APPENDIX: MODEL YEAR 3 HH UPDATE FACTOR CALCULATION

The Home Health case-mix classification system was replaced with a new system, the Patient-Driven Groupings Model (PDGM), on January 1, 2020. The PDGM classifies residents into payment groups based on their resource use within a 30-day period. There are five determinants of these resource-based payment groups: timing of admission, source of admission, clinical grouping, functional impairment level, and comorbidity adjustment. The PDGM also adjusts payments for low or high utilization of resources in the 30-day period through Low-Utilization Payment Adjustment (LUPA) and outlier payments. To account for these payment system changes, the Home Health (HH) 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 the previous system's Home Health Resource Group (HHRG) payment rates. The other component uses reference period claims and updates Target Prices from the reference period to the Model Year sub-period (Model Year 3 contains two sub-periods: CY2020/FY2020 and CY2020/FY2021) and accounts for the change from HHRG to PDGM. The reference period must contain claims with both HHRG and PDGM 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 HH update factors for Model Year 3, the reference period consists of claims with start dates between January 1st, 2018 and December 31st, 2018 (since HH payment rates are updated on a calendar year basis).[1]

It is possible that certain ACHs will have low or zero HH 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 HH update factors will only be calculated individually for ACHs that meet a minimum threshold of 41 Clinical Episodes with HH spending during the reference period. If the ACH does not meet this threshold, the second component of the HH update factor will instead be calculated using the ACH's peer group.[2] In case the peer group also does not meet the threshold, the second component of the HH update factor will instead be calculated using the national set of ACHs.

- **Step A1. Calculate three HH factors for each Acute Care Hosital (ACH), Clinical Episode category and baseline year:** For each triggering ACH, Clinical Episode category, and baseline (fiscal) year combination, calculate the HH factor (the average cost of a HHRG revenue unit) three times: once using baseline year claims[3] grouped to Clinical

---

[1] More details of how claims are grouped to the reference period are discussed below in Step A3.

[2] ACHs are considered to be in the same peer group if and only if they are in the same size category (small, medium, large, or extra-large), 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.

[3] Baseline year claims are HH claims grouped to Clinical Episodes that have an Anchor Stay or Anchor Procedure end date in the baseline year.

Episodes initiated at the ACH, and HHRG rates from the calendar year overlapping the first quarter of the baseline year, once using these same baseline year claims but HHRG rates from the calendar year overlapping the last three quarters of the baseline year, and once using these same baseline year claims but HHRG rates from the calendar year of the reference period. An ACH's factor for the HH setting for a specific Clinical Episode category, baseline year, and payment rate year is defined as shown below for the HHRG payment model.[4]

$$F_{HHRG,P}^{T} = \frac{\sum_{i=1}^{k} HHRG\_Wt_{i,P} * REV\_UNIT_i}{\sum_{i=1}^{k} REV\_UNIT_i} * base\ rate_P$$

where P is the time period the base rate and HHRG weights are from, T is the time period claims are taken from, k is the number of HH lines the ACH has in the period T, i indexes these lines, $HHRG\_Wt_{i,P}$ is the period P HHRG Weight corresponding to line i and REV_UNIT_i is the Revenue Center Unit Count for line i, and base rate$_P$ is the HHRG base rate in period P.

- **Step A2. Calculate the first component of the update factor:** The first component uses baseline claims in both the numerator and the denominator as shown below. The denominator is calculated as a weighted average of factors for the calendar years that overlap the baseline year (since the baseline years are fiscal years while the HH payment rates, and hence factors, are updated every calendar year).

$$UF\ Component\ 1 = \frac{F_{HHRG,CY18}^{BY}}{0.25 F_{HHRG,BY-1}^{BY} + 0.75 F_{HHRG,BY}^{BY}}$$

where the superscript 'BY' represents that claims are taken from the baseline year in both the numerator and the denominator, and the different subscripts represent the time periods that the HHRG rates are taken from.

Appendix Tables 1a and 1b display how the first component of the update factor is calculated for an example ACH that is having its historical costs updated from baseline year FY2016 to Model Year sub-period CY2020/FY2020, using a reference period for HH claims of CY2018. Since only the first two claims are grouped to Clinical Episodes with Anchor Stay or Anchor Procedure end dates in FY2016, only these claims are used to calculate the first component of the update factor. The numerator of the first component of the HH update factor is a simple average of the costs on the two claims grouped to FY2016 Clinical Episodes under CY2018 HHRG rates.

$$1st\ Component\ Num_{ACH} = \frac{140,000 + 220,000}{120} = 3,000$$

To get the denominator, the same FY2016 claims are used but they are priced once using CY2015 rates and once using CY2016 rates, since these are the calendar years overlapping

---

[4] The formulae used to calculate the HH factors, payments, and final Update Factor are specific to an ACH, year, and Clinical Episode category although this is not explicitly represented in the formulae subscripts/superscripts.

FY2016. The CY2015 HH factor using FY2016 claims is a simple average of the costs for the FY2016 claims under CY2015 rates, or $2,083.33. Similarly, the CY2016 HH factor using FY2016 claims is a simple average of the costs for the FY2016 claims under CY2016 rates, or $2,500. CY2015 overlaps with FY2016 for one quarter, so the CY2015 factor receives a weight of 0.25, whereas CY2016 overlaps with FY2016 for three quarters, so the CY2016 factor receives a weight of 0.75. This results in a weighted average factor of $2,395.83 for the denominator.

$$1st\ Component\ Denom_{ACH} = 0.25 * \frac{100{,}000 + 150{,}000}{120} + 0.75 * \frac{120{,}000 + 180{,}000}{120}$$

$$= 2{,}395.83$$

The 1st component of the update factor is equal to $3000/$2395.83, or 1.252.

Appendix Table 1a: Example of Component 1 of Update Factor for HH setting

Claim Number	Revenue Center Units	HHRG Payment Group	Anchor Stay/Anchor Procedure End Date of Episode	Costs under HHRG (CY2015 rates)	Costs under HHRG (CY2016 rates)	Costs under HHRG (CY2017 rates)	Costs under HHRG (CY2018 rates)
1	60	Group 1	1-Nov-2015	$100,000	$120,000	$130,000	$140,000
2	60	Group 2	17-Aug-2016	$150,000	$180,000	$200,000	$220,000
3	60	Group 1	13-Oct-2016	$100,000	$120,000	$130,000	$140,000
…	…	…	…	…	…	…	…

Appendix Table 1b: Component 1 of Update Factor for HH Setting

Numerator	Denominator	Ratio
$3,000	$2,395.83	1.252

- **Step A3. For each ACH and Clinical Episode category, calculate the total cost of reference period HH claims using HHRG reference period rates and Model Year sub-period PDGM rates:**

  For each eligible ACH[5] and Clinical Episode category, calculate total payments for HH claims twice using reference period claims: once using reference period HHRG rates, and once using Model Year sub-period PDGM rates.

  To ensure that the same set of HH claims are used in both the numerator and denominator of the second component, for MY3, reference period HH claims are defined as claims with

---

[5] An eligible ACH is defined as one that has at least 41 baseline Clinical Episodes in a given Clinical Episode category

a start date between January 1st, 2018 and December 31st, 2018, grouped to a BPCI Advanced Clinical Episode in the appropriate Clinical Episode category, for which both the HHRG and PDGM rates are available. PDGM rates are calibrated for a 30-day episode while the HHRG rates are calibrated for a 60-day episode.

The total cost of claims under the HHRG payment system is defined as shown below. This calculation is performed separately for each ACH and Clinical Episode category combination.

$$C^T_{HHRG,P} = \frac{\sum_{i=1}^{k} HHRG\_Wt_{i,p} * REV\_UNIT_i * base\ rate_P}{60}$$

where P is the time period the base rate is from, T is the time period claims are taken from, k is the number of HH lines the ACH has in the period T, i indexes these lines, HHRG_Wt$_{i,P}$ is the period P HHRG Weight corresponding to line i and REV_UNIT$_i$ is the Revenue Center Unit Count for line i for 60-day episodes.

Calculate the total cost of 30-day claims under PDGM in the reference period at the ACH and Clinical Episode category level.

$$C^T_{PDGM,P} = \frac{\sum_{c=1}^{J} REV\_UNIT_c * final\ rate_{c,P}}{30}$$

where final rate$_{c,p}$[6] is the final PDGM rate in period P for a 30-day claim c, J is the number of 30-day claims that the ACH has in the period T for the Clinical Episode category, c indexes these 30-day claims, and REV_UNIT$_c$ is the Revenue Center Unit Count for the 30-day claim.

- **Step A4. For each peer group and Clinical Episode category, calculate the total cost of reference period HH claims using HHRG reference period rates and Model Year sub-period PDGM rates:**

  For each peer group and Clinical Episode category, calculate the total cost of HH claims twice: once using reference period HHRG rates, and once using Model Year sub-period PDGM rates.

- **Step A5. For each Clinical Episode category, calculate the total cost of the national set of HH reference period claims using HHRG reference period rates and Model Year sub-period PDGM rates:**

---

[6] The *final rate* is calculated as the product of the CY2020 case mix weight for the 30-day claim and the PDGM base rate. This is the rate that best estimates how PDGM payments will be made in the future, without taking into account the expected behavioral change in response to implementation of the payment system change to PDGM.

Using the national set of reference period HH claims in a given Clinical Episode category, calculate the total cost of HH claims twice: once using reference period HHRG rates, and once using Model Year sub-period PDGM rates.

- **Step A6. Calculate second component of the update factor:** The second component updates Target Prices from the reference period to the Model Year sub-period and accounts for the change from HHRG to PDGM as shown below.

$$UF\ Component\ 2 = \frac{C_{PDGM,CY20}^{Ref\ Per}}{C_{HHRG,CY18}^{Ref\ Per}}$$

where the numerator is the total cost of HH reference period (CY2018) claims using PDGM rates from the Model Year sub period (i.e. CY2020 rates) and the denominator is the total cost of HH reference period (CY2018) claims using HHRG rates from the reference period (i.e. CY2018 rates).

For each ACH that meets a threshold of 41 Clinical Episodes with HH spending and an associated PDGM payment during the reference period in the Clinical Episode category, use the individual ACH's total cost of reference period HH claims[7] from Step A3 to calculate the second component of the update factor. For ACH-Clinical Episode category combinations that do not meet the 41 Clinical Episode threshold but belong to a peer group that does, use the peer group's total cost of reference period HH claims for the Clinical Episode category from Step A4 to calculate the second component of the update factor. For ACHs that belong to a peer group that does not meet the threshold in a Clinical Episode category, use the national total cost of reference period HH claims for the Clinical Episode category from Step A5 to calculate the second component of the update factor.

Appendix Tables 2a and 2b continue the example from Appendix Tables 1a and 1b, and display how the second component of the example update factor is calculated. Claims 4 and 5 in Table 2a are considered reference period claims.

Since this is an illustrative example, we use a small number of claims and ignore the minimum volume threshold. If an ACH had only 2 reference period claims in the actual data, the second component of its update factor would be calculated either at the peer group level 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 PDGM CY2020 rates and divide by 30.

$$2nd\ Component\ Num_{ACH} = \frac{82{,}000 + 49{,}000 + 75{,}000 + 42{,}000}{30} = \$8{,}266.67$$

To get the denominator of the second component, add the total cost of the reference period claims under HHRG CY2018 rates.

---

[7] Recall that claims are removed from the reference period if rates are missing for the claim under either payment system.

$$2nd\ Component\ Denom_{ACH} = \frac{300,000 + 136,000}{60}$$

$$= \$7,266.67$$

To get the second component of the update factor, divide the numerator by the denominator, which gives \$8266.67 / \$7266.67 = 1.138.

Appendix Table 2a: Example of Component 2 of Update Factor for HH setting

Claim Number	Rev Units	PDGM 30 Day Episode ID	Claim Start Date	Cost Under HHRG (2018)	Cost Under PDGM(2020)
1	60	N/A	1-Nov-2015	$140,000	N/A
2	60	N/A	17-Aug-2016	$220,000	N/A
3	60	N/A	13-Oct-2016	$140,000	N/A
4	60	0001	15-Jan-18	$300,000.00	$82,000.00
4		0002	15-Jan-18		$49,000.00
5	60	0003	19-Sep-18	$136,000.00	$75,000.00
5		0004	19-Sep-18		$42,000.00
6	60	N/A	10-Oct-18	$50,000.00	N/A

Note: Claims that have HHRG rate but no PDGM rate are excluded from the calculations of the 2nd Component.

Appendix Table 2b: Component 2 of Update Factor

Numerator	Denominator	Ratio
$8,266.67	$7,266.67	1.138

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

$$UF_{HH,CY20}^{BY} = \frac{F_{HHRG,CY18}^{BY}}{0.25 F_{HHRG,BY-1}^{BY} + 0.75 F_{HHRG,BY}^{BY}} \times \frac{C_{PDGM,CY20}^{Ref\ Per}}{C_{HHRG,CY18}^{Ref\ Per}}$$

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

$$UF_{HH,CY20}^{FY16} = 1.252 \times 1.138$$
$$= 1.425$$