



# Report to Congress: Unified Payment for Medicare-Covered Post-Acute Care

Analysis and development of the prototype Unified PAC  
prospective payment system called for in the IMPACT Act

## Appendix B

Calculation of Total Cost of the PAC Stay

July 2022

## Introduction

PAC payment systems have historically been developed based on analyses of total costs of care rather than total Medicare payments (or allowed charges). The rationale for using total costs rather than total payments is that total costs more accurately reflect the true cost to the providers of caring for patients whereas total payments also include policy-based adjustments that are not directly related to the costs of providing care.

## Decomposing Claim Cost

Because PAC can often involve several distinct types of care, and because—as previously noted—fixed costs that are independent of patient need can vary by PAC setting type, we began by considering the potential to decompose total costs to differentiate between costs associated with various patient characteristics, which reflect patients' needs, versus other costs that do not vary based on patient characteristics. Our exploration of alternative approaches identified challenges in pursuing a decomposition of total costs with the currently available data sources.

We attempted three approaches for decomposing claim costs. The first approach focused on identifying the percent of total costs that are fixed costs (i.e., those that do not vary based on patient characteristics) for each setting based on cost report and claims data. The results of the fixed cost percentage calculations for the inpatient settings were in line with expectations. However, the HHA fixed costs percentage was significantly higher relative to inpatient PAC providers and not an expected finding. Through consultation with the CMS Office of the Actuary we concluded that additional understanding of uniformity in cost center definitions across settings would be important to ensure consistency of this approach to calculating fixed costs for each of the settings. In light of these complications, we did not pursue this approach to decomposing costs.

Our second approach was to identify costs for services that are common across PAC providers (and therefore likely to be reflective of patient case-mix) versus costs that are not common across PAC providers (and therefore likely to be reflective of factors specific to each setting). We identified four ancillary services that were common across all settings: physical and occupational therapy, speech pathology, and medical/surgical supplies. However, common services across PAC settings are not fully reflected without incorporating nursing costs—which are not separately reported in inpatient PAC. Since nursing is such an important aspect of patient care that is used across all four PAC settings, we pursued a third exploration of the data to attempt to identify nursing costs so that we could decompose total costs into costs for overlapping services including nursing costs and non-overlapping services.

The third approach built upon aspects the first two approaches with a goal to approximate nursing costs for the inpatient PAC claims and incorporate these nursing costs into the overlapping costs discussed in the second approach. To estimate nursing costs for inpatient PAC, we calculated the routine cost to charge ratio (CCR) for each

PAC provider from its cost report data and multiplied this by the room and board charges from MedPAR claims to calculate room and board costs for the stay. These room and board costs were then subtracted from the total routine costs for the claim, and the remainder was considered to reflect nursing and other overhead costs. This value was then multiplied by the average fixed cost percentages by setting from the first approach above. However, the nursing costs calculated in this manner constituted only a small portion of total routine cost and did not have face validity given the important role nursing care plays in inpatient PAC.

As a result of these explorations of approaches for decomposing costs and given that total costs are the basis of the current Medicare PAC prospective payment systems our analyses in support of the prototype development were conducted using total costs. Total costs are the basis of the current Medicare PAC payment systems and can similarly be used as the basis for developing a common case-mix methodology for a prototype Unified PAC PPS.

### Calculating Total Claim Cost

Costs for each PAC stay from 2017–2020 were calculated using 2017 cost reports following the methods in Coomer et al (2017). In brief:

For inpatient PAC settings (LTCH, IRF, and SNF) costs are calculated as follows:

**Step 1** – Calculate facility routine cost per day from the cost report for each facility. Winsorize outliers based on setting-specific distributions then impute missing values at setting-specific medians.

**Step 2** – Calculate facility ancillary cost-to-charge ratios (CCRs) from the cost report for each facility. Winsorize outliers by CCR based on setting-specific distributions then impute missing CCRs using the individual provider’s distribution from the median for non-missing CCRs or in cases where all CCRs are missing the setting-specific medians.

**Step 3** – Calculate routine cost per stay for the claim by multiplying the facility routine cost per day by the number of utilization days on the claim.

**Step 4** – Calculate ancillary cost per claim by multiplying the facility ancillary CCRs by corresponding claim charges.

**Step 5** – Calculate total cost per claim by summing the routine and ancillary costs per claim. Winsorize outliers based on setting-specific distributions.

Costs for HHAs are calculated as follows:

**Step 1** – Calculate agency cost per visit for each visit type from the cost report for each facility. Winsorize outliers based on setting-specific distributions then impute missing costs per visit using the individual provider’s distribution from the median for non-missing costs per visit or in cases where all costs per visit are missing the setting-specific medians.

**Step 2** – Calculate agency cost per minute for each visit type using the agency cost per visit and aggregate minutes data from the claims. Winsorize outliers based on setting-specific distributions then impute missing costs per minute using the setting-specific medians.

**Step 3** – Calculate an agency supplies CCR from the cost report for each facility. Winsorize outliers based on setting-specific distributions then impute missing CCRs using the setting-specific medians.

**Step 4** – Calculate visit costs per claim by multiplying the agency cost per minute by the number of minutes on the claim for each visit type and sum.

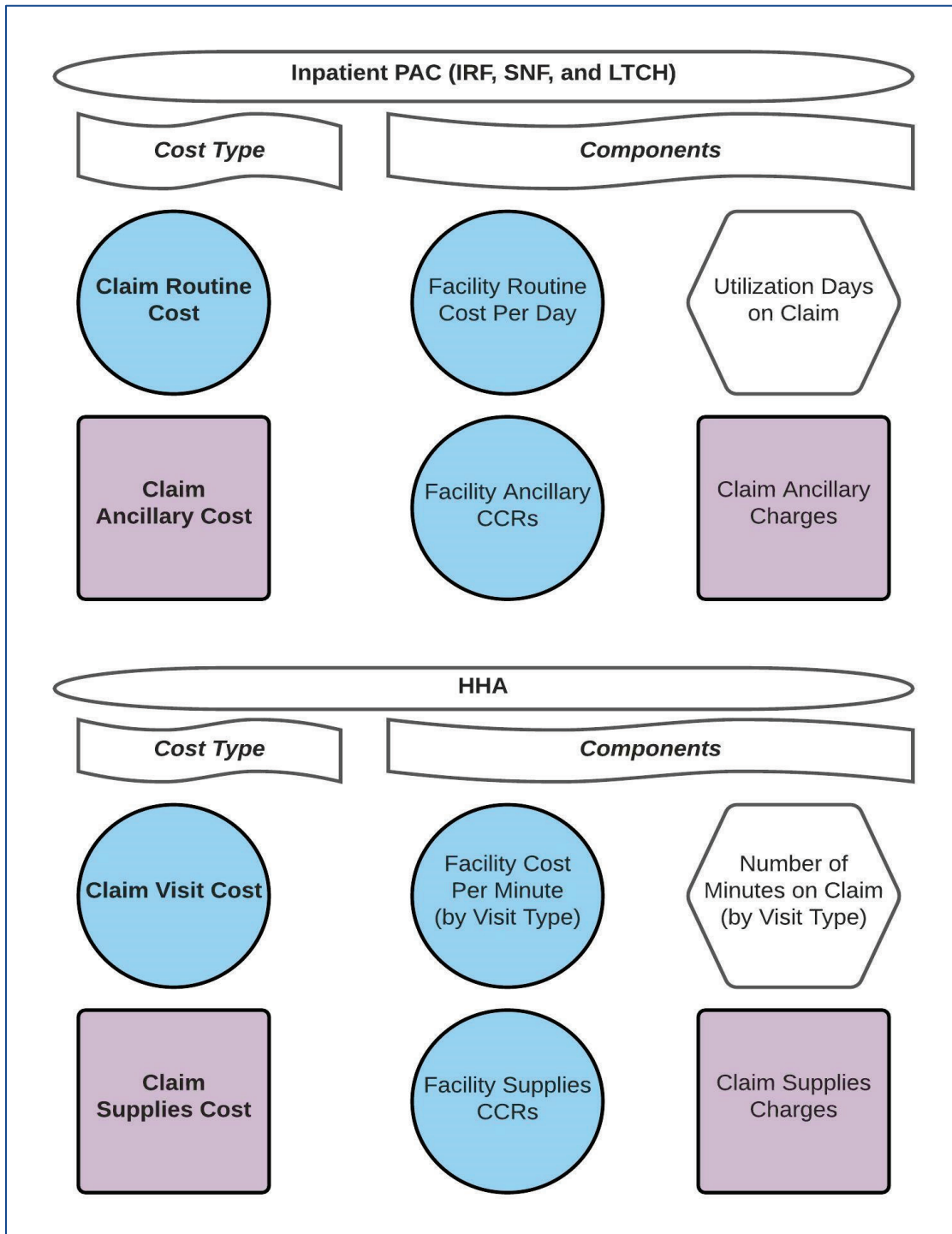
**Step 5** – Calculate the claim supplies cost by multiplying the agency supplies CCR by supplies charges on the claim.

**Step 6** – Calculate total cost per claim by summing the visit costs and supplies costs per claim. Winsorize outliers based on setting-specific distributions.

### **Adjusting Costs for Inflation**

Due to the timing of analyses, the availability of complete cost report data, and in order to efficiently utilize resources, we opted to apply the values derived from 2017 cost reports to 2018, 2019, and 2020 claims and to apply an inflation adjustment factor to express costs uniformly in 2017 dollars. For each of the methods described above, both cost report data in “2017 dollars” and claims data in “current year dollars” (i.e., 2018 or beyond) were used. To properly adjust the costs for inflation over time we transformed the cost components that were in “current year dollars” to “2017 dollars.” **Appendix Figure B-1** below shows each of the cost components.

**Figure B-1. Components of the Cost Calculation**



**Notes:**

- 1) CCR = Cost to Charge Ratio.
- 2) Components in "2017 dollars" are shown in circles and components in "current year dollars" are shown in squares.
- 3) Days and minutes billed on the claims are in hexagons as they are not monetary values.

Source: RTI International

As shown in **Appendix Figure B-1**, the claim routine cost for IRFs, SNFs, and LTCHs is expressed in “2017 dollars” because the facility routine cost per day is expressed in “2017 dollars.” We therefore did not need to adjust the claim’s routine cost component. The claim’s ancillary cost component, however, is expressed in “current year dollars” since ancillary charges are found on the claim. We therefore adjusted the claim ancillary cost to be expressed in “2017 dollars.”

Similarly, for HHA, the claim visit cost is expressed in “2017 dollars” because the facility cost per minute is expressed in “2017 dollars.” We therefore did not need to adjust the claim visit cost. The claim supplies cost, however, is expressed in “current year dollars” since the claim supplies charges are found on the claim. We therefore adjusted the claim supplies cost to be expressed in “2017 dollars.”

We selected the percentage change in the market basket calculation for each PAC setting as the inflation factor for the claim cost calculation. The market basket serves as the basis for annual increases to the base payment rates in each setting (before applying adjustments for patient case-mix and geographic variation). The term “base payment rates” refers to the Home Health Standard Payment Factor in HHA, the IRF Conversion Factor in IRF, the SNF (Non-Case-Mix) Factor in SNF, and the LTCH Standard Payment Factor in LTCH. Changes to this value over time reflect changes in the underlying costs incurred by each setting type in a given year. The market basket adjustments for each setting type are shown in **Appendix Table B-1** along with the resulting base payment rates. It is important to note that while the market basket is the primary driver of changes to the base payment rates, other factors such as adjustments to the payment mechanism and budget neutrality may also play a role in the final base payment rate each year.

To adjust the claim cost for LTCH, IRF, and SNF we applied the appropriate inflation factor to the ancillary costs after Step 4 above. Therefore, the cost calculation method becomes:

**Step 1** – Calculate facility routine cost per day from the cost report for each facility using 2017 cost reports. Winsorize outliers based on setting-specific distributions then impute missing values at setting-specific medians.

**Step 2** – Calculate facility ancillary cost-to-charge ratios (CCRs) from the cost report for each facility using 2017 cost reports. Winsorize outliers by CCR based on setting-specific distributions then impute missing CCRs using the individual provider’s distribution from the median for non-missing CCRs or in cases where all CCRs are missing the setting-specific medians.

**Step 3** – Calculate routine cost per stay for the claim by multiplying the facility routine cost per day by the number of utilization days on the claim.

**Step 4** – Calculate ancillary cost per claim by multiplying the facility ancillary CCRs by corresponding claim charges.

**Step 5** – Calculate inflation-adjusted ancillary cost per claim by applying the facility-type inflation factor to ancillary cost per claim.

**Step 6** – Calculate total cost per claim by summing the routine and inflation-adjusted ancillary costs per claim. Winsorize outliers based on setting-specific distributions.

To adjust the claim cost for HHA we applied an inflation factor to the supplies cost after Step 5 above. Therefore, the cost calculation method becomes:

**Step 1** – Calculate agency cost per visit for each visit type from the cost report for each agency using 2017 cost reports. Winsorize outliers based on setting-specific distributions then impute missing costs per visit using the individual provider's distribution from the median for non-missing costs per visit or in cases where all costs per visit are missing the setting-specific medians.

**Step 2** – Calculate agency cost per minute for each visit type using the agency cost per visit and aggregate minutes data from the claims. Winsorize outliers based on setting-specific distributions then impute missing costs per minute using the setting-specific medians.

**Step 3** – Calculate an agency supplies CCR from the cost report for each agency using 2017 cost reports. Winsorize outliers based on setting-specific distributions then impute missing CCRs using the setting-specific medians.

**Step 4** – Calculate visit costs per claim by multiplying the agency cost per minute by the number of minutes on the claim for each visit type and sum.

**Step 5** – Calculate the claim supplies cost by multiplying the agency supplies CCR by supplies charges on the claim.

**Step 6** – Calculate inflation adjusted supplies cost per claim by applying the HHA inflation factor to supplies cost per claim.

**Step 7** – Calculate total cost per claim by summing the visit costs and inflation adjusted supplies costs per claim. Winsorize outliers based on setting-specific distributions.

### **Adjusting Costs for Geographic Variation in Wages**

CMS adjusts Medicare payments to PAC settings using a local area wage index in accordance with Sections 1886(d)(3), 1888(e)(4), and 1895(b)(4) of the Act. The wage index is calculated as the average hourly wage for a labor market area divided by the national average hourly wage. It is applied to the labor portion of the standardized payment amounts to adjust for area differences in wage levels. For our analyses, we used the wage index to standardize costs across geographic areas for these measured differences in labor costs. This ensures that we capture the effect of patient characteristics and other covariates on cost irrespective of facility location. The resulting claim cost amount can therefore be interpreted as wage-standardized cost of care expressed in 2017 dollars.

**Table B-1. Market Basket Increases and Base Payment Rates by PAC Type – 2017 to 2020**

PAC Type	2017–2018 Market Basket Increase	2018–2019 Market Basket Increase	2019–2020 Market Basket Increase	2017–2019 Market Basket Combined	2017–2020 Market Basket Combined	2017 Base Payment Rate*	2018 Base Payment Rate*	2019 Base Payment Rate*	2020 Base Payment Rate*
LTCH	1.021	1.021	1.025	1.042	1.069	\$42,476.00	\$41,430.56	\$41,558.68	\$42,677.64
IRF	1.020	1.021	1.025	1.041	1.067	\$15,708.00	\$15,838.00	\$16,021.00	\$16,489.00
SNF	1.020	1.020	1.024	1.040	1.065	\$89.46	\$90.47	\$92.60	\$94.84
HHA	1.019	1.022	1.026	1.041	1.068	\$2,989.97	\$3,039.64	\$3,154.27	\$3,220.79

Notes:

\* The term Base Payment Rate refers to the Home Health Standard Payment Factor in HHA, the IRF Conversion Factor in IRF, the SNF (Non-Case-Mix) Factor in SNF, and the LTCH Standard Payment Factor in LTCH.

Sources:

1. Market basket updates: <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MedicareProgramRatesStats/MarketBasketData>
2. IRF PPS Final Rule 2017: <https://www.federalregister.gov/documents/2016/08/05/2016-18196/medicare-program-inpatient-rehabilitation-facility-prospective-payment-system-for-federal-fiscal>
3. IRF PPS Final Rule 2018: <https://www.federalregister.gov/documents/2017/08/03/2017-16291/medicare-program-inpatient-rehabilitation-facility-prospective-payment-system-for-federal-fiscal>
4. IRF PPS Final Rule 2019: <https://www.federalregister.gov/documents/2018/08/06/2018-16517/medicare-program-inpatient-rehabilitation-facility-prospective-payment-system-for-federal-fiscal>
5. IRF PPS Final Rule 2020: <https://www.federalregister.gov/documents/2019/08/08/2019-16603/medicare-program-inpatient-rehabilitation-facility-irf-prospective-payment-system-for-federal-fiscal>
6. SNF PPS Final Rule 2017: <https://www.federalregister.gov/documents/2016/08/05/2016-18113/medicare-program-prospective-payment-system-and-consolidated-billing-for-skilled-nursing-facilities>
7. SNF PPS Final Rule 2018: <https://www.federalregister.gov/documents/2017/08/04/2017-16256/medicare-program-prospective-payment-system-and-consolidated-billing-for-skilled-nursing-facilities>
8. SNF PPS Final Rule 2019: <https://www.federalregister.gov/documents/2018/08/08/2018-16570/medicare-program-prospective-payment-system-and-consolidated-billing-for-skilled-nursing-facilities>
9. SNF PPS Final Rule 2020: <https://www.federalregister.gov/documents/2019/08/07/2019-16485/medicare-program-prospective-payment-system-and-consolidated-billing-for-skilled-nursing-facilities>
10. LTCH PPS Final Rule 2017: <https://www.federalregister.gov/documents/2016/08/22/2016-18476/medicare-program-hospital-inpatient-prospective-payment-systems-for-acute-care-hospitals-and-the>
11. LTCH PPS Final Rule 2018: <https://www.federalregister.gov/documents/2017/08/14/2017-16434/medicare-program-hospital-inpatient-prospective-payment-systems-for-acute-care-hospitals-and-the>
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13. LTCH PPS Final Rule 2020: <https://www.federalregister.gov/documents/2019/08/16/2019-16762/medicare-program-hospital-inpatient-prospective-payment-systems-for-acute-care-hospitals-and-the>
14. HHA PPS Final Rule 2017: <https://www.federalregister.gov/documents/2016/11/03/2016-26290/medicare-and-medicaid-programs-cy-2017-home-health-prospective-payment-system-rate-update-home>
15. HHA PPS Final Rule 2018: <https://www.federalregister.gov/documents/2017/11/07/2017-23935/medicare-and-medicaid-programs-cy-2018-home-health-prospective-payment-system-rate-update-and-cy>
16. HHA PPS Final Rule 2019: <https://www.federalregister.gov/documents/2018/11/13/2018-24145/medicare-and-medicaid-programs-cy-2019-home-health-prospective-payment-system-rate-update-and-cy>
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