among others. Full descriptions of these reports are available in Section 6 of the CASPER Reporting MDS Provider User's Guide available at the following link: https://qtso.cms.gov/reference-and-manuals/casper-reporting-users-guide-mds-providers. Information about Final Validation Reports and error messages in the reports is available in Sections 4 and 5 of the MDS 3.0 Provider User's Guide (https://qtso.cms.gov/reference-and-manuals/mds-30-provider-users-guide).

Appendix

Reliability and Validity Testing

For additional details about the Total Nurse Staffing measure, including measure development details and reliability and validity testing results, please see the materials from the December 16, 2021 Measure Applications Partnership (MAP) Post-Acute Care/Long-Term Care (PAC/LTC) Workgroup Virtual Review Meeting, including the 2021-2022 MAP Final Recommendations, which can be found at: https://www.qualityforum.org/ProjectMaterials.aspx?projectID=75370.

Table A-1 Case-Mix Nursing Minutes by RUG-IV Group and Nursing Staff Type

Table A-1 contains the most current available data on case-mix nursing minutes. For more information on the STRIVE Study, please see: https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/SNFPPS/TimeStudy

Table A-1
Case-Mix Nursing Minutes by RUG-IV Group and Nursing Staff Type

Major RUG Group	RUG-IV Code	STRIVE Study Average Times (Minutes)				
		RN	LPN	Total Licensed	Nurse Aide	Total Nurse (RN+LPN+ Aide)
Rehab Plus Extensive	RUX	68.37	111.44	179.81	131.11	310.92
	RUL	109.06	63.87	172.93	199.94	372.87
	RVX	29.24	95.88	125.12	145.94	271.06
	RVL	67.74	97.39	165.13	139.99	305.12
	RHX	128.79	51.92	180.71	155.24	335.95
	RHL	67.28	48.41	115.69	135.32	251.01
	RMX	97.54	74.61	172.15	148.44	320.59
	RML	133.82	84.01	217.83	153.24	371.07
	RLX	133.82	84.01	217.83	153.24	371.07
Rehab	RUC	27.80	66.41	94.21	148.95	243.16
	RUB	45.01	71.09	116.10	141.03	257.13
	RUA	35.18	54.55	89.73	101.01	190.74
	RVC	34.22	68.45	102.67	156.53	259.20
	RVB	28.86	56.56	85.42	119.90	205.32
	RVA	31.30	59.35	90.65	113.73	204.38
	RHC	36.62	54.88	91.50	156.14	247.64
	RHB	36.42	47.88	84.30	119.48	203.78
	RHA	27.09	51.76	78.85	99.82	178.67
	RMC	32.58	56.05	88.63	148.87	237.50
	RMB	32.10	55.47	87.57	134.74	222.31
	RMA	25.99	48.79	74.78	98.81	173.59
	RLB	33.86	44.58	78.44	185.83	264.27
	RLA	15.46	43.58	59.04	118.93	177.97

Major RUG Group	RUG-IV Code	STRIVE Study Average Times (Minutes)				
		RN	LPN	Total Licensed	Nurse Aide	Total Nurse (RN+LPN+ Aide)
Extensive Services	ES3	130.49	58.49	188.98	152.12	341.10
	ES2	65.19	75.23	140.42	146.65	287.07
	ES1	72.81	49.49	122.30	127.62	249.92
Special Care High	HE2	21.25	67.93	89.18	190.47	279.65
	HD2	41.89	70.63	112.52	153.76	266.28
	HC2	35.13	53.63	88.76	154.72	243.48
	HB2	60.64	67.91	128.55	133.86	262.41
	HE1	19.20	67.73	86.93	149.47	236.40
	HD1	16.89	54.54	71.43	141.80	213.23
	HC1	22.43	54.17	76.60	135.33	211.93
	HB1	21.65	50.50	72.15	106.77	178.92
Special Care Low	LE2	22.16	58.83	80.99	176.15	257.14
	LD2	19.59	58.10	77.69	153.29	230.98
	LC2	27.44	47.80	75.24	116.12	191.36
	LB2	29.52	50.73	80.25	128.44	208.69
	LE1	22.11	52.25	74.36	143.41	217.77
	LD1	11.78	43.94	55.72	130.80	186.52
	LC1	15.72	46.56	62.28	124.77	187.05
	LB1	18.99	48.66	67.65	106.16	173.81
Clinically Complex	CE2	21.05	44.13	65.18	162.70	227.88
	CD2	20.01	45.17	65.18	175.51	240.69
	CC2	19.77	36.95	56.72	132.92	189.64
	CB2	23.50	36.46	59.96	114.97	174.93
	CA2	20.69	44.63	65.32	80.92	146.24
	CE1	21.26	33.75	55.01	159.10	214.11
	CD1	15.31	41.90	57.21	151.40	208.61
	CC1	16.00	35.10	51.10	126.91	178.01
	CB1	16.17	34.99	51.16	118.45	169.61
	CA1	22.39	40.22	62.61	72.76	135.37
Behavioral Symptoms and Cognitive Performance	BB2	11.30	33.26	44.56	117.96	162.52
	BA2	18.34	41.18	59.52	101.56	161.08
	BB1	14.93	32.83	47.76	114.30	162.06
	BA1	13.60	31.57	45.17	86.06	131.23

Major RUG Group	RUG-IV Code	STRIVE Study Average Times (Minutes)				
		RN	LPN	Total Licensed	Nurse Aide	Total Nurse (RN+LPN+ Aide)
Reduced Physical Functioning	PE2	15.11	39.76	54.87	163.58	218.45
	PD2	12.09	38.01	50.10	163.38	213.48
	PC2	8.14	33.51	41.65	124.90	166.55
	PB2	15.49	38.95	54.44	118.83	173.27
	PA2	5.50	35.91	41.41	73.16	114.57
	PE1	19.91	36.07	55.98	161.23	217.21
	PD1	16.18	33.58	49.76	147.31	197.07
	PC1	14.07	36.94	51.01	123.74	174.75
	PB1	12.49	31.80	44.29	95.60	139.89
	PA1	14.32	32.42	46.74	70.77	117.51