

## **APPENDIX: MODEL YEAR 4 SNF UPDATE FACTOR CALCULATION**

The SNF case-mix classification system was replaced with a new system, the Patient-Driven Payment Model (PDPM), on October 1, 2019. The PDPM classifies residents into case-mix groups based on clinical characteristics of five components: physical therapy (PT), occupational therapy (OT), speech-language pathology (SLP), Nursing and Social services (NRSNG), and non-therapy ancillary (NTA) services. The PDPM also applies a variable per diem (VPD) adjustment to the PT, OT, and NTA components to adjust payment in a manner that reflects typical changes in resource use over the course of a given SNF stay, as inferred from recent data. To account for these payment system changes, the SNF update factor now has two components. One component uses baseline year claims and updates Target Prices from the baseline year to a reference period using RUG-IV payment rates (classification system prior to PDPM). The other component uses reference period claims and updates Target Prices from the reference period to the Model Year sub-period (Model Year 4 contains two sub-periods: CY2021/FY2021, and CY2021/FY2022) and accounts for the change from RUG-IV to PDPM. The reference period must contain claims with both RUG-IV and PDPM data, ideally from the last full year of data containing the last quarter of the baseline period. However, the reference period must also have consistent rates throughout. For the SNF update factors for Model Year 4, the reference period consists of claims with start dates between October 1<sup>st</sup>, 2018 and December 31<sup>st</sup>, 2019.<sup>1</sup>

It is possible that certain ACHs will have low or zero SNF claim counts in the reference period. In order to avoid high variability in update factors due to low volume in the reference period, and missing update factors due to zero volume in the reference period, the second component of the SNF update factors will be calculated individually only for ACHs that meet a minimum threshold of 41 Clinical Episodes with SNF spending during the reference period. If the ACH does not meet this threshold, the second component of the SNF update factor will instead be calculated using the ACH's peer group<sup>2</sup>. In case the peer group also does not meet the minimum threshold, the second component of the SNF update factor will instead be calculated using the national set of ACHs.

- **Step A1. Calculate two SNF factors for each combination of ACH, Clinical Episode Category, and baseline year:** For each ACH, Clinical Episode Category, and baseline (fiscal) year, calculate the SNF factor (the average cost of a RUG-IV revenue unit) using baseline year claims<sup>3</sup> associated with Clinical Episodes that were initiated at the ACH, once

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<sup>1</sup> More details of how claims are grouped to the reference period are discussed below in Step A3.

<sup>2</sup> ACHs are considered to be in the same peer group if and only if they are in the same census division, have the same MTH-urban/rural status (options are MTH, urban non-MTH, and rural non-MTH), and have the same safety net status.

<sup>3</sup> Baseline year claims are those grouped to Clinical Episodes with their Anchor Stay or Anchor Procedure end date in the baseline year in a given Clinical Episode Category.

using baseline year RUG-IV rates, and once using reference period RUG-IV rates<sup>4</sup>. An ACH’s factor for the SNF setting is defined as shown below for the RUG-IV payment model.

$$F_{RUG,P}^T = \frac{\sum_{i=1}^k RUG\_Rate_{i,P} REV\_UNIT_i}{\sum_{i=1}^k REV\_UNIT_i}$$

where  $P$  is the time period the rates are from,  $T$  is the time period claims are taken from,  $k$  is the number of SNF lines the ACH has in the period  $T$ ,  $i$  indexes these lines,  $RUG\_Rate_{i,P}$  is the period  $P$  RUG-IV case mix adjusted rate corresponding to line  $i$  and  $REV\_UNIT_i$  is the Revenue Center Unit Count for line  $i$ .

- **Step A2. Calculate the first component of the update factor:** The first component uses baseline year claims in both the numerator and the denominator as shown below, but prices them using baseline rates in the denominator and reference period rates (FY2019) in the numerator.

$$UF\ Component\ 1 = \frac{F_{RUG,FY19}^{BY}}{F_{RUG,BY}^{BY}}$$

Appendix Tables 1a and 1b display an example of how the first component of the update factor is calculated for an example ACH that is having its historical costs updated from baseline year FY2017 to Model Year sub-period CY2021/FY2022, using a reference period for SNF claims of 2018Q4-2019Q4. Since only the first two claims are grouped to Clinical Episodes with Anchor Stay or Anchor Procedure end dates in FY2017, only these claims are used to calculate the first component of the update factor. Since the Revenue Center Unit Count ( $REV\_UNIT_i$ ) is always 1, the numerator of the first component of the SNF update factor is a simple average of the FY2019 RUG-IV payment rates on the two claims grouped to FY2017 Clinical Episodes, i.e., \$180. To get the denominator, the same FY2017 claims are priced using FY2017 rates. Since the revenue center unit counts are both 1, the denominator of the first component of the SNF update factor is a simple average of the FY2017 RUG-IV rates for the FY2017 claims, or \$150. The 1<sup>st</sup> component of the update factor is equal to \$180/\$150, or 1.2.

**Appendix Table 1a: Example of Component 1 of Update Factor for SNF Setting**

Anchor Stay or Anchor Procedure End Date of Episode	Claim Number	RUG-IV Payment Group	Revenue Center Units	RUG-IV Rate FY2016	RUG-IV Rate FY2017	RUG-IV Rate FY2018	RUG-IV Rate FY2019
1-Nov-2016	1	Group 1	1	\$100	\$120	\$130	\$140
17-Aug-2017	2	Group 2	1	\$150	\$180	\$200	\$220
13-Oct-2017	3	Group 1	1	\$100	\$120	\$130	\$140
...	...	...	...	...	...	...	...

<sup>4</sup> Clinical Episodes before overlap resolution are used to calculate the update factor.

**Appendix Table 1b: Component 1 of Update Factor**

Numerator	Denominator	Ratio
\$180	\$150	1.2

- **Step A3. For each ACH and Clinical Episode Category, calculate the total cost of the reference period SNF claims under RUG-IV reference period rates and Model Year sub-period PDPM rates:**

For each eligible ACH<sup>5</sup> and Clinical Episode Category, calculate the total cost of the reference period SNF claims associated with Clinical Episodes initiated at the ACH once using reference period RUG-IV rates, and once using Model Year sub-period PDPM rates. For the SNF update factor in MY4, the reference period will contain all claims associated with a SNF stay with a start date between October 1st, 2018 and December 31st, 2019 where the SNF stay has a PDPM payment amount, the corresponding claims have payment rates for RUG-IV, and the SNF stay is grouped to a BPCI Advanced Clinical Episode.<sup>6</sup>

The total cost of claims under the RUG-IV payment system is defined as shown below.

$$C_{RUG,P}^T = \sum_{i=1}^k RUG\_Rate_{i,P} REV\_UNIT_i$$

where  $P$  is the time period the rates are from,  $T$  is the time period claims are taken from,  $C_{RUG,P}^T$  is the cost of period  $T$  claims under period  $P$  RUG-IV rates,  $k$  is the number of SNF lines the ACH has in the period  $T$ ,  $i$  indexes those lines,  $RUG\_Rate_{i,P}$  is the period  $P$  RUG-IV case mix adjusted Rate corresponding to line  $i$  and  $REV\_UNIT_i$  is the Revenue Center Unit Count for line  $i$ .

The following methodology is applied to calculate the total cost of reference period claims under the PDPM payment system.

- For each SNF stay and case-mix group (CMG), calculate the payment rate as the average of the rural payment rate and the urban payment rate. The payment rate reflects the base rate multiplied by Case Mix Index (CMI).

$$AvgCMG_{c,P} = \frac{CMG_c CMI Rural * CMG_c Rate Rural_p + CMG_c CMI Urban * CMG_c Rate Urban_p}{2}$$

where  $c$  = SNF components {Occupational Therapy services (OT), Physical Therapy services (PT), Speech Language Pathology services (SLP), Nursing and Social services (NRSNG), Non-therapy ancillary services (NTA)};  $CMG_c CMI Rural$  is the rural Case Mix Index corresponding to the Case Mix Group,  $CMG_c Rate Rural_p$  is the rural

<sup>5</sup> An eligible ACH is defined as one that has at least 41 baseline Clinical Episodes in a given Clinical Episode Category. Final Clinical Episodes after overlap resolution are used to determine if the ACH meets the minimum threshold of 41 Clinical Episodes.

<sup>6</sup> Note that all SNF stays (and their corresponding claims) that are collapsed as an interrupted stay under PDPM will be included in the calculation if at least one claim from that interrupted stay qualifies for the reference period. SNF claims with from date outside of the reference period will be included in the calculation provided that at least one claim from that SNF stay qualifies for the reference period.

payment rate under period  $P$  corresponding to the Case Mix Group,  $CMG_c$   $CMI$   $Urban$  is the urban Case Mix Index corresponding to the Case Mix Group,  $CMG_c$   $Rate$   $Urban_p$  is the urban payment rate under period  $P$  corresponding to the Case Mix Group.

- For each SNF stay, calculate non-case-mix-adjusted payment as the average of urban and rural non-case-mix base rate.

$$AvgNonCM_p = \frac{NonCM\ Rate\ Rural_p + NonCM\ Rate\ Urban_p}{2}$$

where  $NonCM\ Rate\ Rural_p$  is the rural non-case-mix-adjusted payment rate under period  $P$ ; and  $NonCM\ Rate\ Urban_p$  is the urban non-case-mix-adjusted payment rate under period  $P$ .

- For each SNF stay, calculate the PDPM payment as the weighted sum of the payment rates of PDPM components and the non-case-mix adjusted payment. The weights for PDPM components and non-case-mix group are Variable Per Diem (VPD) adjusted total utilization days and total utilization days, respectively.

$$PDPM_{s,p} = \sum_c (AvgCMG_{c,p} * VPD\ Adj\ Util\ Days_c) + (AvgNonCM_p * Util\ Days_s)$$

where,  $s$  = SNF stay;

$c$  = SNF components {OT, PT, SLP, NRSNG, NTA};

$VPD\ Adj\ Util\ Days_c$  = Variable Per Diem (VPD) adjusted total utilization days for component  $c$ ;

$Util\ Days_s$  = Variable Per Diem (VPD) adjusted total utilization days for the entire SNF stay

- Calculate the total cost of reference period SNF claims under PDPM as the sum of PDPM payments over all stays corresponding to the reference period claims.

$$C_{PDPM,P}^T = \sum_{j=1}^s PDPM_{j,p}$$

where  $P$  is the time period the rates are from,  $T$  is the time period claims are taken from,  $C_{PDPM,P}^T$  is the cost of period  $T$  claims under period  $P$  PDPM rate,  $s$  is the number of SNF stays the ACH has in the period  $T$ ,  $j$  indexes these stays and  $PDPM_{j,p}$  is the period  $P$  PDPM payment corresponding to stay  $j$ .

- **Step A4. For each peer group and Clinical Episode Category, calculate the total cost of the reference period SNF claims under RUG-IV reference period rates and Model Year sub-period PDPM rates:**

For each peer group and Clinical Episode Category, calculate the total cost of reference period SNF claims twice: once using reference period RUG-IV rates and once using Model Year sub-period PDPM rates.

- **Step A5. For each Clinical Episode Category, using the national set of reference period SNF claims, calculate the total cost of the reference period SNF claims under RUG-IV reference period rates and Model Year sub-period PDPM rates:**

Calculate the national total cost of reference period SNF claims twice for each Clinical Episode Category: once using FY2019 RUG-IV rates, and once using Model Year sub-period PDPM rates.

- **Step A6. Calculate second component of the SNF update factor:** The second component updates Target Prices from the reference period to the Model Year sub-period and accounts for the change from RUG-IV to PDPM by dividing the total cost of the reference period stays in FY2022 PDPM rates, by the total cost of the reference period claims under RUG-IV FY2019 rates.

$$UF \text{ Component } 2 = \frac{C_{PDPM, FY22}^{Ref \text{ Per}}}{C_{RUG, FY19}^{Ref \text{ Per}}}$$

For each ACH that meets a threshold of 41 Clinical Episodes with SNF spending during the reference period, use the individual ACH’s SNF costs from Step A3 to calculate the second component of the update factor. For ACHs that do not meet the threshold but belong to a peer group that does meet the threshold, use the peer group’s SNF costs from Step A4 to calculate the second component of the update factor. For ACHs that do not meet the threshold and belong to a peer group that does not meet the threshold, use the national SNF costs to calculate the second component of the update factor.

Appendix Tables 2a and 2b continue the example from Tables 1a and 1b, and display how the second component of the example update factor is calculated. The last 3 claims in Table 2a are considered reference period claims. Note that claim 6 is included as a reference period claim, in spite of being outside the reference period, since it is part of a SNF stay where one of the other claims (claim 5) is in the reference period.

Since this is an illustrative example, we use a small number of claims and ignore the minimum volume threshold. If an ACH had only 3 reference period claims in the actual data, the second component of its update factor would be calculated either at the peer group or at the national level. To get the numerator of the second component of the update factor, add the total cost of the reference period stays under PDPM FY2022. This is equal to \$300 + \$350 = \$650. To get the denominator of the update factor, add the total cost of the reference period claims under RUG-IV. This is equal to \$150 + \$130 + \$200 = \$480. To get the second component of the update factor, divide the numerator by the denominator, which gives \$650 / \$480 = 1.354.

**Appendix Table 2a: Example of Component 2 of Update Factor for SNF Setting**

PDPM stay ID	Claim Number	Claim Start Date	Cost Under RUG-IV (FY2019)	Cost Under PDPM (FY2019)	Cost Under PDPM (FY2022)
n/a	1	1-Nov-2016	\$140	n/a	n/a
n/a	2	17-Aug-2017	\$220	n/a	n/a
n/a	3	13-Oct-2017	\$140	n/a	n/a
0001	4	15-Jan-2019	\$150	\$280	\$300
0002	5	10-Sep-2019	\$130	\$340	\$350
0002	6	4-Jan-2020	\$200		

\*Note: PDPM is paid for at the stay level, and therefore the cost is integrated into the cell above.

**Appendix Table 2b: Component 2 of Update Factor**

Numerator	Denominator	Ratio
\$650	\$480	1.354

**Step A7. Calculate the update factor:** Multiply the first and second components to calculate the update factor.

$$UF_{SNF, FY22}^{BY} = \frac{F_{RUG, FY19}^{BY}}{F_{RUG, BY}^{BY}} \times \frac{C_{PDPM, FY22}^{Ref Per}}{C_{RUG, FY19}^{Ref Per}}$$

Continuing with the example from above, the update factor will be calculated as:

$$\begin{aligned} UF_{SNF, FY22}^{FY17} &= 1.2 \times 1.354 \\ &= 1.625 \end{aligned}$$