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Updated Simulation of a Prospective Payment System for Post-Acute Care

A report by the Urban Institute for the Medicare Payment Advisory Commission

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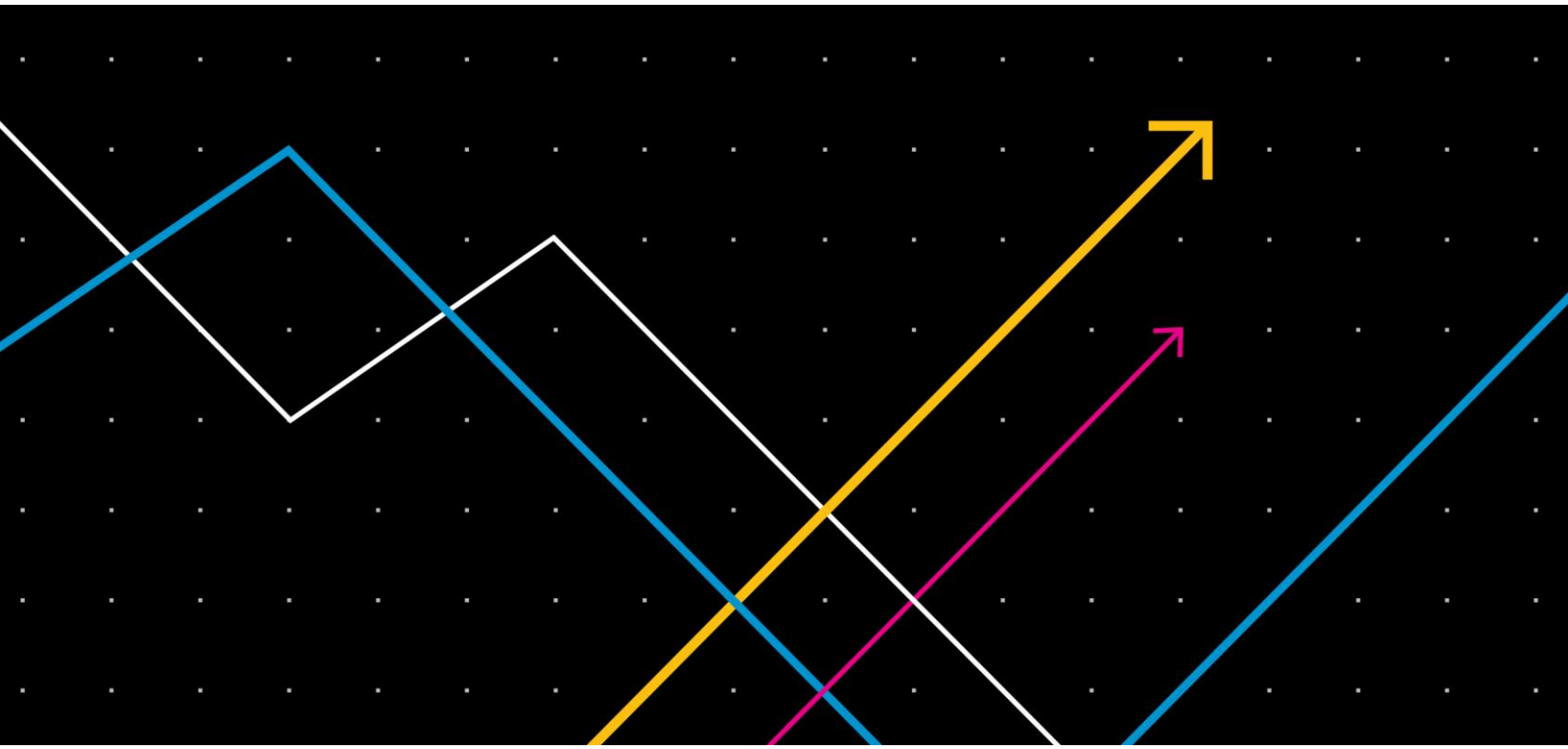

RESEARCH REPORT

Updated Simulation of a Prospective Payment System for Post-Acute Care

Doug Wissoker and Bowen Garrett

January 2023

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Updated Simulation of a Prospective Payment System for Post-Acute Care

This report presents the methods used to develop and assess the potential for fee-for-service Medicare to pay for post-acute care (PAC) using a unified prospective payment system (PPS). Our initial work for the Medicare Payment Advisory Commission (MedPAC) on a unified PAC PPS used data from 2013 to demonstrate the potential to pay for post-acute stays based on administrative data available in all four settings—home health agencies (HHAs), skilled nursing facilities (SNFs), inpatient rehabilitation facilities (IRFs), and long-term care hospitals (LTCHs). The model in that initial PAC PPS work and its estimated impacts are described in detail in Wissoker and Garrett (2016) and updated in Wissoker and Garrett (2019).

In this report, we update to our initial modeling of a PAC PPS and estimate impacts of a PAC PPS on PAC providers and beneficiaries. In keeping with the original design and findings from our earlier work, the PAC PPS design described in this paper would pay by stay. Wissoker and Garrett (2018a, 2019) assessed the feasibility of paying by episode rather than by stay. These studies found that an episode-based system would likely overpay short episodes and underpay long episodes and could have undesirable incentive effects.[1] As a result, we model a stay-based payment system.

The PAC PPS design in this report responds to our previous finding that a PAC PPS that sets payments without using patient-level functional status data yields profits that are substantially below average (defined as having a payment-to-cost ratio less than average) for low-functioning patients and substantially above average (defined as having a payment-to-cost ratio greater than average) for high-functioning patients. Garrett, Wissoker, and Skopec (2021) investigated whether proxies for functional status could be used that were not subject to systematic misreporting or gaming and concluded that effective proxies are not available. Therefore, in this work, our model uses function measures as predictors. We also present impacts from a payment model excluding function, allowing a direct comparison of the performance of the two versions of the model in explaining costs per stay.

This analysis is based on fee-for-service post-acute stays that began between April and September 2019 and have functional assessment data reported. Current payments are measured using actual payments for IRF patients, actual payments adjusted for the site-neutral payment policy for LTCH

patients, and simulated payments for SNF and home health patients under the new payment systems for those settings (introduced in fiscal year 2020). For our primary estimated impacts, we assume that the system is implemented immediately and is budget neutral. We also simulate two other scenarios for implementation: immediate implementation with a 5 percent reduction to payments and implementation of the PAC PPS with a 5 percent reduction phased in over three years.

This report provides technical details supporting the discussion in MedPAC's forthcoming 2023 report to Congress (MedPAC, forthcoming). The MedPAC report will provide more of the implications of the findings for the design of a unified payment system, as well as the likely impacts of moving from the current setting-specific prospective payment system to a unified payment system.

This report has two main sections. First, we detail the data sources and methods for the stay- and episode-based PAC prospective payment systems. Second, we report and briefly describe the results for the updated PAC PPS, the effects of inclusion of function in the payment model, and the effects on payments of the two modeling approaches.

Data and Methods for Cost Modeling and Analysis

In this section, we describe the data and methods used to model the prospective payment system for post-acute care. The data and methods are similar to those reported in Wissoker and Garrett (2016, 2018a) and for the "stays model" in Wissoker and Garrett (2019). The section concludes with a description of the groups used to evaluate the models.

Modeling the PAC PPS

ESTIMATING THE COST OF PAC STAYS

The analysis in this report is based on a subset of stays for payment year 2019. We first describe the construction of the analysis file based on the full payment year and reasons for excluding certain stays. The data for the full year were used in early runs and then served to reassure us that the results are very similar when we focus on the subset of stays that began between April and September 2019 and have matching assessment items to measure function.

The analysis file for the full payment year of PAC stays includes observations for 10.6 million stays across the four PAC settings. The institutional stays, which correspond to FY 2019, began between October 2018 and September 2019. Home health episodes ended during the calendar year 2019.

Definitions of stays depend on setting. A stay is defined as a discharge in IRFs and LTCHs, a 30-day episode in HHAs, and days on Medicare-covered claims within a SNF stay.[2] Note that the unit of analysis for home health is a 30-day episode rather than a 60-day episode, to simulate the 30-day payment period begun in 2020. The shorter payment periods were simulated from the 60-day episodes in 2019 by assigning costs of visits in the first 30 days to the first payment period; if there were visits in the second 30 days, their costs were assigned to a second payment period.

We constructed the file using post-acute claims from the Medicare Standard Analytic File (SAF). The claim files were first processed by Abt Associates and Acumen LLC to simulate the new payment systems for home health agency and skilled nursing facility stays.

In total, we received records for 11.3 million stays in the year. Of these stays, approximately 4 percent of home health episodes, 16 percent of SNF stays, 7 percent of IRF stays, and 15 percent of LTCH stays and were dropped (table 1).

TABLE 1

Distribution of 2019 Stays across Settings

	Number of 2019 stays (entire year)	Percent of 2019 stays dropped because of exclusion rules	Number of stays in 2019 PAC PPS analysis File
Home health agencies	8,744,171	3.6%	8,425,034
Skilled nursing facilities	2,051,631	15.7	1,729,668
Inpatient rehabilitation facilities	408,354	7.0	379,845
Long-term care hospitals	94,538	14.6	80,731
Total	**11,298,694**	**6.0**	**10,615,278**

Sources: 2018–2019 Medicare acute hospital and post-acute care claims, Medicare 2019 risk score file, and Medicare cost reports for 2019.
Note: Skilled nursing facility, inpatient rehabilitation facility, and long-term care hospital claims are for stays beginning between October 2018 and September 2019; the home health claims are for 60-day episodes that ended between January and December 2019.

These drop rates reflect decisions made in preparing the files obtained for the analysis. As detailed in Appendix A, table A.1, stays were dropped for the following reasons:

- patients having health maintenance organization/Medicare Advantage coverage during the year
- missing provider data from cost reports, such as cost-to-charge ratios for institutional providers

- missing data on charges
- missing data on simulated payments for SNFs
- facilities outside the 50 states and DC (e.g., facilities in Puerto Rico)
- other issues (such as missing risk scores, missing an area wage index, multiple stays with the same start date for a beneficiary, SNF stays of over 101 days, and IRF and LTCH stays longer than three standard deviations above the mean of the logged distribution)

The relatively small drop rate of home health episodes reflects that the source file for HHA claims (created by Abt Associates) included only episodes with cost data. The high drop rate found in the 2019 SNF file simulated by Acumen reflects that the file included many cases for which payments under the new PDPM model could not be simulated. In all four settings, the files before exclusions included some patients with health maintenance organization coverage.

The stays include all health conditions, reflecting the assumption that the PAC PPS would be used to pay for all stays regardless of the principal reason for treatment or the patients' comorbidities. The stays were from 9,685 HHAs (39 percent of PAC providers); 13,925 SNFs (56 percent of PAC providers); 1,061 IRFs (4 percent of PAC providers); and 339 LTCHs (1 percent of PAC providers). Overall, 9 percent of stays were with hospital-based providers.[3]

We base the analysis in this report on the six-month sample of stays that began between April and September 2019. Because we wanted to include functional status in the risk adjustment, we had to limit the analysis to stays that had matching patient assessments with uniformly defined measures of function. Institutional providers were required to collect this information (the "GG" items) beginning on October 1, 2018. HHAs were not required to collect this information until January 1, 2019. As a result, there is considerable missing data in the early months of collection from HHAs. Our use of the April–September window helps ensure that the measures were collected for a consistent share of stays in each setting across the entire window.

Table 2 reports the counts and shares of stays and episodes with usable function data during the six-month period.[4] The share of episodes with usable function data is much lower for home health episodes than for stays in institutional settings.

TABLE 2

Number and Share of Stays Included in the Function Analysis File, by Setting

	Number of stays in 2019 PAC PPS analysis file (1)	Number of stays started in April to September 2019 (2)	Number of stays in final PAC PPS analysis file started in April to September 2019 with CARE function items (3)	Share of stays in 6-month file with CARE function items (4)
Home health agencies	8,425,034	4,203,989	2,639,025	0.628
Skilled nursing facilities	1,729,668	843,856	840,922	0.997
Inpatient rehabilitation facilities	379,845	189,800	176,755	0.931
Long-term care hospitals	80,731	38,103	35,362	0.928
Total	**10,615,278**	**5,275,748**	**3,692,064**	**0.700**

Sources: 2018–2019 Medicare acute hospital and post-acute care claims and assessments, Medicare 2019 risk score file, and Medicare cost reports for 2019.

Notes: PAC = post-acute care. PPS = prospective payment system. CARE = Continuity Assessment Record and Evaluation. The PAC PPS analysis file (column 1) contains institutional stays beginning in FY 2019 and home health episodes ending in calendar year 2019 after excluding problematic stays as described in Appendix A table A.1. Column 2 restricts the 2019 PAC PPS analysis file to those stays and episodes that began between April and September 2019. The final PAC PPS analysis file (column 3) restricts the 2019 PAC PPS analysis file to stays begun between April and September 2019 for which CARE function items were reported on a matched assessment.

Overall, the average cost per stay is $5,495 for those with CARE function measures versus $4,266 for all stays. This occurs because of non-random reporting of the CARE function measures, both within and across settings. Home health episodes with usable function measures have higher average costs than all home health episodes ($1,685 versus $1,492 for all episodes). And, as can be calculated from table 1, SNF, IRF, and LTCH stays combine to make up a larger share of the observations of those with usable function measures (28.6 percent of stays in column 3) than among all observations (21.3 percent of stays in column 1).

Restriction of the sample to stays with usable function data that began between April and September 2019 reduced the underlying number of HHA providers by 4 percent and the number of institutional providers by 1 percent. The remaining sample includes stays from 9,285 HHAs (38 percent of PAC providers); 13,868 SNFs (57 percent of PAC providers); 1,047 IRFs (4 percent of PAC providers); and 335 LTCHs (1 percent of PAC providers). For this sample, 10 percent of stays in the final sample were with hospital-based providers.

Costs per stay include both routine and ancillary costs (including overhead costs), and for IRFs, the costs associated with teaching programs and treating low-income patients.[5]

For *institutional stays*, we estimated routine costs as the average routine cost per day from the 2019 Medicare cost report times the stay's covered length of stay from the claims. For free-standing SNFs, the cost report figure is adjusted upward by 16.4 percent to account for the higher nursing costs associated with treating Medicare beneficiaries compared with other patients, particularly long-stay nursing home residents (the cost report includes a facility's total costs for treating all patients and residents).

We estimated both therapy and nontherapy ancillary costs by converting charges on the PAC claims to costs using facility- and department-specific cost-to-charge ratios from each provider's 2019 Medicare cost report.

For HHAs, routine and ancillary costs are calculated by aggregating the estimated cost for the 30-day episode over six types of visits. Routine costs are the sum of the costs of the three nontherapy visit types (skilled nursing, home health aides, and medical social services).[6] Therapy costs are the sum of the costs of the three therapy visit types (physical therapy, occupational therapy, and speech language pathology services). The cost of each type of visit is the product of the number of minutes of that visit type from claims and the cost per minute from the 2019 Medicare cost report and was provided on the data file prepared by Abt Associates. Nontherapy ancillary (NTA) costs for HHAs are not calculated because they are not covered separately for HHA episodes.

All costs were standardized using the setting-specific labor share and the area wage index. Labor shares were set at 76.1 for HHAs, 68.8 for SNFs, 70.9 for IRFs, and 66.5 for LTCHs. Finally, we capped routine, therapy, and non-therapy ancillary wage-adjusted costs at the 99.5th percentile for stays within each setting, separately by whether a facility is a hospital-based or free-standing facility.

PREDICTING THE COST OF STAYS USING PATIENT CHARACTERISTICS

Under a PAC PPS, the payment for a stay would be based on the stay's predicted cost. Patient and stay characteristics are used to predict the actual cost of the stay. In the below list, two sets of characteristics—primary reason to treat and the patient's severity of illness—were taken from the hospital claim when there was a hospital stay within 30 days of the admission date for the PAC stay and were proxied from PAC claims for stays without a preceding hospitalization.

For home health, we used the information from the prior hospital stay to create predictors for both 30-day periods that were in the 60-day episodes that was preceded by the hospital stay. We used measures of the following to predict the cost of stays:

- patient age and disability status

- primary reason to treat (Medicare Severity Diagnosis-Related Group, aggregated into "reason to treat" groups)
- patient comorbidities (observed in a prior hospital stay and the PAC stay)
- the number of body systems involved with the patient's comorbidities for patients in institutional settings
- days spent in the intensive and coronary care units during the prior hospital stay
- the patient's severity of illness using the All Patient Refined Diagnosis-Related Groups
- beneficiary's risk score based on patient diagnoses for the prior year
- impairments and treatments (including bowel incontinence, urinary incontinence, impaired vision, severe wounds or pressure ulcers, use of certain high-cost service items, and difficulty swallowing)
- proxies for patient's frailty
- patient's cognitive status
- patient functional status

Most risk adjustors are based on administrative data other than the patient assessment. We used claims information from PAC stays and the preceding hospital stays, demographic information from the Medicare enrollment files, and beneficiary risk scores. Information on diagnoses and the primary reason for treatment was collected from prior hospital stay claims and from PAC stay claims for patients admitted from the community. Comorbidities data were collected from hospital stay claims where available and from the PAC stays claims. Indicators of ventilator care and severe wound care needs were obtained from the PAC stay claims.

We used claims-based diagnoses and procedure codes for measures of frailty, cognitive function, and select PAC service use. We used codes from the *International Classification of Diseases*, 10th revision (ICD-10) in the PAC claims to indicate bowel and urinary incontinence, severe wound care, and the presence of ventilator care.[7] We calculated a JEN Frailty Index for each stay using ICD-10 codes and included the 13 components of that index as predictors.[8] As proxies for impaired cognitive function, we used ICD-10 codes to identify patients in a coma or with dementia or Alzheimer's' disease. As indicators of serious mental illness, we used ICD-10 codes to identify patients with schizophrenia, bipolar disorder, and/or severe depression. We used ICD-10 codes for dysphagia as a proxy for swallowing difficulties in the post-acute setting.

Our model of costs also includes indicators of total functional score based on six questions from the Continuity Assessment Record and Evaluation Item Set that are now reported on patient assessments. The total functional score is the sum of zero to five scores from the following six measures (with the relevant question number in brackets):

- **Self care [GG0130 E], shower/bathe self:** the ability to bathe self in shower or tub, including washing, rinsing, and drying self. Does not include transferring in/out of tub/shower.
- **Mobility [GG0170 B], sit to lying:** the ability to move from sitting on side of bed to lying flat on the bed
- **Mobility [GG0170 I], walk 10 feet:** once standing, the ability to walk at least 10 feet in a room, corridor, or similar space
- **Self care [GG0130 C], toileting hygiene:** the ability to maintain perineal hygiene, adjust clothes before and after using the toilet, commode, bedpan, or urinal. If managing an ostomy, include wiping the opening but not managing equipment
- **Mobility [GG0170 A], roll left and right:** the ability to roll from lying on back to left and right side, and return to lying on back
- **Mobility [GG0170 D], sit to stand:** the ability to safely come to a standing position from sitting in a chair or on the side of the bed

For many stays, at least one activity was not measured. If the patient refused to perform the activity or it was not attempted due to environmental limitations, the activity was excluded from the total functional score and the score was reweighted to account for fewer responses. Stays with three or more such activities were eliminated from the analysis. Activities that were not attempted—either because the patient didn't perform the activity prior to the current illness or because of the patient's medical condition or safety concerns—were included as a zero, indicating full dependence on a helper to accomplish the activity.

The following indicators of total functional score are included in the primary prediction models of costs with highest function as a reference category:

- 0 to less than 6 points (lowest function)
- 6 to less than 12 points
- 12 to less than 18 points
- 18 to less than 24 points

- 24 to 30 points (highest function)

More detailed definitions of all of the predictors are reported in Appendix A, table A.2.

We avoided including in the model indicators of service use that might be manipulated by providers (such as the amount of rehabilitation therapy, the number of therapy disciplines, or the use of oxygen without a link to a respiratory diagnosis), but we included indicators for ventilator care, tracheostomy care, and continuous positive airflow pressure because the costs of those services are significant and use is much less likely to be influenced by payment policy. The measure for continuous positive airflow pressure captures use only within institutional settings, since home health claims do not provide the procedure codes needed to identify its use in home health.

As in our earlier work, we included in the payment model an indicator for care provided by HHAs. HHAs do not incur the same kinds or levels of costs as institutional providers, so we adjust for this with an indicator in the model for home health. (Details are explained below.) Inclusion of this indicator ensures that costs for home health cases are predicted correctly on average. In addition, two indicators—whether secondary diagnoses involved five or more body systems and continuous airflow pressure—are only measured for those in institutional settings. Severely ill patients include those with a severity of illness level 4 (the sickest), calculated using the all-patient refined-diagnosis related groups, and exclude patients treated in home health agencies.

Costs were predicted using generalized linear models with a log link (Poisson regression models). Compared with ordinary least squares regression, the Poisson regression gives less emphasis to infrequent but exceptionally high-cost stays. In addition, Poisson models can more easily handle dependent variables with zero values (such as institutional stays with no NTA costs) than linear models with a logged dependent variable.

Our approach uses two regression models to predict each stay's actual costs: one for routine plus therapy costs and another for NTA costs. The routine plus therapy cost model is based on stays from HHA and institutional PAC settings. The NTA model is based on stays from only the institutional PAC settings because these services are not part of the home health benefit so HHAs do not incur costs for them. The two models use the patient and stay characteristics as predictors, except for inclusion of an indicator of a home health stay as mentioned above. We combined the cost estimates generated by the models (including zero predicted NTA costs for HHA stays) to obtain total predicted costs. One method of evaluating the results is obtained by comparing total actual costs (including zero NTA costs for HHA stays) with the total predicted costs.

COMPARING PAYMENTS AND COSTS

To compare what estimated payments would be under PAC PPS with the costs and payments of stays, all costs and payments were standardized for variation in wages across geographic areas. This ensures that the comparison of costs, actual payments, and modelled payments takes place on an equal basis. Since estimated payments under the new systems were based on standardized costs, they did not need to be further adjusted for wage differences.

Actual payments include relevant adjustments for rural location, teaching status, low-income share, outliers, and the amounts paid by the beneficiary (any coinsurance and deductibles). For SNFs, the total "actual" payments were simulated for the 2019 stays by staff at Acumen LLC based on the Patient Driven Payment Model—the payment system implemented in FY 2020. For HHAs, total payments were simulated for the 30-day periods in 2019 by staff at Abt Associates based on the Patient Driven Groupings Model (PDGM)—the episode length and payment system implemented in 2020. LTCH payments reflected what would have been paid under fully implemented dual-rate structure: LTCH rates for qualifying stays and the lower of the inpatient hospital PPS rate or 100 percent of the cost of the case.

The PAC PPS payments combine an initial payment that is set to be proportional to total predicted costs that includes an outlier policy for low utilization stays and a high loss episode. Total PAC PPS dollars paid out were set equal to total actual payments (i.e., payment levels are set to be budget neutral across all PAC settings).

To implement a low-utilization payment policy that works across all PAC settings, we defined a short stay outlier (SSO) for institutional stays that parallels the low-utilization payment adjustment (LUPA) definition used in home health. SSOs are defined as institutional stays in the bottom decile of length of stay within each setting (six or fewer days for SNFs and IRFs and seven or fewer days for LTCHs). LUPA cases were assigned based on whether the 30-day episode qualified as a LUPA episode under the PDGM rules.[9] The high-loss outlier policy was implemented with separate pools and fixed-loss amounts for home health episodes and institutional stays, with each pool equal to 5 percent of payments. The combined outlier payment is calculated in the following steps:

1. For these SSO and LUPA cases, expected costs are set equal to 1.2 times the setting-specific average cost per day or per visit for the first day to reflect higher initial costs and set equal to average cost per day or per visit for subsequent days. For other stays, expected costs are set equal to the model prediction. Payments (before the addition of a high-loss outlier) are then set

proportional to the expected cost, imposing the condition that the average implied PAC PPS payment equals the average of current payments.

2. In our primary model with total function score as a predictor, PAC PPS payments for non-SSO and non-LUPA stays are reduced by 5 percent to establish an outlier pool, which is then used to pay 80 percent of losses above $1,044 for HHAs and above $11,134 for institutional settings. In our model without function as a predictor, the pool is used to pay 80 percent of losses above $1,058 for HHAs and $11,726 for institutional providers.

Evaluating the Design of the PAC PPS

To evaluate the potential accuracy of a PAC PPS and estimate its impact on payments, we examined the accuracy of the payment models in aggregate (across all stays) and their effects on many patient groups. We created these groups to report the results of the PPS design, but the underlying prediction models remain the same across all groups. These groups "stress test" the models by looking at how well they perform for different clinical conditions and various definitions of medically complex patients. The following subsections detail the patient groups that we use in evaluating the models.

CLINICAL CONDITION

Measures of clinical condition were generally based on information (diagnoses and procedure codes) from claims for the preceding hospital stay. When there was not a prior acute hospital stay within 30 days (such as the two-thirds of home health care stays that are admitted from the community), we used claims for the PAC stay.[10] For these stays, the Medicare Severity Diagnosis-Related Group assignment was simulated using diagnostic information from the PAC claim. For two clinical conditions, ventilator care and severe wound care, we based measures on information from the PAC claim instead of from a prior acute hospital stay claim to focus on the adequacy of payments for those with the condition observed during the PAC stay. Except for stays for patients with serious mental illness, the clinical condition groups are mutually exclusive, with stays first assigned to ventilator care, then severe wound care; all other stays are assigned to a major diagnosis category (MDC) based on the Medicare Severity Diagnosis-Related Group.

We report on the following clinical conditions:

- ventilator care
- severe wound care

- stroke
- other neurology medical—medical stays assigned to MDC 1, excluding stroke
- other neurology surgical—surgical stays assigned to MDC 1, excluding stroke
- orthopedic medical—medical stays assigned to MDC 8
- orthopedic surgical—surgical stays assigned to MDC 8
- respiratory medical—medical stays assigned to MDC 4
- respiratory surgical—surgical stays assigned to MDC 4
- cardiovascular medical—medical stays assigned to MDC 5
- cardiovascular surgical—surgical stays assigned to MDC 5
- infection medical—medical stays assigned to MDC 18
- infection surgical—surgical stays assigned to MDC 18
- hematology medical—medical stays assigned to MDC 16 or 17
- hematology surgical—surgical stays assigned to MDC 16 or 17
- rehabilitation medical—medical stays assigned diagnosis-related groups 945 or 946
- skin medical—medical stays assigned to MDC 9
- skin surgical—surgical stays assigned to MDC 9
- serious mental illness—includes stays for beneficiaries with schizophrenia, bipolar disorder, or severe depression, identified using the hierarchical condition category indicators 57 or 58 in the PAC or preceding hospital stay. This group is not mutually exclusive with the other clinical groups; a stay can be assigned to another clinical group and to the serious mental illness group.
- kidney and urinary tract medical—medical stays assigned to MDC 11
- liver medical—medical stays assigned to MDC 7
- digestive medical—medical stays assigned to MDC 6
- endocrine medical—medical stays assigned to MDC 10
- mental illness medical—medical stays assigned to MDC 19
- alcohol and drug use medical—medical stays assigned to MDC 20
- HIV medical—medical stays assigned to MDC 25

- other medical—medical stays not otherwise grouped (including eye and ear, reproductive, and other factors influencing health)
- other surgical—surgical stays not otherwise grouped (including liver, gastrointestinal, or endocrine)

A small number of cases that could not be assigned as medical or surgical were dropped from the analysis.

In addition, we report groups with the following clinical conditions (these groups are not mutually exclusive and may overlap with other conditions):

- cancer—stays with cancer as primary reason for treatment
- transplant—stays with transplant as primary reason for treatment
- kidney and urinary—stays assigned to MDC 11
- gastrointestinal or hepatobiliary—stays with primary reason for treatment as GI, liver, or pancreatic (MS-DRG in ranges 326–358; 368–395; 405–425; 432–446)
- vision impairment in the PAC or preceding hospital stay
- urinary incontinence in the PAC
- trauma—stays with a PAC Clinical Classifications Software Refined (CCSR) trauma code, an IRF rehabilitation impairment trauma code, or an MS-DRG for the prior hospitalization indicating trauma

MEDICAL COMPLEXITY AND IMPAIRMENT

To further evaluate stays, we examine groups of medically complex patients or those with impairments who meet the following conditions:

- health conditions affecting multiple body systems: patients in institutional settings with secondary diagnoses involving five or more body systems
- chronically critically ill: patients who spent eight or more days in an intensive care or coronary care unit during the preceding hospital stay or are on a ventilator in the PAC setting
- severity of illness level 4: institutional PAC patients assigned to the highest-severity group using the All Patient Refined Diagnosis-Related Group, based on diagnostic information from the preceding hospital stay or proxied for patients admitted without a hospital stay

- impaired cognition: patients who were in a coma or had dementia or Alzheimer's disease
- patient frailty: patients in approximately the top and bottom quartile of the JEN Frailty Index
- total function score: stays in the bottom quartile, middle two quartiles, and top quartile in a 30-point total functional score (defined above) defined from full year of stays

OTHER STAY AND PATIENT CHARACTERISTICS

We also examined the following patient groups:

- therapy use: For home health episodes, the groups are defined by the number of therapy visits: zero, one to four, five to nine, and ten or more; for institutional PAC stays, the groups are the four quartiles of per-diem therapy costs.
- disabled based on original reason for entitlement
- fully dual-eligible for Medicare and Medicaid, partially dual-eligible, or received the Low-Income Subsidy under part D
- beneficiaries with end-stage renal disease
- age 85 or older

We also examined groups defined by the following stay characteristics:

- short stays: For institutional stays, patients with stays in the shortest decile for their setting (that is, less than or equal to six days for SNFs and IRFs, less than or equal to seven days for long-term care hospitals); for home health, 30-day episodes subject to the current low-utilization payment adjustment.
- community admissions: patients admitted from the community (with no hospital stay within the 30 days preceding the PAC stay, identified by the lack of a matching hospital claim)
- patients with a prior hospitalization within the 30 days preceding the PAC stay identified by a matching hospital claim

Outcomes for short stays are examined by setting, while those for community admissions and those with a recent hospitalization are examined separately for home health and for institutional stays.

PROVIDER CHARACTERISTICS

We also examine payment accuracy by provider characteristics:

- facility type: hospital-based, freestanding facilities
- ownership: nonprofit, for-profit, and government facilities
- low-volume provider: bottom decile of provider size within setting in full-year file
- low-income share for IRFs: quintiles of provider share among IRFs in full-year file
- IRF teaching facilities
- provider shares of duals/LIS: quintiles of provider share of duals or LIS patient stays within setting among April–September stays
- geographic location: frontier, metro, rural micropolitan, rural adjacent, rural nonadjacent, and urban or rural core-based statistical areas
- provider share of race/ethnicity groups: top decile within setting of proportion of stays with white non-Hispanic patients, black non-Hispanic patients, and patients of other race/ethnicities. Race/ethnicity is assigned using the RTI measure of race and ethnicity, which takes the beneficiary's name into account to assign persons to Hispanic and Asian categories. Cutoffs for bottom decile is based on facilities with at least 25 stays in the full year file.

In addition, we report the CMS region where the provider is located:

- region 1: CT, ME, MA, NH, RI, VT
- region 2: NJ, NY
- region 3: DC, DE, MD, PA, VA, WV
- region 4: AL, GA, FL, KY, MS, NC, SC, TN
- region 5: IL, IN, MI, MN, OH, WI
- region 6: AR, LA, OK, NM, TX
- region 7: IA, KS, MO, NE
- region 8: CO, MT, ND, SD, UT, WY
- region 9: AZ, CA, HI, NV
- region 10: AK, ID, OR, WA

Findings

In this section, we report on the regression models underlying the PAC PPS and provide estimates of the implied payment model's accuracy and expected impacts on payments for key subgroups. Results are presented for payment models with and without total functional score in the predictive model and an assumption that the systems would be implemented immediately and be budget neutral.

In addition, we present impacts for two other scenarios. In the first, the PAC PPS with function as a predictor is implemented immediately with a 5 percent reduction in pooled PAC payments. In the second, this PAC PPS with reduced payments is implemented over three years. We report the estimated impacts for the first of the three years.

Findings for the PAC PPS: Immediate Implementation of a Budget-Neutral Policy

In Appendix A, table A.3, we report the coefficients and standard errors from the Poisson regression models that underlie our primary simulation of the PAC PPS system. This model includes indicators of functional score as predictors. Coefficients are reported separately for models of routine plus therapy costs and models of NTA costs. The exponentiated coefficients provide multipliers for predicted costs associated with a one unit increase in the predictor.

The models of routine-plus-therapy costs are based on stays from both institutional and home health settings; the model of NTA costs is based on stays from institutional settings. The standard errors are clustered to account for the similarity of stays from the same provider. The prediction for each institutional stay is the sum of the predicted costs from the routine-plus-therapy and NTA cost models; the prediction for home health episodes is the predicted cost from the routine plus the therapy cost model.

Altogether, the model explains 54.3 percent of the variation in total costs across all settings. The relatively high share of variance explained stems largely from including the home health setting indicator in the model. The coefficient on the home health indicator in the routine-plus-therapy model implies that, all else equal, home health costs for routine and therapy are 15 percent of those of institutional settings (see the exponentiated coefficient).

As expected, we find a strong relationship between indicators of patient total functional score and both combined routine and therapy costs and non-therapy ancillary costs per stay after controlling for other stay and patient characteristics. (See the section of Appendix A, table A.3 labeled "Functional score.") For example, those with function scores less than six are estimated to have 49 percent higher

routine and ancillary costs and 25 percent higher non-therapy ancillary costs than those in the reference group with the highest functional scores. We reject the hypothesis that the coefficients on the function measures equal zero (p=0.0 in each model) and, as shown in Appendix A, table A.4, when we estimate the model excluding the four measures of function score, the R^2 statistic falls to 53.2.

The pattern of R^2 statistics obtained by estimating the payment model within each setting shows greater predictive power within LTCHs and IRFs than in HHAs and SNFs. The within-setting payment models explain 20 and 21 percent of the variation in LTCHs and IRFs, compared with 4 percent and 7 percent of the variation in SNFs and HHAs (data not shown). That the overall R^2 statistic is much higher than the within-setting R^2 statistics suggests that much of the predictive power comes from predicting the variation across settings and is consistent with the high R^2 resulting from including a control for home health in the routine/therapy regression model.

Average costs, predicted costs, current payments, and PAC PPS payments for the initial PAC PPS approach are reported in Appendix A, table A.5. The PAC PPS payments are based on the predictive model including total functional score as a predictor and assume immediate implementation of a budget-neutral system.

The overall payment-to-cost ratio is 1.14, that is, average PAC PPS payments are 14 percent higher than average costs. This high level of profitability matches the overall level of profitability of actual payments and is the result of assuming budget neutrality. As noted earlier, budget neutrality ensures that average PAC PPS payments are set equal to average actual 2019 payments.

In general, the ratios of PAC PPS payments to costs (i.e., profitability) are relatively even across the various patient and stay reporting groups. An interesting exception is cases with no or few therapy costs in home health (shown in Appendix A, table A.5, in the rows labeled "HHA, no therapy" and "HHA, 1–4 visits"), which would be considerably more profitable than home health stays with higher therapy costs under the modeled system. The payment-to-cost ratio for nontherapy home health cases is 1.85 as compared with ratios between 0.79 for home health stays with ten or more therapy visits.[11] Because the PAC PPS design does not consider the amount of therapy in establishing payments (because it is under the control of providers), it is not surprising that the design does not accurately predict the variation in costs with therapy as accurately as for other types of stays.[12] This would tend to be true for any measure of service provision, which, with a few exceptions, are not included among predictors by design.

The PAC PPS tends to shift payments toward SNFs and away from IRFs and LTCHs, as can be seen in the section "Provider characteristics" of table A.5 in Appendix A. The ratio of PAC PPS payments to

current payments is 1.07 for SNFs, 0.83 for IRFs, and 0.94 for LTCHs. These ratios are close to those found using 2017 data and reported in Wissoker and Garrett (2019). Home health payments would be reduced slightly less than in the earlier work.

Other notable differences in profitability and payments are observed for providers. We highlight a few cases that stand out. The findings show that chronically clinically ill LTCH stays are more profitable than LTCH stays overall, with a payment-to-cost ratio of 0.99 as compared with a ratio of 0.93 for all LTCH stays. In this sample, PAC PPS payments to hospital-based facilities would be lower than current payments (with a PAC PPS to current payment ratio of 0.97) and continue to be less profitable than freestanding facilities (with a payment-to-cost ratio of 0.92 compared with 1.17 for freestanding facilities).

In Appendix A, table A.6, we show that if function is not included as a predictor in the payment model, profitability under the PAC PPS would be substantially below average for patients with low functional ability and above average for patients with high functional ability. This can be seen in the section labeled "Frailty, cognitive function, mental illness and functional score. Patients with function in the lowest quartile have an average payment-to-cost ratio of 1.06, while patients with function in the highest quartile have an average payment-to-cost ratio of 1.31. By contrast, table A.5 in Appendix A shows that with functional score in the payment model, patients with function in the bottom and top quartiles have quite similar levels of profitability. These results are in line with those found in Garrett, Wissoker, and Skopec (2021) based on 2017 stays and functional score data that led to the decision to include function in the preferred payment model.

Distribution of Impacts on Payments

Next, we report the distribution of impacts on payments for stays and for providers. Table A.7 in Appendix A reports the distribution of the ratio of PAC PPS to current payments by stay reporting group. The columns indicate the size of the expected change in payments. Overall, we see that although the new system would be budget neutral, 19 percent of stays would be paid at least 25 percent less and 33 percent would be paid at least 25 percent more.

These results show there is substantial variation in impacts across stays. For example, in table A.5 in Appendix A we see that payments increase by one percent for home health episodes without therapy visits. In table A.7, we see that 16 percent of these episodes would be paid at least 25 percent less and 40 percent paid 25 percent more.

In Appendix A, table A.8 reports the distribution of the ratio of the percentage change in payments under a PAC PPS by provider groups. The percentage change in payments for each provider is calculated as the ratio of total PAC PPS payments to total current payments. The distributions are reported for the provider reporting groups used in earlier tables. Only providers with at least 20 stays are included in the reported distributions.

Overall, as seen in the "all providers" row, 21 percent of providers with at least 20 stays have a decrease in payments of at least 10 percent, while 33 percent of providers have an increase of at least 10 percent. These patterns vary dramatically by setting. For HHAs, where impacts are set to be close to one, the distribution is roughly symmetric, with 12 percent having at least a 10 percent increase and 12 percent having at least a 10 percent decrease in payments. Among IRFs, the finding is quite unbalanced with 78 percent of IRFs having a decrease of at least 10 percent and less than 1 percent with an increase of at least 10 percent. Among SNFs and LTCHs, the distribution is a bit more balanced: Among SNFs, 51 percent have an increase of at least 10 percent as compared with 22 percent with a decrease of 10 percent; among LTCHs, 34 percent have a decrease of 10 percent as compared with 9 percent with an increase of at least 10 percent.

In Appendix A, table A.9 we describe how the changes in payments from implementation of the PAC PPS are estimated to vary with the relative current profitability of facilities. Relative profitability of a provider is the provider's profitability divided by the average profitability in the setting. The table reports the counts of facilities for combinations of ranges of impacts and relative profitability. Facilities with below average current relative profitability tend to get an increase in payments with the PAC PPS while those with above average profitability tend to get a decrease in payments.

Findings: Immediate Implementation of PAC PPS Payments with a 5 Percent Reduction

Overall, a 5 percent reduction in overall payments leads to a reduction in the payment to cost ratio from 1.14 to 1.08 (see Appendix A, table A.10). The reduction is comparable in each of the four settings. Home health payment-to-cost ratios fall from 1.15 to 1.09, the SNF ratio falls from 1.22 to 1.15, the IRF ratio from 0.83 to 0.78, and the LTCH ratio from 0.94 to 0.90. The payment cut falls nearly evenly across settings, with a 5 percent reduction in payments for home health, a 5.0 to 5.1 percent reduction for SNFs and IRFs and a 4.1 percent reduction for LTCHs. The variation in the reduction across settings results from differential effects of the payment cut on outlier payments across the institutional settings. More details and findings by group of providers are reported in table A.10 in Appendix A.

Findings: Phased-in Implementation of PAC PPS Payments with a 5 Percent Reduction

The simulation of the first year of a three-year implementation of the PAC PPS with a 5 percent reduction works as expected. We assume that payments in the first year of transition are a blend of one-third of the PAC PPS payments and two-thirds of current PPS payments. As can be seen in Appendix A, table A.11, with a three-year transition, payments differ from actual payments by one-third as much as with the immediate implementation and a 5 percent reduction shown in table A.10. As a result, the payment-to-cost ratios also change from those observed with actual payments by one third as much as with an immediate implementation. For example, for all stays the payment-to-cost ratio in this simulation is 1.12—this is simply one third of the change from the payment-to-cost ratio based on actual payments (1.14) and the ratio with an immediate implementation of the 5 percent reduction (1.08).

Conclusion

In this report, we have provided additional methodological detail and data analyses used in the MedPAC report to Congress on a unified payment system for post-acute care. The implications of these findings for the design of a unified payment system, as well as likely impacts of moving from the current setting-specific prospective payment system to a unified payment system, are discussed in MedPAC's forthcoming 2023 report to Congress (MedPAC, forthcoming).

Appendix A. Payment Models and Impacts

TABLE A.1

Disposition of Full Year Stays for Post-Acute Files, Payment Year 2019

Disposition	Home health	Skilled nursing facility	Inpatient rehabilitation facility	Long-term care hospital	All
Included in annual sample	**8,425,034**	**1,729,668**	**379,845**	**80,731**	**10,615,278**
Two stays with same start date	1,209	489	218	27	1,943
Health maintenance organization/MA coverage	308,094	93,944	14,203	4,096	420,337
Long length of stay	0	718	230	11	959
No ratio of costs to charges	0	3,360	2,654	14	6,028
Common Medicare Environment record missing	114	0	0	0	114
No cost report	0	82,910	6,149	4,966	94,025
No charges reported	0	6,472	127	1,232	7,831
No MEDPAR record for LTCH stays	0	0	0	2,570	2,570
MSDRG group not assigned	183	107	5	4	299
No provider of service record	724	0	0	0	724
No payment or zero length of stay	0	119,830	4,395	885	125,110
No risk score	48	6	10	2	66
No routine costs	0	13,974	0	0	13,974
No wage index	0	100	0	0	100
Records missing due to file error	37	0	0	0	37
Facility located in US Territory	8,728	0	489	0	9,217
Patient is a minor	0	2	0	0	2
Data from the wrong year	0	51	29	0	80
Total	**8,744,171**	**2,051,631**	**408,354**	**94,538**	**11,298,694**

Sources: 2018–2019 Medicare post-acute care claims and assessments, Medicare 2019 risk score file, and Medicare cost reports for 2019.

Notes: Skilled nursing facility, inpatient rehabilitation facility, and long-term care hospital claims are for stays beginning between October 2018 and September 2019; the home health claims are for 60-day episodes that ended between January and December 2019. MA=Medicare Advantage.

TABLE A.2

Description and Sources of Model Predictors

	Model Predictors	
Characteristic	**Stay predictor**	**Source**
ProAge	Age at start of PAC stay, restricted to between 50 and 95: Age minus 50, (Age minus 50)^2, and indicator for age less than 50	CMS-HCC risk score file
Cognitive function	Dementia with and without comorbidities (HCC51 and HCC52) and coma	Based on diagnoses from prior hospital stay and current PAC stay; measures other than coma assigned using PACE/ESRD HCCs definitions
Mental health	Schizophrenia (HCC57) and major depressive disorder, bipolar disorder, paranoid disorder (HCC58)	Based on diagnoses from prior hospital stay and current PAC stay; measures other than coma assigned using PACE/ESRD HCCs definitions
Frailty	Components of JEN Frailty Index included are minor ambulatory limitations; severe ambulatory limitations; cognitive developmental disability; chronic mental illness; dementia; sensory disorders; self-care impairment; syncope; cancer; chronic medical disease; pneumonia; renal disorders; other systemic disorders (e.g., septicemia)	Based on diagnoses from prior hospital stay and current PAC stay; calculated using ICD-10-based JEN program from Westat.
Primary reason for treatment	MSDRGs were assigned to broad categories[a]	From prior hospital stay MSDRG if available; used PAC stay to proxy MSDRG if no prior stay found. Groupings exclude current ventilator cases
Ventilator care	Patient was on a ventilator during PAC stay	PAC diagnosis
Patient comorbidities	Comorbidities	Prior hospital stay and PAC stay secondary diagnoses combined to 22 groups of CMS-HCC PACE/ESRD categories. Respirator dependence is measured only in PAC stay.

	Model Predictors	
Characteristic	**Stay predictor**	**Source**
Treatments and impairments	Indicators of bowel incontinence, continuous positive airflow pressure in institutional setting, urinary incontinence, vision impairment, difficulty swallowing, with tracheostomy	PAC diagnoses; vision from PAC and prior hospital stay diagnoses
Risk score	Risk score and squared risk score	2019 CMS-HCC risk score
Total number of ICU and CCU days	Total number of ICU and CCU days (capped at 15)	From prior hospital stay claim
Severity level	APRDRG severity levels 1–4. Indicators for levels 2, 3, and 4	Stay assigned to APRDRG severity of illness levels 1–4 using claim from prior hospital stay (or proxied if no prior hospital stay within 30 days was found)
Severe wound	Includes nonhealing surgical wound, wound for a patient who is morbidly obese, fistula, osteomyelitis, or patient with a stage III, stage IV, or an unstageable pressure wound	PAC diagnoses
Number of body systems ≥ 5	Secondary diagnoses include five or more body systems and stay is in institutional setting	Count of comorbidities from prior hospital stay and PAC stay
Disabled	Original reason for entitlement is disabled	Medicare enrollment file
Function score	Indicators of total functional score between [0,6), [6,12), [12,18), [18,24);	Composite of measures at admission of six assessment items: ability to perform toileting hygiene, bathe/wash, roll left/right, walk 10 feet, transfer from sit to lying, and transfer from sit to stand. Assessments with refusals and not attempted due to environmental limitations are excluded with the score increased to maintain the scale of 30 points.
Home health agency patient	Patient treated by a home health agency	Home health claim

Notes: PAC = post-acute care. CMS HCC = Centers for Medicare & Medicaid Services Hierarchical Condition Category. PACE = Programs of All-Inclusive Care for the Elderly. ESRD = end-stage renal disease. MSDRG = Medicare Severity Diagnosis-Related Groups. ICU = intensive care unit. CCU = coronary care unit. APRDRG = All Patients Refined Diagnosis-Related Groups. Frailty indicators are the 13 components of the JEN Frailty index. Comorbidity groups are alcohol or drug disease; cancer; cardiac and vascular; complications of device or graft; dementia; eye disorders; gastrointestinal and liver; head and spine; hematologic and immunologic disease; HIV/AIDS; mental illness; metabolic endocrine; neurological, excluding stroke; obesity; orthopedic; renal; respirator dependence; respiratory; septicemia and other systemic infection; skin disorders; stroke; and transplant.

[a] Broad groups for primary reason for treatment are stroke; neurological surgical; neurological medical; respiratory with tracheostomy or ventilator care; respiratory surgical; respiratory medical; chronic obstructive pulmonary disease; cardiovascular surgical; cardiac medical; orthopedic spinal; orthopedic surgical; orthopedic medical; skin surgical; skin medical; endocrine and metabolic surgical; endocrine and metabolic medical; kidney and urinary surgical; kidney and urinary medical; infections surgical; infections medical (except septicemia); infections including septicemia; transplant; gastrointestinal surgical; gastrointestinal medical; liver and pancreas medical; liver and pancreas surgical; hematology (except cancer) surgical; hematology (except cancer) medical; cancer surgical; cancer medical; trauma, injury, and burns surgical; trauma, injury, and burns medical; mental medical; alcohol and drug abuse; HIV; male reproductive medical; female reproductive medical; other surgery; and other medical.

TABLE A.3

Models of Costs per Stay Including Total Functional Score, based on April–September 2019 PAC Stays with Function Data

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)
Age minus 50 (age restricted to 50–95)								
Age minus 50	0.002	0.0003	5.46	1.002	-0.002	0.0009	-2.63	0.998
Age minus 50 squared	-0.000014	0.00001	-2.37	1.000	-0.000189	0.00002	-11.78	1.000
Age less than 50	0.006	0.0062	0.94	1.006	0.084	0.0161	5.22	1.088
Cognitive function								
Coma	-0.051	0.0091	-5.59	0.950	-0.040	0.0199	-2.00	0.961
Dementia with and without complications (HCC51 and HCC52)	-0.067	0.0105	-6.36	0.935	0.030	0.0334	0.90	1.031
Schizophrenia (HCC57)	0.076	0.0082	9.20	1.079	0.035	0.0201	1.74	1.036
Major depressive, bipolar, and paranoid disorders (HCC58)	-0.006	0.0088	-0.67	0.994	-0.015	0.0269	-0.57	0.985
Frailty (JEN Frailty Index components)								
Minor ambulatory limitations	0.045	0.0038	11.65	1.046	-0.095	0.0280	-3.38	0.910
Severe ambulatory limitations	0.094	0.0019	49.70	1.099	-0.047	0.0063	-7.37	0.954
Cognitive developmental disorder	-0.006	0.0079	-0.82	0.994	-0.077	0.0224	-3.44	0.926
Chronic mental illness	0.011	0.0018	6.03	1.011	0.037	0.0068	5.42	1.037
Dementia	0.047	0.0050	9.39	1.048	-0.045	0.0113	-4.03	0.956
Sensory disorders	0.021	0.0033	6.15	1.021	-0.047	0.0077	-6.02	0.954
Self-care impairment	0.026	0.0017	15.88	1.027	0.048	0.0060	7.96	1.049
Syncope	0.039	0.0022	17.54	1.040	0.022	0.0076	2.90	1.022
Cancer	-0.059	0.0049	-12.08	0.943	-0.086	0.0150	-5.78	0.917
Chronic medical disease	0.005	0.0019	2.79	1.005	0.081	0.0062	13.06	1.084

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)
Pneumonia	0.014	0.0027	5.25	1.014	0.104	0.0079	13.08	1.109
Renal disorders	-0.004	0.0040	-1.00	0.996	-0.017	0.0110	-1.50	0.984
Systemic disorders (e.g., septicemia)	0.032	0.0016	19.93	1.033	0.093	0.0043	21.61	1.098
Primary reason for treatment[a]								
Stroke	0.158	0.0055	28.89	1.171	0.011	0.0108	1.03	1.011
Neurological surgical	0.163	0.0070	23.15	1.177	0.069	0.0157	4.38	1.071
Neurological medical	-0.001	0.0036	-0.25	0.999	-0.059	0.0098	-6.08	0.942
Respiratory with trach/vent	0.058	0.0089	6.48	1.059	0.172	0.0210	8.19	1.188
Respiratory surgical	-0.074	0.0108	-6.82	0.929	0.054	0.0280	1.95	1.056
Respiratory medical	-0.107	0.0038	-27.93	0.898	-0.096	0.0095	-10.18	0.908
COPD	-0.070	0.0051	-13.72	0.932	0.052	0.0135	3.87	1.054
Cardiovascular surgical	-0.072	0.0043	-16.66	0.930	-0.088	0.0102	-8.63	0.916
Cardiac medical	-0.100	0.0035	-28.91	0.905	-0.155	0.0097	-16.04	0.856
Orthopedic spinal	0.022	0.0066	3.29	1.022	-0.055	0.0130	-4.23	0.947
Orthopedic medical	0.016	0.0032	4.98	1.016	-0.007	0.0072	-0.99	0.993
Skin surgical	0.024	0.0108	2.26	1.025	0.233	0.0346	6.73	1.262
Skin medical	-0.062	0.0046	-13.46	0.940	-0.071	0.0137	-5.15	0.932
Endocrine and metabolic surgical	0.058	0.0089	6.48	1.059	0.264	0.0223	11.87	1.302
Endocrine and metabolic medical	-0.074	0.0108	-6.82	0.929	-0.162	0.0109	-14.82	0.850
Kidney and urinary surgical	-0.107	0.0038	-27.93	0.898	-0.138	0.0262	-5.26	0.871
Kidney and urinary medical	-0.070	0.0051	-13.72	0.932	-0.279	0.0086	-32.32	0.757
Infections surgical	-0.072	0.0043	-16.66	0.930	0.137	0.0142	9.71	1.147
Infections medical, except septicemia	-0.100	0.0035	-28.91	0.905	0.174	0.0304	5.72	1.190
Infections septicemia	0.022	0.0066	3.29	1.022	-0.196	0.0121	-16.17	0.822
Transplant	0.016	0.0032	4.98	1.016	0.425	0.0732	5.80	1.529
GI surgical	0.024	0.0108	2.26	1.025	-0.037	0.0199	-1.84	0.964
GI medical	-0.062	0.0046	-13.46	0.940	-0.194	0.0113	-17.17	0.824
Liver and pancreas medical	0.058	0.0089	6.48	1.059	-0.133	0.0310	-4.30	0.875
Liver and pancreas surgical	-0.074	0.0108	-6.82	0.929	-0.177	0.0178	-9.98	0.838
Hematology, except cancer surgical	-0.107	0.0038	-27.93	0.898	-0.285	0.0742	-3.84	0.752
Hematology, except cancer medical	-0.070	0.0051	-13.72	0.932	-0.214	0.0182	-11.75	0.807
Cancer surgical	-0.072	0.0043	-16.66	0.930	-0.090	0.0530	-1.69	0.914
Cancer medical	-0.169	0.0127	-13.27	0.844	-0.197	0.0368	-5.35	0.821

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)
Trauma, injury, and burns surgical	0.084	0.0084	9.94	1.087	0.152	0.0246	6.19	1.165
Trauma, injury, and burns medical	-0.046	0.0070	-6.65	0.955	-0.117	0.0178	-6.58	0.890
Mental medical	-0.042	0.0083	-5.03	0.959	-0.133	0.0383	-3.47	0.875
Alcohol and drug abuse	-0.177	0.0154	-11.44	0.838	-0.612	0.0315	-19.41	0.542
HIV	-0.016	0.0314	-0.51	0.984	0.017	0.0609	0.28	1.017
Male reproductive medical	-0.113	0.0145	-7.81	0.893	-0.166	0.0428	-3.88	0.847
Female reproductive medical	-0.162	0.0209	-7.75	0.850	-0.269	0.0544	-4.95	0.764
Other surgery	-0.020	0.0072	-2.80	0.980	0.074	0.0198	3.75	1.077
Other medical	-0.035	0.0045	-7.83	0.965	-0.014	0.0133	-1.08	0.986
Ventilator in post-acute care	0.635	0.0164	38.63	1.887	1.424	0.0309	46.03	4.154
Comorbidities								
Alcohol or drug disease	-0.019	0.0042	-4.52	0.981	-0.088	0.0114	-7.72	0.916
Cancer	-0.006	0.0048	-1.29	0.994	-0.034	0.0150	-2.29	0.966
Cardiac and vascular	0.015	0.0015	9.51	1.015	0.116	0.0050	22.97	1.123
Complications of device or graft	0.023	0.0039	6.02	1.023	0.199	0.0106	18.77	1.221
Dementia	0.005	0.0094	0.56	1.005	-0.075	0.0315	-2.39	0.927
Eye disorders	0.000	0.0118	-0.03	1.000	-0.069	0.0380	-1.82	0.933
GI and liver	0.020	0.0028	7.32	1.020	0.133	0.0091	14.51	1.142
Head and spine	0.076	0.0049	15.61	1.079	0.072	0.0112	6.46	1.075
Hematologic and immunologic disease	0.015	0.0025	5.94	1.015	0.058	0.0083	6.93	1.059
HIV/AIDS	0.027	0.0135	2.01	1.027	0.334	0.0352	9.47	1.396
Mental illness	-0.005	0.0090	-0.56	0.995	-0.117	0.0276	-4.24	0.890
Metabolic endocrine	0.025	0.0016	15.54	1.025	0.211	0.0055	38.32	1.236
Neurological, excluding stroke	0.033	0.0017	19.30	1.034	0.088	0.0055	16.03	1.092
Obesity	0.035	0.0026	13.46	1.036	0.091	0.0083	10.98	1.095
Orthopedic	0.052	0.0035	14.96	1.054	0.020	0.0089	2.28	1.021
Renal	0.001	0.0041	0.25	1.001	0.077	0.0108	7.14	1.080
Respirator dependence	0.190	0.0141	13.51	1.209	0.285	0.0263	10.83	1.330
Respiratory	-0.005	0.0017	-2.97	0.995	0.188	0.0058	32.36	1.207
Septicemia and other systemic infection	0.027	0.0043	6.35	1.028	0.095	0.0114	8.35	1.100
Skin disorders	0.056	0.0026	21.28	1.057	0.130	0.0076	17.07	1.138
Stroke	0.024	0.0027	8.97	1.024	0.021	0.0072	2.87	1.021
Transplant	0.064	0.0102	6.20	1.066	0.135	0.0297	4.54	1.145

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)
Functional score								
0 to 5.999	0.399	0.0060	66.58	1.491	0.223	0.0286	7.78	1.249
6 to 11.999	0.382	0.0056	68.16	1.465	0.130	0.0253	5.15	1.139
12 to 17.999	0.230	0.0053	43.03	1.258	-0.044	0.0251	-1.75	0.957
18 to 23.999	0.113	0.0046	24.46	1.119	-0.136	0.0232	-5.83	0.873
Treatments and impairments								
Bowel incontinence	0.159	0.0106	15.02	1.173	0.197	0.0295	6.67	1.218
Urinary incontinence	0.093	0.0052	17.84	1.097	0.130	0.0113	11.47	1.139
Vision impairment	-0.009	0.0048	-1.93	0.991	0.052	0.0160	3.25	1.053
Continuous positive airflow pressure	0.443	0.0151	29.35	1.558	0.999	0.0265	37.64	2.715
Swallowing	0.082	0.0029	28.05	1.085	-0.058	0.0111	-5.22	0.943
Tracheostomy	-0.086	0.0220	-3.90	0.918	-0.023	0.0346	-0.66	0.977
Risk score	-0.016	0.0008	-19.98	0.984	0.039	0.0023	16.87	1.040
Risk score squared	0.000	0.0001	7.19	1.000	-0.002	0.0002	-11.82	0.998
Total number of ICU and CCU days (capped)	0.002	0.0004	4.69	1.002	0.008	0.0011	7.83	1.008
Severity level								
Two	0.024	0.0019	12.53	1.024	0.098	0.0069	14.14	1.102
Three	-0.001	0.0026	-0.20	0.999	0.118	0.0079	14.90	1.125
Four	-0.015	0.0034	-4.40	0.985	0.174	0.0101	17.25	1.190
Wound care								
Pressure ulcer, stage III	0.133	0.0071	18.81	1.142	0.184	0.0177	10.40	1.202
Pressure ulcer, stage IV	0.202	0.0105	19.26	1.224	0.404	0.0183	22.13	1.498
Pressure ulcer, unstageable	0.051	0.0071	7.21	1.053	0.126	0.0182	6.93	1.135
Wound with morbid obesity	0.051	0.0092	5.55	1.052	0.041	0.0198	2.06	1.042
Fistula	0.236	0.0178	13.26	1.266	0.557	0.0325	17.12	1.745
Nonhealing surgical wound	0.178	0.0081	21.93	1.195	0.455	0.0236	19.30	1.576
Number of body systems ≥ 5	-0.018	0.0025	-7.11	0.983	0.029	0.0074	3.96	1.030
Disabled	-0.017	0.0019	-8.56	0.984	-0.020	0.0059	-3.35	0.980
Home health agency patient	-1.867	0.0060	-312.29	0.155				
Constant	8.954	0.0102	876.22	7740.247	6.949	0.0455	152.72	1042.317

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)
Sample size	3,692,064				1,053,039			
Combined Routine+Therapy and NTA model R^2	0.543							

Sources: 2019 Medicare acute hospital and post-acute care claims and assessments, Medicare 2019 risk score file, and Medicare cost reports for 2019.
Notes: PAC = post-acute care. COPD = chronic obstructive pulmonary disease. GI = gastrointestinal. ICU = intensive care unit. CCU = coronary care unit. Models estimated using Poisson regression. Standard errors are clustered by provider. Data are all stays that began between April and September 2019 and had the CARE function variables on a matched assessment. Routine and therapy costs model is based on data from home health and institutional settings; the model of nontherapy ancillary costs is based only on data from institutional settings.
[a] Orthopedic surgery is the omitted group.

TABLE A.4

Models of Costs per Stay Excluding Total Functional Score, based on April–September 2019 PAC Stays with Function Data

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)
Age minus 50 (age restricted to 50–95)								
Age minus 50	0.003	0.0004	7.20	1.003	-0.002	0.0009	-1.94	0.998
Age minus 50 squared	-0.000002	0.00001	-0.32	1.000	-0.00018	0.00002	-11.11	1.000
Age less than 50	0.006	0.0062	0.98	1.006	0.082	0.0161	5.10	1.086
Cognitive function								
Coma	-0.065	0.0091	-7.15	0.937	-0.052	0.0201	-2.58	0.949
Dementia with and without complications (HCC51 and HCC52)	-0.029	0.0105	-2.77	0.971	0.062	0.0334	1.86	1.064
Schizophrenia (HCC57)	0.065	0.0083	7.80	1.067	0.037	0.0204	1.82	1.038
Major depressive, bipolar, and paranoid disorders (HCC58)	-0.015	0.0089	-1.64	0.986	-0.018	0.0272	-0.66	0.982

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	**Coefficient**	**Cluster robust standard error**	**t-statistic**	**Exp (coef)**	**Coefficient**	**Cluster robust standard error**	**t-statistic**	**Exp (coef)**
Frailty (JEN Frailty Index components)								
Minor ambulatory limitations	0.052	0.0039	13.49	1.054	-0.094	0.0283	-3.33	0.910
Severe ambulatory limitations	0.118	0.0019	60.77	1.126	-0.021	0.0060	-3.55	0.979
Cognitive developmental disorder	0.026	0.0079	3.27	1.026	-0.042	0.0220	-1.90	0.959
Chronic mental illness	0.009	0.0018	4.80	1.009	0.033	0.0069	4.84	1.034
Dementia	0.047	0.0050	9.28	1.048	-0.047	0.0113	-4.15	0.954
Sensory disorders	0.014	0.0034	4.24	1.014	-0.053	0.0079	-6.67	0.949
Self-care impairment	0.030	0.0017	17.85	1.031	0.055	0.0059	9.21	1.056
Syncope	0.034	0.0023	14.82	1.034	0.015	0.0078	1.92	1.015
Cancer	-0.062	0.0049	-12.65	0.940	-0.089	0.0150	-5.95	0.915
Chronic medical disease	0.000	0.0020	-0.09	1.000	0.074	0.0062	11.88	1.077
Pneumonia	0.016	0.0027	5.79	1.016	0.108	0.0081	13.30	1.114
Renal disorders	-0.008	0.0041	-2.07	0.992	-0.021	0.0111	-1.87	0.979
Systemic disorders (e.g., septicemia)	0.043	0.0016	26.07	1.044	0.108	0.0045	23.82	1.114
Primary reason for treatment[a]								
Stroke	0.113	0.0055	20.64	1.120	-0.033	0.0108	-3.08	0.967
Neurological surgical	0.119	0.0071	16.80	1.127	0.027	0.0157	1.71	1.027
Neurological medical	-0.023	0.0036	-6.22	0.978	-0.091	0.0098	-9.31	0.913
Respiratory with trach/vent	0.028	0.0090	3.08	1.028	0.146	0.0211	6.90	1.157
Respiratory surgical	-0.117	0.0109	-10.70	0.890	0.008	0.0280	0.28	1.008
Respiratory medical	-0.138	0.0039	-35.76	0.871	-0.131	0.0092	-14.29	0.877
COPD	-0.117	0.0051	-22.80	0.890	-0.012	0.0129	-0.92	0.988
Cardiovascular surgical	-0.114	0.0044	-26.22	0.892	-0.137	0.0100	-13.78	0.872
Cardiac medical	-0.138	0.0034	-40.27	0.871	-0.202	0.0088	-22.95	0.817
Orthopedic spinal	0.015	0.0067	2.16	1.015	-0.070	0.0132	-5.33	0.932
Orthopedic medical	0.004	0.0032	1.31	1.004	-0.017	0.0073	-2.40	0.983
Skin surgical	-0.005	0.0109	-0.45	0.995	0.219	0.0347	6.29	1.244
Skin medical	-0.075	0.0045	-16.58	0.927	-0.094	0.0135	-6.98	0.910
Endocrine and metabolic surgical	-0.016	0.0092	-1.74	0.984	0.205	0.0218	9.42	1.228
Endocrine and metabolic medical	-0.123	0.0044	-28.04	0.885	-0.205	0.0113	-18.22	0.814
Kidney and urinary surgical	-0.148	0.0083	-17.87	0.863	-0.171	0.0256	-6.66	0.843
Kidney and urinary medical	-0.138	0.0038	-35.92	0.871	-0.300	0.0085	-35.20	0.740
Infections surgical	-0.009	0.0068	-1.25	0.9 92	0.109	0.0143	7.62	1.115

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	**Coefficient**	**Cluster robust standard error**	**t-statistic**	**Exp (coef)**	**Coefficient**	**Cluster robust standard error**	**t-statistic**	**Exp (coef)**
Infections medical, except septicemia	-0.099	0.0104	-9.54	0.906	0.137	0.0307	4.47	1.147
Infections septicemia	-0.181	0.0054	-33.78	0.835	-0.228	0.0123	-18.52	0.796
Transplant	0.121	0.0347	3.49	1.129	0.359	0.0747	4.80	1.431
GI surgical	-0.116	0.0059	-19.61	0.890	-0.081	0.0194	-4.16	0.922
GI medical	-0.168	0.0042	-40.29	0.845	-0.227	0.0109	-20.87	0.797
Liver and pancreas medical	-0.170	0.0107	-15.93	0.843	-0.177	0.0314	-5.63	0.838
Liver and pancreas surgical	-0.244	0.0071	-34.32	0.784	-0.222	0.0170	-13.02	0.801
Hematology, except cancer surgical	-0.215	0.0380	-5.66	0.806	-0.325	0.0751	-4.33	0.723
Hematology, except cancer medical	-0.164	0.0074	-22.28	0.848	-0.247	0.0185	-13.35	0.781
Cancer surgical	-0.105	0.0224	-4.69	0.900	-0.121	0.0533	-2.26	0.886
Cancer medical	-0.197	0.0127	-15.48	0.821	-0.224	0.0369	-6.09	0.799
Trauma, injury, and burns surgical	0.076	0.0086	8.86	1.079	0.141	0.0246	5.74	1.151
Trauma, injury, and burns medical	-0.081	0.0071	-11.47	0.922	-0.157	0.0173	-9.09	0.854
Mental medical	-0.092	0.0083	-11.06	0.912	-0.181	0.0390	-4.65	0.834
Alcohol and drug abuse	-0.236	0.0158	-14.92	0.790	-0.672	0.0315	-21.32	0.511
HIV	-0.058	0.0316	-1.83	0.944	-0.011	0.0605	-0.18	0.989
Male reproductive medical	-0.134	0.0146	-9.19	0.875	-0.191	0.0430	-4.44	0.826
Female reproductive medical	-0.171	0.0209	-8.22	0.843	-0.267	0.0540	-4.94	0.766
Other surgery	-0.051	0.0072	-7.04	0.950	0.044	0.0198	2.24	1.045
Other medical	-0.064	0.0045	-14.14	0.938	-0.046	0.0133	-3.42	0.955
Ventilator in post-acute care	0.635	0.0167	38.08	1.886	1.444	0.0314	45.92	4.237
Comorbidities								
Alcohol or drug disease	-0.036	0.0043	-8.30	0.965	-0.104	0.0114	-9.11	0.901
Cancer	-0.009	0.0048	-1.80	0.991	-0.039	0.0149	-2.64	0.961
Cardiac and vascular	0.017	0.0016	10.64	1.017	0.119	0.0050	23.61	1.126
Complications of device or graft	0.030	0.0038	7.80	1.030	0.209	0.0105	19.88	1.232
Dementia	-0.004	0.0094	-0.41	0.996	-0.076	0.0313	-2.42	0.927
Eye disorders	-0.011	0.0119	-0.96	0.989	-0.084	0.0385	-2.17	0.920
GI and liver	0.030	0.0028	10.74	1.030	0.146	0.0090	16.22	1.157
Head and spine	0.109	0.0049	22.29	1.116	0.104	0.0115	9.03	1.110
Hematologic and immunologic disease	0.013	0.0025	5.14	1.013	0.055	0.0083	6.59	1.056
HIV/AIDS	0.017	0.0136	1.23	1.017	0.324	0.0354	9.15	1.382
Mental illness	0.004	0.0091	0.41	1.004	-0.114	0.0278	-4.10	0.892

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	**Coefficient**	**Cluster robust standard error**	**t-statistic**	**Exp (coef)**	**Coefficient**	**Cluster robust standard error**	**t-statistic**	**Exp (coef)**
Metabolic endocrine	0.028	0.0016	17.64	1.029	0.216	0.0056	38.27	1.241
Neurological, excluding stroke	0.041	0.0017	23.90	1.042	0.095	0.0055	17.29	1.099
Obesity	0.058	0.0026	21.98	1.059	0.118	0.0077	15.20	1.125
Orthopedic	0.067	0.0035	19.10	1.069	0.034	0.0088	3.83	1.034
Renal	0.003	0.0041	0.74	1.003	0.078	0.0109	7.15	1.081
Respirator dependence	0.206	0.0143	14.41	1.228	0.306	0.0270	11.32	1.358
Respiratory	-0.012	0.0017	-6.79	0.988	0.180	0.0060	30.23	1.197
Septicemia and other systemic infection	0.035	0.0044	8.07	1.036	0.105	0.0118	8.89	1.111
Skin disorders	0.085	0.0026	32.38	1.088	0.163	0.0081	20.14	1.177
Stroke	0.038	0.0027	14.05	1.039	0.036	0.0075	4.78	1.036
Transplant	0.050	0.0103	4.84	1.051	0.119	0.0300	3.96	1.126
Functional score								
0 to 5.999	0.399	0.0060	66.58	1.491	0.223	0.0286	7.78	1.249
6 to 11.999	0.382	0.0056	68.16	1.465	0.130	0.0253	5.15	1.139
12 to 17.999	0.230	0.0053	43.03	1.258	-0.044	0.0251	-1.75	0.957
18 to 23.999	0.113	0.0046	24.46	1.119	-0.136	0.0232	-5.83	0.873
Treatments and impairments								
Bowel incontinence	0.185	0.0107	17.38	1.204	0.219	0.0307	7.14	1.245
Urinary incontinence	0.105	0.0052	20.17	1.111	0.137	0.0114	12.03	1.147
Vision impairment	-0.001	0.0048	-0.14	0.999	0.060	0.0163	3.67	1.062
Continuous positive airflow pressure	0.462	0.0153	30.14	1.587	1.022	0.0272	37.64	2.779
Swallowing	0.113	0.0029	38.86	1.120	-0.023	0.0101	-2.29	0.977
Tracheostomy	-0.082	0.0222	-3.69	0.922	-0.015	0.0346	-0.44	0.985
Risk score	-0.011	0.0008	-13.83	0.989	0.042	0.0024	17.97	1.043
Risk score squared	0.0003	0.0001	4.58	1.000	-0.002	0.0002	-12.33	0.998
Total number of ICU and CCU days (capped)	0.003	0.0005	6.25	1.003	0.009	0.0011	8.31	1.009
Severity level								
Two	0.028	0.0019	14.58	1.028	0.104	0.0070	14.75	1.109
Three	0.007	0.0027	2.77	1.007	0.132	0.0082	16.23	1.142
Four	0.001	0.0035	0.33	1.001	0.202	0.0102	19.77	1.224
Wound care								

	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
Predictor	**Coefficient**	**Cluster robust standard error**	**t-statistic**	**Exp (coef)**	**Coefficient**	**Cluster robust standard error**	**t-statistic**	**Exp (coef)**
Pressure ulcer, stage III	0.148	0.0071	20.89	1.160	0.193	0.0177	10.90	1.213
Pressure ulcer, stage IV	0.222	0.0104	21.31	1.248	0.420	0.0190	22.14	1.522
Pressure ulcer, unstageable	0.068	0.0070	9.73	1.071	0.141	0.0180	7.82	1.151
Wound with morbid obesity	0.045	0.0092	4.82	1.046	0.033	0.0200	1.67	1.034
Fistula	0.236	0.0180	13.12	1.266	0.562	0.0330	17.02	1.754
Nonhealing surgical wound	0.170	0.0082	20.78	1.186	0.459	0.0238	19.28	1.582
Number of body systems ≥ five	-0.015	0.0025	-5.87	0.985	0.040	0.0078	5.05	1.040
Disabled	-0.010	0.0019	-5.04	0.990	-0.012	0.0061	-2.02	0.988
Home health agency patient	-1.923	0.0059	-323.80	0.146				
Constant	9.185	0.0087	1059.43	9749.064	6.951	0.0331	210.13	1043.959
Sample size	3,692,064				1,053,039			
Combined Routine+Therapy and NTA model R^2	0.532							

Sources: 2019 Medicare acute hospital and post-acute care claims, Medicare 2019 risk score file, and Medicare cost reports for 2019.

Notes: PAC = post-acute care. COPD = chronic obstructive pulmonary disease. GI = gastrointestinal. ICU = intensive care unit. CCU = coronary care unit. Models estimated using Poisson regression. Standard errors are clustered by provider. Data are all stays that began between April and September 2019 and had the CARE function variables on a matched assessment. Routine and therapy costs model is based on data from home health and institutional settings; the model of nontherapy ancillary costs is based only on data from institutional settings. Functional score is measured on a 30-point scale that increases with functionality.

[a] Orthopedic surgery is the omitted group.

TABLE A.5

Comparison of Actual Costs, Predicted Costs, Actual Payments, and Payments (Including Outliers) under a PAC PPS for PAC Stays from April–September 2019, with Function in the Model, 5 Percent Outlier Pool and Short-Stay Outlier Payments

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
All	**5,496**	**5,496**	**6,266**	**6,259**	**1.14**	**1.00**	**3,692,064**	**71.5**	**22.8**	**4.8**	**1.0**
Clinical group											
Ventilator	62,681	62,681	71,415	75,178	1.20	1.05	8,451	0.0	0.6	0.8	98.6
Severe wounds	7,655	7,470	8,773	8,791	1.15	1.00	157,912	70.7	19.8	4.4	5.0
Stroke	11,473	11,453	12,641	12,978	1.13	1.03	88,788	43.7	31.2	24.6	0.4
Other neurology medical	4,251	4,239	4,949	4,831	1.14	0.98	344,129	81.2	13.2	5.5	0.1
Other neurology surgical	11,185	11,202	12,123	12,556	1.12	1.04	32,188	45.4	26.1	27.6	1.0
Orthopedic medical	3,703	3,704	4,163	4,251	1.15	1.02	523,541	85.1	11.6	3.2	0.1
Orthopedic surgical	7,672	7,701	8,407	8,773	1.14	1.04	363,782	55.1	35.4	9.4	0.2
Respiratory medical	5,185	5,242	5,976	5,900	1.14	0.99	290,637	69.7	26.6	2.7	1.0
Respiratory surgical	5,546	5,627	6,318	6,257	1.13	0.99	11,808	67.0	25.5	5.7	1.8
Cardiovascular medical	3,884	3,881	4,390	4,397	1.13	1.00	477,884	79.8	17.9	1.9	0.4
Cardiovascular surgical	6,220	6,281	7,010	7,002	1.13	1.00	123,119	62.4	27.4	9.2	1.0
Infection medical	7,414	7,448	8,887	8,401	1.13	0.95	184,382	52.5	41.7	3.9	2.0
Infection surgical	9,696	9,902	11,142	11,259	1.16	1.01	39,087	47.6	41.1	7.3	4.0
Hematology medical	4,601	4,607	5,308	5,174	1.12	0.97	37,193	71.7	25.6	2.4	0.3
Hematology surgical	5,924	6,021	6,718	6,697	1.13	1.00	3,225	59.9	31.9	7.7	0.6
Rehabilitation medical	9,295	8,868	9,623	10,071	1.08	1.05	2,179	45.6	32.3	22.1	0.0
Skin medical	3,417	3,386	4,105	3,894	1.14	0.95	115,348	85.5	13.1	1.1	0.3
Skin surgical	6,168	6,285	7,089	7,171	1.16	1.01	10,213	66.9	28.4	2.9	1.8
Kidney and urine medical	5,463	5,438	6,290	6,197	1.13	0.99	220,018	66.9	30.5	2.3	0.3
Liver medical	4,989	4,980	5,721	5,496	1.10	0.96	30,063	65.3	31.3	2.8	0.5
Digestive medical	5,096	5,100	5,906	5,742	1.13	0.97	126,434	68.1	29.2	2.3	0.4
Endocrine medical	4,384	4,358	5,159	4,956	1.13	0.96	123,093	76.1	21.7	1.9	0.3
Mental illness medical	4,002	3,997	4,752	4,590	1.15	0.97	56,973	78.7	20.6	0.5	0.2
Alcohol and drug use medical	8,167	8,192	9,805	9,183	1.12	0.94	3,889	25.7	67.7	6.1	0.6
HIV medical	7,982	7,758	10,837	8,939	1.12	0.82	1,220	56.4	37.5	3.2	2.9
Other medical	3,364	3,367	3,930	3,828	1.14	0.97	181,258	85.6	10.7	3.5	0.1

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
Other surgical	7,076	7,050	8,047	7,998	1.13	0.99	135,250	60.1	31.4	6.5	2.0
Other clinical conditions											
Cancer	4,083	4,083	4,708	4,521	1.11	0.96	13,852	75.1	21.0	3.5	0.4
Transplant	5,961	5,961	6,004	6,655	1.12	1.11	3,830	79.3	4.9	14.2	1.7
Kidney/urinary	5,618	5,624	6,497	6,405	1.14	0.99	249,759	66.3	30.6	2.5	0.5
GI or hepatobiliary	5,341	5,341	6,098	6,015	1.13	0.99	223,312	66.8	29.3	3.1	0.9
Vision impairment	6,139	6,139	7,081	7,008	1.14	0.99	83,938	68.2	24.2	6.7	1.0
Urinary incontinence	6,342	6,342	7,043	7,278	1.15	1.03	99,207	72.7	11.8	14.7	0.7
Trauma	6,118	5,798	6,975	6,704	1.10	0.96	160,667	71.2	19.1	8.8	0.9
Frailty, cognitive function, mental illness, and functional score											
Least frail	2,032	2,059	2,424	2,352	1.16	0.97	581,928	95.6	3.8	0.6	0.0
Most frail	9,179	9,171	10,380	10,445	1.14	1.01	1,245,183	47.3	41.9	8.6	2.2
Cognitively impaired	6,618	6,615	7,748	7,576	1.14	0.98	747,570	63.7	31.8	3.5	1.0
Serious mental illness	7,550	7,552	8,875	8,656	1.15	0.98	386,130	54.7	41.5	3.0	0.8
Function, 0–25th percentile	9,742	9,636	11,283	10,981	1.13	0.97	853,908	51.5	39.2	6.5	2.9
Function, 25–75th percentile	5,001	5,040	5,634	5,749	1.15	1.02	1,889,877	72.5	21.4	5.7	0.4
Function, 75–100th percentile	2,658	2,674	3,009	3,022	1.14	1.00	948,279	87.5	10.7	1.5	0.4
Severely ill (SOI level 4)	17,346	17,394	19,825	19,685	1.13	0.99	238,693	0.0	75.9	14.0	10.0
Multiple body systems	17,064	17,064	19,762	19,449	1.14	0.98	353,374	0.0	78.2	14.0	7.8
Chronically critically ill	12,806	12,631	14,443	14,533	1.13	1.01	149,404	43.9	37.2	9.0	10.0
Highest acuity	16,123	15,860	18,188	18,321	1.14	1.01	82,410	36.5	38.6	9.7	15.2
Other stay and patient characteristics											
HHA, no therapy visits	872	1,615	1,600	1,609	1.85	1.01	637,749	100.0	0.0	0.0	0.0
HHA, 1–4 therapy visits	987	1,679	1,695	1,729	1.75	1.02	583,154	100.0	0.0	0.0	0.0
HHA, 5–9 therapy visits	1,884	1,688	2,167	2,033	1.08	0.94	862,746	100.0	0.0	0.0	0.0
HHA,10+ therapy visits	3,045	1,770	2,524	2,393	0.79	0.95	555,376	100.0	0.0	0.0	0.0

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
I-PAC, therapy costs per day in 0–25th percentile	15,227	15,943	19,465	18,139	1.19	0.93	263,871	0.0	90.7	0.4	8.8
I-PAC, therapy costs per day in 25–50th percentile	13,911	14,412	16,140	16,755	1.20	1.04	266,970	0.0	97.9	0.3	1.8
I-PAC, therapy costs per day in 50–75th percentile	14,140	14,522	14,369	16,657	1.18	1.16	266,716	0.0	96.2	2.2	1.7
I-PAC, therapy costs per day in > 75th percentile	16,982	15,320	17,918	16,782	0.99	0.94	255,482	0.0	32.7	66.2	1.1
HHA community admitted	1,535	1,676	1,819	1,902	1.24	1.05	1,761,523	100.0	0.0	0.0	0.0
HHA stays with prior hospital stay	1,988	1,705	2,367	2,013	1.01	0.85	877,502	100.0	0.0	0.0	0.0
I-PAC community admitted	15,467	14,078	18,029	16,309	1.05	0.90	85,802	0.0	67.2	30.2	2.5
I-PAC stays with prior hospital stay	15,006	15,130	16,861	17,152	1.14	1.02	967,237	0.0	81.0	15.6	3.4
Disabled	5,702	5,702	6,709	6,503	1.14	0.97	883,582	71.1	22.8	4.6	1.6
Dual eligible or LIS	6,016	5,968	7,254	6,847	1.14	0.94	1,255,694	69.0	26.3	3.3	1.4
ESRD	6,670	6,589	7,983	7,466	1.12	0.94	171,844	65.3	26.7	5.6	2.4
Very old (85+)	5,187	5,179	5,829	5,911	1.14	1.01	1,138,287	72.6	23.9	3.2	0.4
SNF shortest 10th percentile	2,311	14,178	2,488	4,046	1.75	1.63	85,909	0.0	100.0	0.0	0.0
IRF shortest 10th percentile	6,639	14,667	10,940	4,657	0.70	0.43	17,935	0.0	0.0	100.0	0.0
LTCH shortest 10th percentile	7,898	26,056	8,223	4,783	0.61	0.58	3,597	0.0	0.0	0.0	100.0
IRF short stay outlier (<=3 days)	3,499	15,551	3,584	2,433	0.70	0.68	5,282	0.0	0.0	100.0	0.0
HHA LUPA	353	1,664	332	483	1.37	1.46	230,005	100.0	0.0	0.0	100.0
Provider setting											
HHA	1,685	1,685	2,001	1,939	1.15	0.97	2,639,025	100.0	0.0	0.0	0.0
SNF	13,179	14,301	14,957	16,014	1.22	1.07	840,922	0.0	100.0	0.0	0.0
IRF	18,393	15,621	21,344	17,621	0.96	0.83	176,755	0.0	0.0	100.0	0.0

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
LTCH	42,647	29,838	42,564	39,834	0.93	0.94	35,362	0.0	0.0	0.0	100.0
LTCH chronically critically ill by law	47,699	36,461	50,303	47,458	0.99	0.94	22,124	0.0	0.0	0.0	100.0
Provider characteristics											
Hospital-based	7,507	5,890	7,089	6,872	0.92	0.97	372,747	69.1	9.8	21.2	0.0
Freestanding	5,270	5,451	6,174	6,190	1.17	1.00	3,319,317	71.7	24.2	2.9	1.1
Nonprofit	6,036	5,734	6,146	6,563	1.09	1.07	904,608	69.0	23.7	6.8	0.5
For-profit	5,160	5,294	6,177	6,012	1.17	0.97	2,665,098	73.3	21.7	3.9	1.1
Government	8,811	8,118	9,108	9,383	1.06	1.03	122,358	50.6	39.9	9.2	0.4
Low-volume provider, bottom decile	15,659	12,618	16,187	15,427	0.99	0.95	16,581	22.0	58.9	14.3	4.8
IRF low-income share 0–20th percentile	16,966	15,288	20,656	17,060	1.01	0.83	41,505	0.0	0.0	100.0	0.0
IRF low-income share 20–40th percentile	17,236	15,399	20,851	17,166	1.00	0.82	40,196	0.0	0.0	100.0	0.0
IRF low-income share 40–60th percentile	18,480	15,711	21,301	17,653	0.96	0.83	37,279	0.0	0.0	100.0	0.0
IRF low-income share 60–80th percentile	18,972	15,843	21,561	17,914	0.94	0.83	31,816	0.0	0.0	100.0	0.0
IRF low-income share 80th+ percentile	21,698	16,148	23,140	18,929	0.87	0.82	24,139	0.0	0.0	100.0	0.0
Teaching (IRF only)	21,743	16,512	23,612	19,345	0.89	0.82	18,558	0.0	0.0	100.0	0.0
Dual/LIS share 0–20th percentile in setting	5,645	5,702	5,804	6,489	1.15	1.12	952,563	68.7	27.0	3.6	0.7
Dual/LIS share 20–40th percentile in setting	4,545	4,681	5,159	5,300	1.17	1.03	1,134,141	77.2	18.9	3.3	0.6
Dual/LIS share 40–60th percentile in setting	4,942	5,019	5,817	5,706	1.15	0.98	811,907	75.3	19.3	4.6	0.8
Dual/LIS share 60–80th percentile in setting	6,507	6,404	7,782	7,282	1.12	0.94	498,054	65.5	25.1	8.0	1.3
Dual/LIS share 80 –100th percentile in setting	8,478	7,735	10,689	8,989	1.06	0.84	295,399	57.8	29.7	9.5	3.1

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
White Non-Hispanic share, top decile in setting	5,324	4,906	5,651	5,715	1.07	1.01	239,036	75.9	17.6	5.2	1.3
Black Non-Hispanic share, top decile in setting	9,634	9,208	11,305	10,635	1.10	0.94	155,293	46.2	42.4	9.2	2.2
Other race/ethnicity share, top decile in setting	8,954	8,745	11,987	9,960	1.11	0.83	190,893	49.7	40.1	7.8	2.4
Geographic location											
Frontier	5,700	4,958	6,028	5,956	1.04	0.99	9,317	72.9	27.1	0.0	0.0
Metro	5,441	5,495	6,288	6,242	1.15	0.99	3,191,331	71.7	22.1	5.2	1.1
Rural micropolitan	5,915	5,554	6,183	6,417	1.08	1.04	326,658	69.8	26.5	3.3	0.5
Rural adjacent	5,905	5,546	6,186	6,452	1.09	1.04	106,236	69.0	30.6	0.4	0.0
Rural nonadjacent	5,411	5,158	5,761	5,974	1.10	1.04	67,812	72.0	26.8	1.1	0.0
Urban CBSA based	5,441	5,494	6,287	6,241	1.15	0.99	3,195,018	71.7	22.0	5.2	1.1
Rural CBSA based	5,847	5,503	6,131	6,368	1.09	1.04	496,901	69.9	27.5	2.3	0.3
Regions											
1: CT, MA, M, NH, RI, VT	4,417	5,052	5,535	5,628	1.27	1.02	243,902	72.5	23.6	3.2	0.6
2: NY, NJ	6,538	6,396	8,317	7,308	1.12	0.88	276,819	64.0	32.0	3.7	0.4
3: DE, DC, MD, PA, VA, WV	5,561	5,649	6,025	6,407	1.15	1.06	403,044	70.1	24.0	5.3	0.6
4: AL, FL, GA, KY, MS, NC, SC, TN	5,111	5,075	5,504	5,799	1.13	1.05	908,759	75.1	19.7	4.4	0.9
5: IL, IN, MI, MN, OH, WI	5,700	5,830	6,261	6,597	1.16	1.05	607,492	68.7	26.5	4.0	0.8
6: AR, LA, NM, OK, TX	6,021	5,589	6,681	6,453	1.07	0.97	472,780	71.8	17.3	8.5	2.4
7: IA, KS, MO, NE	6,494	6,481	6,861	7,406	1.14	1.08	154,319	63.4	29.5	6.0	1.2
8: CO, MT, ND, SD, UT, WY	6,312	5,731	6,321	6,674	1.06	1.06	79,673	69.0	25.6	4.7	0.6
9: AZ, CA, HI, NV	4,859	4,993	6,542	5,641	1.16	0.86	452,636	75.9	19.3	3.9	0.8
10: AK, ID, OR, WA	5,420	5,373	6,132	6,185	1.14	1.01	92,640	72.1	25.2	2.3	0.4

Sources: 2019 Medicare acute hospital and post-acute care claims and assessments, Medicare 2019 risk score file, and Medicare cost reports for 2019.
Notes: PAC = post-acute care. PPS = prospective payment system. HHA = home health agency. SNF = skilled nursing facility. IRF = inpatient rehabilitation facility. LTCH = long-term care hospital. SOI = severity of illness. I-PAC = institutional post-acute care. ESRD = end-stage renal disease. LUPA = low-utilization payment adjustment. CBSA = core-based statistical area. LIS = Low-income subsidy program for Part D enrollees. Data are all stays that began between April and September 2019 and had the CARE function variables on a

matched assessment. Patients' level of frailty was determined using the JEN Frailty Index. Chronically critically ill stays include patients who spent eight or more days in an intensive care or coronary care unit during the preceding hospital stay or were on a ventilator in the PAC setting. LTCH chronically critically ill by law stays include LTCH patients who spent three or more days in an intensive care or coronary care unit during the preceding hospital stay or were on a ventilator in the LTCH. Severely ill stays include institutional-setting patients who were categorized as severity of illness level 4, usually during the immediately preceding hospital stay. Multiple body systems include institutional patients with secondary diagnoses involving five or more body systems. Highest-acuity patients were institutional patients categorized as severity of illness level 4, on dialysis, and who had severe wounds or a pressure ulcer. Race/ethnicity shares are based on the RTI race measure, with top decile based on shares in facilities within a setting with at least 25 stays.

TABLE A.6

Comparison of Actual Costs, Predicted Costs, Actual Payments, and Payments (Including Outliers) under a PAC PPS for April–September 2019 PAC Stays, with 5 Percent Outlier Pool and Short-Stay Outlier Payments, Functional Score Omitted from the Model

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
All	**5,496**	**5,496**	**6,266**	**6,258**	**1.14**	**1.00**	**3,692,064**	**71.5**	**22.8**	**4.8**	**1.0**
Clinical group											
Ventilator	62,681	62,681	71,415	75,280	1.20	1.05	8,451	0.0	0.6	0.8	98.6
Severe wounds	7,655	7,428	8,773	8,745	1.14	1.00	157,912	70.7	19.8	4.4	5.0
Stroke	11,473	11,457	12,641	13,003	1.13	1.03	88,788	43.7	31.2	24.6	0.4
Other neurology medical	4,251	4,240	4,949	4,831	1.14	0.98	344,129	81.2	13.2	5.5	0.1
Other neurology surgical	11,185	11,205	12,123	12,572	1.12	1.04	32,188	45.4	26.1	27.6	1.0
Orthopedic medical	3,703	3,703	4,163	4,246	1.15	1.02	523,541	85.1	11.6	3.2	0.1
Orthopedic surgical	7,672	7,700	8,407	8,757	1.14	1.04	363,782	55.1	35.4	9.4	0.2
Respiratory medical	5,185	5,243	5,976	5,906	1.14	0.99	290,637	69.7	26.6	2.7	1.0
Respiratory surgical	5,546	5,632	6,318	6,264	1.13	0.99	11,808	67.0	25.5	5.7	1.8
Cardiovascular medical	3,884	3,882	4,390	4,400	1.13	1.00	477,884	79.8	17.9	1.9	0.4
Cardiovascular surgical	6,220	6,286	7,010	7,003	1.13	1.00	123,119	62.4	27.4	9.2	1.0
Infection medical	7,414	7,451	8,887	8,407	1.13	0.95	184,382	52.5	41.7	3.9	2.0
Infection surgical	9,696	9,910	11,142	11,277	1.16	1.01	39,087	47.6	41.1	7.3	4.0
Hematology medical	4,601	4,609	5,308	5,179	1.13	0.98	37,193	71.7	25.6	2.4	0.3
Hematology surgical	5,924	6,024	6,718	6,711	1.13	1.00	3,225	59.9	31.9	7.7	0.6
Rehabilitation medical	9,295	9,091	9,623	10,287	1.11	1.07	2,179	45.6	32.3	22.1	0.0
Skin medical	3,417	3,405	4,105	3,911	1.14	0.95	115,348	85.5	13.1	1.1	0.3
Skin surgical	6,168	6,333	7,089	7,210	1.17	1.02	10,213	66.9	28.4	2.9	1.8
Kidney and urine medical	5,463	5,439	6,290	6,197	1.13	0.99	220,018	66.9	30.5	2.3	0.3
Liver medical	4,989	4,981	5,721	5,505	1.10	0.96	30,063	65.3	31.3	2.8	0.5
Digestive medical	5,096	5,104	5,906	5,749	1.13	0.97	126,434	68.1	29.2	2.3	0.4

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
Endocrine medical	4,384	4,358	5,159	4,957	1.13	0.96	123,093	76.1	21.7	1.9	0.3
Mental illness medical	4,002	3,999	4,752	4,587	1.15	0.97	56,973	78.7	20.6	0.5	0.2
Alcohol and drug use medical	8,167	8,196	9,805	9,171	1.12	0.94	3,889	25.7	67.7	6.1	0.6
HIV medical	7,982	7,802	10,837	8,951	1.12	0.83	1,220	56.4	37.5	3.2	2.9
Other medical	3,364	3,368	3,930	3,828	1.14	0.97	181,258	85.6	10.7	3.5	0.1
Other surgical	7,076	7,055	8,047	8,008	1.13	1.00	135,250	60.1	31.4	6.5	2.0
Other clinical conditions											
Cancer	4,083	4,083	4,708	4,528	1.11	0.96	13,852	75.1	21.0	3.5	0.4
Transplant	5,961	5,961	6,004	6,672	1.12	1.11	3,830	79.3	4.9	14.2	1.7
Kidney/urinary	5,618	5,625	6,497	6,405	1.14	0.99	249,759	66.3	30.6	2.5	0.5
GI or hepatobiliary	5,341	5,341	6,098	6,019	1.13	0.99	223,312	66.8	29.3	3.1	0.9
Vision impairment	6,139	6,139	7,081	7,007	1.14	0.99	83,938	68.2	24.2	6.7	1.0
Urinary incontinence	6,342	6,342	7,043	7,276	1.15	1.03	99,207	72.7	11.8	14.7	0.7
Trauma	6,118	5,762	6,975	6,668	1.09	0.96	160,667	71.2	19.1	8.8	0.9
Frailty, cognitive function, mental illness, and functional score											
Least frail	2,032	2,059	2,424	2,351	1.16	0.97	581,928	95.6	3.8	0.6	0.0
Most frail	9,179	9,167	10,380	10,445	1.14	1.01	1,245,183	47.3	41.9	8.6	2.2
Cognitively impaired	6,618	6,614	7,748	7,572	1.14	0.98	747,570	63.7	31.8	3.5	1.0
Serious mental illness	7,550	7,553	8,875	8,657	1.15	0.98	386,130	54.7	41.5	3.0	0.8
Function, 0–25th percentile	9,742	8,920	11,283	10,306	1.06	0.91	853,908	51.5	39.2	6.5	2.9
Function, 25–75th percentile	5,001	5,126	5,634	5,829	1.17	1.03	1,889,877	72.5	21.4	5.7	0.4
Function, 75–100th percentile	2,658	3,148	3,009	3,469	1.31	1.15	948,279	87.5	10.7	1.5	0.4
Severely ill (SOI level 4)	17,346	17,383	19,825	19,702	1.14	0.99	238,693	0.0	75.9	14.0	10.0
Multiple body systems	17,064	17,064	19,762	19,462	1.14	0.98	353,374	0.0	78.2	14.0	7.8
Chronically critically ill	12,806	12,603	14,443	14,523	1.13	1.01	149,404	43.9	37.2	9.0	10.0
Highest acuity	16,123	15,833	18,188	18,324	1.14	1.01	82,410	36.5	38.6	9.7	15.2

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
Other stay and patient characteristics											
HHA, no therapy visits	872	1,640	1,600	1,635	1.88	1.02	637,749	100.0	0.0	0.0	0.0
HHA, 1–4 therapy visits	987	1,681	1,695	1,729	1.75	1.02	583,154	100.0	0.0	0.0	0.0
HHA, 5–9 therapy visits	1,884	1,687	2,167	2,030	1.08	0.94	862,746	100.0	0.0	0.0	0.0
HHA,10+ therapy visits	3,045	1,739	2,524	2,363	0.78	0.94	555,376	100.0	0.0	0.0	0.0
I-PAC, therapy costs per day in 0–25th percentile	15,227	15,860	19,465	18,066	1.19	0.93	263,871	0.0	90.7	0.4	8.8
I-PAC, therapy costs per day in 25–50th percentile	13,911	14,416	16,140	16,765	1.21	1.04	266,970	0.0	97.9	0.3	1.8
I-PAC, therapy costs per day in 50–75th percentile	14,140	14,567	14,369	16,711	1.18	1.16	266,716	0.0	96.2	2.2	1.7
I-PAC, therapy costs per day in > 75th percentile	16,982	15,356	17,918	16,796	0.99	0.94	255,482	0.0	32.7	66.2	1.1
HHA community admitted	1,535	1,667	1,819	1,893	1.23	1.04	1,761,523	100.0	0.0	0.0	0.0
HHA stays with prior hospital stay	1,988	1,722	2,367	2,028	1.02	0.86	877,502	100.0	0.0	0.0	0.0
I-PAC community admitted	15,467	13,951	18,029	16,174	1.05	0.90	85,802	0.0	67.2	30.2	2.5
I-PAC stays with prior hospital stay	15,006	15,141	16,861	17,166	1.14	1.02	967,237	0.0	81.0	15.6	3.4
Disabled	5,702	5,702	6,709	6,500	1.14	0.97	883,582	71.1	22.8	4.6	1.6
Dual eligible or LIS	6,016	5,928	7,254	6,807	1.13	0.94	1,255,694	69.0	26.3	3.3	1.4
ESRD	5,227	5,272	5,757	5,975	1.14	1.04	171,844	65.3	26.7	5.6	2.4
Very old (85+)	6,670	6,587	7,983	7,468	1.12	0.94	1,138,287	72.6	23.9	3.2	0.4
SNF shortest 10th percentile	2,311	14,099	2,488	4,047	1.75	1.63	85,909	0.0	100.0	0.0	0.0
IRF shortest 10th percentile	6,639	15,109	10,940	4,657	0.70	0.43	17,935	0.0	0.0	100.0	0.0
LTCH shortest 10th percentile	7,898	25,687	8,223	4,784	0.61	0.58	3,597	0.0	0.0	0.0	100.0

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
IRF short stay outlier (<=3 days)	3,499	15,397	3,584	2,434	0.70	0.68	5,282	0.0	0.0	100.0	0.0
HHA LUPA	353	1,677	332	483	1.37	1.46	230,005	100.0	0.0	0.0	100.0
Provider setting											
HHA	1,685	1,685	2,001	1,938	1.15	0.97	2,639,025	100.0	0.0	0.0	0.0
SNF	13,179	14,299	14,957	16,024	1.22	1.07	840,922	0.0	100.0	0.0	0.0
IRF	18,393	15,650	21,344	17,616	0.96	0.83	176,755	0.0	0.0	100.0	0.0
LTCH	42,647	29,737	42,564	39,662	0.93	0.93	35,362	0.0	0.0	0.0	100.0
LTCH chronically critically ill by law	47,699	36,347	50,303	47,303	0.99	0.94	22,124	0.0	0.0	0.0	100.0
Provider characteristics											
Hospital-based	7,507	5,954	7,089	6,918	0.92	0.98	372,747	69.1	9.8	21.2	0.0
Freestanding	5,270	5,444	6,174	6,184	1.17	1.00	3,319,317	71.7	24.2	2.9	1.1
Nonprofit	6,036	5,785	6,146	6,612	1.10	1.08	904,608	69.0	23.7	6.8	0.5
For-profit	5,160	5,276	6,177	5,994	1.16	0.97	2,665,098	73.3	21.7	3.9	1.1
Government	8,811	8,141	9,108	9,402	1.07	1.03	122,358	50.6	39.9	9.2	0.4
Low-volume provider, bottom decile	15,659	12,627	16,187	15,415	0.98	0.95	16,581	22.0	58.9	14.3	4.8
IRF low-income share 0–20th percentile	16,966	15,312	20,656	17,058	1.01	0.83	41,505	0.0	0.0	100.0	0.0
IRF low-income share 20–40th percentile	17,236	15,421	20,851	17,152	1.00	0.82	40,196	0.0	0.0	100.0	0.0
IRF low-income share 40–60th percentile	18,480	15,680	21,301	17,580	0.95	0.83	37,279	0.0	0.0	100.0	0.0
IRF low-income share 60–80th percentile	18,972	15,901	21,561	17,932	0.95	0.83	31,816	0.0	0.0	100.0	0.0
IRF low-income share 80th+ percentile	21,698	16,244	23,140	18,994	0.88	0.82	24,139	0.0	0.0	100.0	0.0
Teaching (IRF only)	21,743	16,534	23,612	19,329	0.89	0.82	18,558	0.0	0.0	100.0	0.0
Dual/LIS share 0–20th percentile in setting	5,645	5,748	5,804	6,534	1.16	1.13	952,563	68.7	27.0	3.6	0.7
Dual/LIS share 20–40th percentile in setting	4,545	4,687	5,159	5,305	1.17	1.03	1,134,141	77.2	18.9	3.3	0.6

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
Dual/LIS share 40–60th percentile in setting	4,942	5,010	5,817	5,697	1.15	0.98	811,907	75.3	19.3	4.6	0.8
Dual/LIS share 60–80th percentile in setting	6,507	6,367	7,782	7,245	1.11	0.93	498,054	65.5	25.1	8.0	1.3
Dual/LIS share 80 –100th percentile in setting	8,478	7,653	10,689	8,904	1.05	0.83	295,399	57.8	29.7	9.5	3.1
White Non-Hispanic share, top decile in setting	5,324	4,942	5,651	5,748	1.08	1.02	239,036	75.9	17.6	5.2	1.3
Black Non-Hispanic share, top decile in setting	9,634	9,156	11,305	10,586	1.10	0.94	155,293	46.2	42.4	9.2	2.2
Other race/ethnicity share, top decile in setting	8,954	8,609	11,987	9,824	1.10	0.82	190,893	49.7	40.1	7.8	2.4
Geographic location											
Frontier	5,700	4,998	6,028	5,992	1.05	0.99	9,317	72.9	27.1	0.0	0.0
Metro	5,441	5,494	6,288	6,241	1.15	0.99	3,191,331	71.7	22.1	5.2	1.1
Rural micropolitan	5,915	5,564	6,183	6,428	1.09	1.04	326,658	69.8	26.5	3.3	0.5
Rural adjacent	5,905	5,542	6,186	6,450	1.09	1.04	106,236	69.0	30.6	0.4	0.0
Rural nonadjacent	5,411	5,153	5,761	5,967	1.10	1.04	67,812	72.0	26.8	1.1	0.0
Urban CBSA based	5,441	5,493	6,287	6,240	1.15	0.99	3,195,018	71.7	22.0	5.2	1.1
Rural CBSA based	5,847	5,508	6,131	6,374	1.09	1.04	496,901	69.9	27.5	2.3	0.3
Regions											
1: CT, MA, M, NH, RI, VT	4,417	5,164	5,535	5,738	1.30	1.04	243,902	72.5	23.6	3.2	0.6
2: NY, NJ	6,538	6,290	8,317	7,206	1.10	0.87	276,819	64.0	32.0	3.7	0.4
3: DE, DC, MD, PA, VA, WV	5,561	5,685	6,025	6,444	1.16	1.07	403,044	70.1	24.0	5.3	0.6
4: AL, FL, GA, KY, MS, NC, SC, TN	5,111	5,047	5,504	5,773	1.13	1.05	908,759	75.1	19.7	4.4	0.9
5: IL, IN, MI, MN, OH, WI	5,700	5,868	6,261	6,636	1.16	1.06	607,492	68.7	26.5	4.0	0.8
6: AR, LA, NM, OK, TX	6,021	5,562	6,681	6,420	1.07	0.96	472,780	71.8	17.3	8.5	2.4
7: IA, KS, MO, NE	6,494	6,551	6,861	7,473	1.15	1.09	154,319	63.4	29.5	6.0	1.2
8: CO, MT, ND, SD, UT, WY	6,312	5,825	6,321	6,764	1.07	1.07	79,673	69.0	25.6	4.7	0.6
9: AZ, CA, HI, NV	4,859	4,953	6,542	5,599	1.15	0.86	452,636	75.9	19.3	3.9	0.8

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
10: AK, ID, OR, WA	5,420	5,393	6,132	6,204	1.14	1.01	92,640	72.1	25.2	2.3	0.4

Sources: 2019 Medicare acute hospital and post-acute care claims, Medicare 2019 risk score file, and Medicare cost reports for 2019.
Notes: PAC = post-acute care. PPS = prospective payment system. HHA = home health agency. SNF = skilled nursing facility. IRF = inpatient rehabilitation facility. LTCH = long-term care hospital. SOI = severity of illness. I-PAC = institutional post-acute care. ESRD = end-stage renal disease. LUPA = low-utilization payment adjustment. CBSA = core-based statistical area. LIS = Low-income subsidy program for Part D enrollees. Data are all stays that began between April and September 2019 and had the CARE function variables on a matched assessment. Patients' level of frailty was determined using the JEN Frailty Index. Chronically critically ill stays include patients who spent eight or more days in an intensive care or coronary care unit during the preceding hospital stay or were on a ventilator in the PAC setting. LTCH chronically critically ill by law stays include LTCH patients who spent three or more days in an intensive care or coronary care unit during the preceding hospital stay or were on a ventilator in the LTCH. Severely ill stays include institutional-setting patients who were categorized as severity of illness level 4, usually during the immediately preceding hospital stay. Multiple body systems include institutional patients with secondary diagnoses involving five or more body systems. Highest-acuity patients were institutional patients categorized as severity of illness level 4, on dialysis, and who had severe wounds or a pressure ulcer. Race/ethnicity shares are based on the RTI race measure, with top decile based on shares in facilities within a setting with at least 25 stays.

TABLE A.7

Estimated Distribution of the Changes in Payments under MedPAC's Model of a PAC PPS for PAC Stays

Reporting category	N	Ratio of Model to Actual Payments								
		Decrease in payment					Increase in payment			
		> 25%	10% to 25%	5% to 10%	1% to 5%	About the same	1% to 5%	5% to 10%	10% to 25%	> 25%
All stays	**3,692,064**	**0.19**	**0.20**	**0.05**	**0.03**	**0.02**	**0.03**	**0.04**	**0.11**	**0.33**
Clinical group										
Ventilator	8,451	0.21	0.19	0.07	0.05	0.02	0.04	0.04	0.09	0.29
Severe wounds	157,912	0.14	0.17	0.06	0.04	0.02	0.04	0.06	0.14	0.33
Stroke	88,788	0.12	0.15	0.06	0.05	0.02	0.04	0.05	0.10	0.40
Other neurology medical	344,129	0.14	0.21	0.06	0.04	0.02	0.04	0.06	0.15	0.28
Other neurology surgical	32,188	0.11	0.15	0.06	0.05	0.02	0.05	0.05	0.11	0.38
Orthopedic medical	523,541	0.10	0.23	0.07	0.04	0.02	0.03	0.04	0.12	0.35
Orthopedic surgical	363,782	0.21	0.23	0.05	0.03	0.01	0.02	0.03	0.07	0.36

		Ratio of Model to Actual Payments								
		Decrease in payment					Increase in payment			
Reporting category	N	> 25%	10% to 25%	5% to 10%	1% to 5%	About the same	1% to 5%	5% to 10%	10% to 25%	> 25%
Respiratory medical	290,637	0.21	0.18	0.04	0.03	0.01	0.03	0.04	0.10	0.35
Respiratory surgical	11,808	0.28	0.19	0.03	0.02	0.01	0.02	0.03	0.08	0.34
Cardiovascular medical	477,884	0.20	0.19	0.04	0.03	0.01	0.03	0.04	0.12	0.33
Cardiovascular surgical	123,119	0.23	0.22	0.04	0.03	0.01	0.02	0.03	0.08	0.34
Infection medical	184,382	0.26	0.16	0.04	0.03	0.01	0.02	0.03	0.09	0.35
Infection surgical	39,087	0.17	0.17	0.05	0.04	0.02	0.03	0.04	0.08	0.39
Hematology medical	37,193	0.28	0.16	0.03	0.03	0.01	0.03	0.05	0.11	0.30
Hematology surgical	3,225	0.30	0.14	0.03	0.02	0.01	0.02	0.03	0.08	0.35
Rehabilitation medical	2,179	0.14	0.20	0.06	0.03	0.02	0.03	0.04	0.08	0.39
Skin medical	115,348	0.25	0.19	0.06	0.05	0.03	0.05	0.05	0.10	0.22
Skin surgical	10,213	0.25	0.17	0.05	0.03	0.02	0.03	0.04	0.09	0.33
Kidney and urine medical	220,018	0.21	0.18	0.04	0.03	0.01	0.03	0.04	0.10	0.35
Liver medical	30,063	0.33	0.13	0.03	0.02	0.01	0.03	0.05	0.10	0.30
Digestive medical	126,434	0.26	0.17	0.04	0.03	0.01	0.03	0.04	0.10	0.33
Endocrine medical	123,093	0.25	0.18	0.05	0.04	0.02	0.04	0.05	0.11	0.27
Mental illness medical	56,973	0.11	0.18	0.06	0.04	0.02	0.03	0.04	0.10	0.43
Alcohol and drug use medical	3,889	0.27	0.10	0.03	0.02	0.01	0.02	0.04	0.09	0.42
HIV medical	1,220	0.22	0.20	0.04	0.04	0.01	0.02	0.05	0.09	0.33
Other medical	181,258	0.17	0.22	0.06	0.04	0.02	0.04	0.05	0.11	0.29
Other surgical	135,250	0.22	0.18	0.04	0.03	0.01	0.03	0.04	0.08	0.37
Other clinical conditions										
Cancer	13,852	0.33	0.15	0.03	0.03	0.01	0.03	0.05	0.11	0.25
Transplant	3,830	0.05	0.17	0.08	0.06	0.03	0.05	0.07	0.11	0.38
Kidney/urinary	249,759	0.21	0.18	0.04	0.03	0.01	0.03	0.04	0.10	0.36
GI or hepatobiliary	223,312	0.26	0.17	0.04	0.03	0.01	0.03	0.04	0.10	0.34
Vision impairment	83,938	0.18	0.19	0.05	0.04	0.02	0.03	0.04	0.11	0.35

		Ratio of Model to Actual Payments								
		Decrease in payment					Increase in payment			
Reporting category	N	> 25%	10% to 25%	5% to 10%	1% to 5%	About the same	1% to 5%	5% to 10%	10% to 25%	> 25%
Urinary incontinence	99,207	0.08	0.17	0.07	0.05	0.02	0.04	0.05	0.11	0.40
Trauma	160,667	0.22	0.20	0.06	0.05	0.02	0.04	0.05	0.10	0.26
Frailty, cognitive function, mental illness, and functional score										
Least frail	581,928	0.18	0.23	0.05	0.04	0.02	0.03	0.05	0.12	0.27
Most frail	1,245,183	0.20	0.17	0.05	0.03	0.01	0.03	0.04	0.09	0.39
Cognitively impaired	747,570	0.18	0.18	0.05	0.04	0.02	0.03	0.04	0.11	0.35
Serious mental illness	386,130	0.19	0.17	0.05	0.03	0.02	0.03	0.04	0.10	0.38
Function, 0–25th percentile	853,908	0.14	0.18	0.06	0.04	0.02	0.03	0.04	0.10	0.39
Function, 25–75th percentile	1,889,877	0.17	0.21	0.05	0.04	0.02	0.03	0.04	0.11	0.33
Function, 75–100th percentile	948,279	0.26	0.19	0.04	0.03	0.01	0.03	0.04	0.10	0.29
Severely ill (SOI level 4)	238,693	0.23	0.12	0.03	0.03	0.01	0.02	0.03	0.08	0.46
Multiple body systems	353,374	0.23	0.12	0.03	0.03	0.01	0.02	0.03	0.08	0.45
Chronically critically ill	149,404	0.20	0.17	0.05	0.03	0.01	0.03	0.04	0.09	0.38
Highest acuity	82,410	0.21	0.16	0.05	0.03	0.01	0.03	0.04	0.09	0.38
Other stay and patient characteristics										
HHA, no therapy visits	637,749	0.16	0.15	0.04	0.03	0.01	0.03	0.06	0.12	0.40
HHA, 1–4 therapy visits	583,154	0.16	0.15	0.04	0.03	0.01	0.03	0.05	0.15	0.40
HHA, 5–9 therapy visits	862,746	0.21	0.28	0.06	0.04	0.02	0.03	0.04	0.11	0.21
HHA,10+ therapy visits	555,376	0.17	0.31	0.09	0.06	0.03	0.05	0.05	0.11	0.14
I-PAC, therapy costs per day in 0–25th percentile	263,871	0.26	0.09	0.03	0.02	0.01	0.02	0.03	0.07	0.48
I-PAC, therapy costs per day, 25–50th percentile	266,970	0.20	0.09	0.03	0.02	0.01	0.02	0.03	0.08	0.51

		Ratio of Model to Actual Payments								
		Decrease in payment					Increase in payment			
Reporting category	N	> 25%	10% to 25%	5% to 10%	1% to 5%	About the same	1% to 5%	5% to 10%	10% to 25%	> 25%
I-PAC, therapy costs per day, 50–75th percentile	266,716	0.14	0.09	0.03	0.02	0.01	0.02	0.03	0.08	0.58
I-PAC, therapy costs per day, > 75th percentile	255,482	0.25	0.21	0.06	0.04	0.02	0.03	0.03	0.07	0.29
HHA community admitted	1,761,523	0.10	0.18	0.05	0.04	0.02	0.04	0.05	0.15	0.36
HHA stays with prior hospital stay	877,502	0.33	0.32	0.06	0.04	0.01	0.03	0.04	0.06	0.12
I-PAC community admitted	85,802	0.29	0.17	0.04	0.03	0.01	0.03	0.03	0.07	0.34
I-PAC stays with prior hospital stay	967,237	0.20	0.12	0.04	0.03	0.01	0.02	0.03	0.08	0.48
Disabled	883,582	0.21	0.19	0.05	0.03	0.02	0.03	0.04	0.11	0.33
Dual eligible or LIS	1,255,694	0.20	0.18	0.05	0.03	0.02	0.03	0.04	0.11	0.34
ESRD	171,844	0.27	0.17	0.04	0.03	0.01	0.03	0.04	0.10	0.30
Very old (85+)	1,138,287	0.16	0.20	0.05	0.04	0.02	0.03	0.04	0.11	0.35
SNF shortest 10th percentile	85,909	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.05	0.91
IRF shortest 10th percentile	17,935	0.91	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.04
LTCH shortest 10th percentile	3,597	0.77	0.14	0.03	0.02	0.01	0.01	0.01	0.02	0.01
IRF short stay outlier (<=3 days)	5,282	0.74	0.08	0.00	0.00	0.00	0.00	0.01	0.05	0.12
HHA LUPA	230,005	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.07	0.82

Sources: 2019 Medicare acute hospital and post-acute care claims and assessments, Medicare 2019 risk score file, and Medicare cost reports for 2019.
Notes: PAC = post-acute care. PPS = prospective payment system. HHA = home health agency. SNF = skilled nursing facility. IRF = inpatient rehabilitation facility. LTCH = long-term care hospital. SOI = severity of illness. I-PAC = institutional post-acute care. ESRD = end-stage renal disease. LUPA = low-utilization payment adjustment. LIS = Low-income subsidy program for Part D enrollees. Data are all stays that began between April and September 2019 and had the CARE function variables on a matched assessment. Patients' level of frailty was determined using the JEN Frailty Index. Chronically critically ill stays include patients who spent eight or more days in an intensive care or coronary care unit during the preceding hospital stay or were on a ventilator in the PAC setting. LTCH chronically critically ill by law stays include LTCH patients who spent three or more days in an intensive care or coronary care unit during the preceding hospital stay or were on a ventilator in the LTCH. Severely ill stays include institutional-setting patients who were categorized as severity of illness level 4, usually during the immediately preceding hospital stay. Multiple body systems include institutional patients with secondary diagnoses involving five or more body systems. Highest-acuity patients were institutional patients categorized as severity of illness level 4, on dialysis, and who had severe wounds or a pressure ulcer.

TABLE A.8

Estimated Distribution of the Changes in Payments under MedPAC's Model of a PAC PPS for Providers with 20 or More Stays

		Ratio of Model to Actual Payments								
		Decrease in payment					Increase in payment			
Reporting category	N	> 25%	10% to 25%	5% to 10%	1% to 5%	About the same	1% to 5%	5% to 10%	10% to 25%	> 25%
Provider setting										
All providers	19,979	0.05	0.16	0.12	0.12	0.05	0.09	0.08	0.15	0.18
HHA	7,881	0.00	0.12	0.20	0.21	0.09	0.14	0.11	0.10	0.02
SNF	10,766	0.09	0.13	0.06	0.06	0.03	0.06	0.07	0.20	0.31
IRF	1,010	0.10	0.68	0.13	0.06	0.01	0.01	0.01	0.00	0.00
LTCH	322	0.04	0.30	0.17	0.13	0.07	0.11	0.09	0.07	0.02
Provider characteristics										
Hospital-based	1,768	0.05	0.30	0.14	0.10	0.04	0.06	0.06	0.08	0.18
Freestanding	18,211	0.05	0.14	0.12	0.12	0.05	0.09	0.08	0.16	0.18
Nonprofit	4,036	0.02	0.17	0.12	0.08	0.03	0.05	0.06	0.15	0.31
For-profit	14,733	0.06	0.15	0.13	0.13	0.06	0.10	0.09	0.15	0.14
Government	1,210	0.05	0.19	0.10	0.09	0.03	0.08	0.10	0.16	0.20
Low-volume provider, bottom decile	89	0.10	0.45	0.17	0.07	0.00	0.12	0.02	0.04	0.02
IRF low-income share 0–20th percentile	203	0.09	0.67	0.13	0.07	0.00	0.02	0.01	0.00	0.00
IRF low-income share 20–40th percentile	197	0.12	0.70	0.10	0.04	0.01	0.02	0.01	0.01	0.00
IRF low-income share 40–60th percentile	210	0.06	0.70	0.14	0.06	0.01	0.00	0.00	0.00	0.00
IRF low-income share 60–80th percentile	209	0.09	0.67	0.17	0.06	0.00	0.00	0.00	0.00	0.00
IRF low-income share 80th+ percentile	178	0.16	0.65	0.08	0.04	0.02	0.01	0.01	0.01	0.01
Teaching (IRF only)	90	0.09	0.74	0.10	0.03	0.02	0.01	0.00	0.00	0.00
Dual/LIS share 0–20th percentile in setting	4,099	0.01	0.12	0.13	0.11	0.05	0.07	0.07	0.13	0.32

		Ratio of Model to Actual Payments								
		Decrease in payment					Increase in payment			
Reporting category	N	> 25%	10% to 25%	5% to 10%	1% to 5%	About the same	1% to 5%	5% to 10%	10% to 25%	> 25%
Dual/LIS share 20–40th percentile in setting	4,454	0.02	0.14	0.14	0.14	0.05	0.08	0.07	0.15	0.21
Dual/LIS share 40–60th percentile in setting	4,190	0.04	0.16	0.14	0.14	0.06	0.09	0.08	0.15	0.15
Dual/LIS share 60–80th percentile in setting	4,016	0.06	0.18	0.11	0.12	0.05	0.10	0.09	0.16	0.11
Dual/LIS share 80th+ percentile in setting	3,220	0.17	0.18	0.09	0.08	0.04	0.10	0.12	0.15	0.07
White Non-Hispanic stays, top decile by setting	1,761	0.02	0.19	0.14	0.12	0.05	0.08	0.07	0.13	0.20
Black Non-Hispanic stays, top decile by setting	1,757	0.10	0.16	0.09	0.08	0.05	0.09	0.11	0.20	0.13
Other race/ethnicity stays, top decile by setting	1,761	0.02	0.19	0.14	0.12	0.05	0.08	0.07	0.13	0.20
Geographic location										
Frontier	120	0.03	0.22	0.14	0.13	0.05	0.10	0.08	0.14	0.11
Metro	15,997	0.06	0.16	0.12	0.12	0.05	0.09	0.08	0.14	0.17
Rural micropolitan	2,358	0.03	0.15	0.12	0.12	0.04	0.07	0.08	0.17	0.20
Rural adjacent	992	0.02	0.14	0.12	0.14	0.04	0.11	0.09	0.16	0.17
Rural nonadjacent	631	0.03	0.18	0.12	0.11	0.05	0.10	0.07	0.16	0.18
Urban CBSA based	16,021	0.06	0.16	0.12	0.12	0.05	0.09	0.08	0.14	0.17
Rural CBSA based	3,956	0.03	0.15	0.12	0.12	0.04	0.09	0.08	0.17	0.19
Regions										
1: CT, MA, M, NH, RI, VT	990	0.04	0.21	0.15	0.09	0.03	0.06	0.06	0.18	0.19
2: NY, NJ	1,024	0.24	0.25	0.10	0.06	0.02	0.04	0.04	0.09	0.14
3: DE, DC, MD, PA, VA, WV	1,847	0.01	0.14	0.14	0.11	0.03	0.07	0.06	0.13	0.30
4: AL, FL, GA, KY, MS, NC, SC, TN	3,844	0.01	0.13	0.11	0.13	0.06	0.08	0.08	0.18	0.21
5: IL, IN, MI, MN, OH, WI	3,978	0.03	0.15	0.11	0.10	0.04	0.09	0.10	0.18	0.20
6: AR, LA, NM, OK, TX	3,396	0.03	0.15	0.13	0.15	0.07	0.12	0.09	0.13	0.12

		Ratio of Model to Actual Payments								
		Decrease in payment					Increase in payment			
Reporting category	N	> 25%	10% to 25%	5% to 10%	1% to 5%	About the same	1% to 5%	5% to 10%	10% to 25%	> 25%
7: IA, KS, MO, NE	1,191	0.01	0.17	0.11	0.11	0.04	0.07	0.06	0.14	0.28
8: CO, MT, ND, SD, UT, WY	582	0.02	0.19	0.14	0.12	0.04	0.09	0.07	0.14	0.19
9: AZ, CA, HI, NV	2,619	0.17	0.15	0.13	0.12	0.06	0.11	0.10	0.11	0.05
10: AK, ID, OR, WA	508	0.03	0.17	0.14	0.17	0.06	0.09	0.08	0.14	0.12

Sources: 2019 Medicare acute hospital and post-acute care claims and assessments, Medicare 2019 risk score file, and Medicare cost reports for 2019.
Notes: PAC = post-acute care. PPS = prospective payment system. HHA = home health agency. SNF = skilled nursing facility. IRF = inpatient rehabilitation facility. LTCH = long-term care hospital. CBSA = core-based statistical area. Underlying data are the 3.7 million stays that began between April and September 2019 and had the CARE function variables on a matched assessment. Table restricted to facilities with at least 20 stays. Deciles of facility race/ethnicity of patients based on shares with race/ethnicity groups defined Race/ethnicity shares are based RTI race measure, with top decile based on shares in facilities within a setting with at least 25 stays.

TABLE A.9

Estimated Change in Payments under PAC PPS by Current Relative Medicare Profitability

		Decrease in Payments				Increase in Payments		
Relative profitability	**Provider count**	**< 25%**	**10% to 25%**	**1% to 10%**	**About the same**	**1% to 10%**	**10% to 25%**	**> 25%**
Below average								
<.75	2,846	0	47	223	82	611	702	1,181
.75 - .9	4,519	8	376	1,025	309	949	811	1,041
About average								
.9 - 1.1	6,906	137	1,191	2,083	396	1,135	985	979
Above average								
1.1 - 1.25	2,876	208	762	857	130	400	283	236
>1.25	2,832	694	748	652	111	330	196	101
Provider counts		1047	3124	4840	1028	3425	2977	3538

Sources: 2019 Medicare acute hospital and post-acute care claims and assessments, Medicare 2019 risk score file, and Medicare cost reports for 2019.
Notes: PAC = post-acute care. PPS = Prospective Payment System. Relative profitability is the ratio of the provider's profitability (the ratio of the provider's average payment under current policy to the average stay cost) to the setting's average profitability. Ratios below 1.0 indicate below-average profitability; ratios above 1.0 indicate above-average profitability. Only providers with at least 20 stays were included in the analysis (N=19,979). Data are 3.7 million stays that began between April and September 2019 and had the CARE function variables on a matched assessment.

TABLE A.10

Comparison of Actual Costs, Predicted Costs, Actual Payments, and PAC PPS Payments (Including Outliers) under PAC PPS for April–September 2019 Stays, with 5 Percent Outlier Pool and Short-Stay Outlier Payments: Five Percent Cut in Payments

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
All	**5,496**	**5,496**	**6,266**	**5,946**	**1.08**	**0.95**	**3,692,064**	**71.5**	**22.8**	**4.8**	**1.0**
Provider setting											
HHA	1,685	1,685	2,001	1,842	1.09	0.92	2,639,025	100.0	0.0	0.0	0.0
SNF	13,179	14,301	14,957	15,200	1.15	1.02	840,922	0.0	100.0	0.0	0.0
IRF	18,393	15,621	21,344	16,732	0.91	0.78	176,755	0.0	0.0	100.0	0.0
LTCH	42,647	29,838	42,564	38,198	0.90	0.90	35,362	0.0	0.0	0.0	100.0
Provider characteristics											
Hospital-based	7,507	5,890	7,089	6,528	0.87	0.92	372,747	69.1	9.8	21.2	0.0
Freestanding	5,270	5,451	6,174	5,880	1.12	0.95	3,319,317	71.7	24.2	2.9	1.1
Nonprofit	6,036	5,734	6,146	6,236	1.03	1.01	904,608	69.0	23.7	6.8	0.5
For-profit	5,160	5,294	6,177	5,711	1.11	0.92	2,665,098	73.3	21.7	3.9	1.1
Government	8,811	8,118	9,108	8,913	1.01	0.98	122,358	50.6	39.9	9.2	0.4
Low-volume provider, bottom decile	15,659	12,618	16,187	14,676	0.94	0.91	16,581	22.0	58.9	14.3	4.8
Dual/LIS share 0–20th percentile in setting	5,645	5,702	5,804	6,165	1.09	1.06	952,563	68.7	27.0	3.6	0.7
Dual/LIS share 20–40th percentile in setting	4,545	4,681	5,159	5,035	1.11	0.98	1,134,141	77.2	18.9	3.3	0.6
Dual/LIS share 40–60th percentile in setting	4,942	5,019	5,817	5,421	1.10	0.93	811,907	75.3	19.3	4.6	0.8
Dual/LIS share 60–80th percentile in setting	6,507	6,404	7,782	6,917	1.06	0.89	498,054	65.5	25.1	8.0	1.3
Dual/LIS share 80–100th percentile in setting	8,478	7,735	10,689	8,540	1.01	0.80	295,399	57.8	29.7	9.5	3.1
White Non-Hispanic share, top decile in setting	5,324	4,906	5,651	5,432	1.02	0.96	239,036	75.9	17.6	5.2	1.3
Black Non-Hispanic share, top decile in setting	9,634	9,208	11,305	10,108	1.05	0.89	155,293	46.2	42.4	9.2	2.2

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
Other race/ethnicity share, top decile in setting	8,954	8,745	11,987	9,461	1.06	0.79	190,893	49.7	40.1	7.8	2.4
Geographic location											
Frontier	5,700	4,958	6,028	5,656	0.99	0.94	9,317	72.9	27.1	0.0	0.0
Metro	5,441	5,495	6,288	5,930	1.09	0.94	3,191,331	71.7	22.1	5.2	1.1
Rural micropolitan	5,915	5,554	6,183	6,093	1.03	0.99	326,658	69.8	26.5	3.3	0.5
Rural adjacent	5,905	5,546	6,186	6,124	1.04	0.99	106,236	69.0	30.6	0.4	0.0
Rural nonadjacent	5,411	5,158	5,761	5,670	1.05	0.98	67,812	72.0	26.8	1.1	0.0
Urban CBSA based	5,441	5,494	6,287	5,930	1.09	0.94	3,195,018	71.7	22.0	5.2	1.1
Rural CBSA based	5,847	5,503	6,131	6,046	1.03	0.99	496,901	69.9	27.5	2.3	0.3
Regions											
1: CT, MA, M, NH, RI, VT	4,417	5,052	5,535	5,345	1.21	0.97	243,902	72.5	23.6	3.2	0.6
2: NY, NJ	6,538	6,396	8,317	6,940	1.06	0.83	276,819	64.0	32.0	3.7	0.4
3: DE, DC, MD, PA, VA, WV	5,561	5,649	6,025	6,086	1.09	1.01	403,044	70.1	24.0	5.3	0.6
4: AL, FL, GA, KY, MS, NC, SC, TN	5,111	5,075	5,504	5,510	1.08	1.00	908,759	75.1	19.7	4.4	0.9
5: IL, IN, MI, MN, OH, WI	5,700	5,830	6,261	6,267	1.10	1.00	607,492	68.7	26.5	4.0	0.8
6: AR, LA, NM, OK, TX	6,021	5,589	6,681	6,131	1.02	0.92	472,780	71.8	17.3	8.5	2.4
7: IA, KS, MO, NE	6,494	6,481	6,861	7,037	1.08	1.03	154,319	63.4	29.5	6.0	1.2
8: CO, MT, ND, SD, UT, WY	6,312	5,731	6,321	6,340	1.00	1.00	79,673	69.0	25.6	4.7	0.6
9: AZ, CA, HI, NV	4,859	4,993	6,542	5,358	1.10	0.82	452,636	75.9	19.3	3.9	0.8
10: AK, ID, OR, WA	5,420	5,373	6,132	5,878	1.08	0.96	92,640	72.1	25.2	2.3	0.4

Sources: 2019 Medicare acute hospital and post-acute care claims and assessments, Medicare 2019 risk score file, and Medicare cost reports for 2019.

Notes: PAC = post-acute care. PPS = prospective payment system. HHA = home health agency. SNF = skilled nursing facility. IRF = inpatient rehabilitation facility. LTCH = long-term care hospital. SOI = severity of illness. I-PAC = institutional post-acute care. ESRD = end-stage renal disease. LUPA = low-utilization payment adjustment. CBSA = core-based statistical area. LIS = Low-income subsidy program for Part D enrollees. Data are all stays that began between April and September 2019 and had the CARE function variables on a matched assessment. Race/ethnicity shares are based RTI race measure, with top decile based on shares in facilities within a setting with at least 25 stays.

TABLE A.11

Comparison of Actual Costs, Predicted Costs, Actual Payments, and PAC PPS Payments (Including Outliers) under PAC PPS for April–September 2019 Stays, with 5 Percent Outlier Pool and Short-Stay Outlier Payments: First Year of a 3-Year Transition with a Five Percent Cut in Payments

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
All	**5,496**	**5,496**	**6,266**	**6,159**	**1.12**	**0.98**	**3,692,064**	**71.5**	**22.8**	**4.8**	**1.0**
Provider setting											
HHA	1,685	1,685	2,001	1,948	1.16	0.97	1,685	100.0	0.0	0.0	0.0
SNF	13,179	14,301	14,957	15,038	1.14	1.01	13,179	0.0	100.0	0.0	0.0
IRF	18,393	15,621	21,344	19,807	1.08	0.93	18,393	0.0	0.0	100.0	0.0
LTCH	42,647	29,838	42,564	41,108	0.96	0.97	42,647	0.0	0.0	0.0	100.0
Provider characteristics											
Hospital-based	7,507	5,890	7,089	6,902	0.92	0.97	372,747	69.1	9.8	21.2	0.0
Freestanding	5,270	5,451	6,174	6,076	1.15	0.98	3,319,317	71.7	24.2	2.9	1.1
Nonprofit	6,036	5,734	6,146	6,176	1.02	1.00	904,608	69.0	23.7	6.8	0.5
For-profit	5,160	5,294	6,177	6,021	1.17	0.97	2,665,098	73.3	21.7	3.9	1.1
Government	8,811	8,118	9,108	9,043	1.03	0.99	122,358	50.6	39.9	9.2	0.4
Low-volume provider, bottom decile	15,659	12,618	16,187	15,683	1.00	0.97	16,581	22.0	58.9	14.3	4.8
Dual/LIS share 0–20th percentile in setting	5,645	5,702	5,804	5,924	1.05	1.02	952,563	68.7	27.0	3.6	0.7
Dual/LIS share 20–40th percentile in setting	4,545	4,681	5,159	5,117	1.13	0.99	1,134,141	77.2	18.9	3.3	0.6
Dual/LIS share 40–60th percentile in setting	4,942	5,019	5,817	5,685	1.15	0.98	811,907	75.3	19.3	4.6	0.8
Dual/LIS share 60–80th percentile in setting	6,507	6,404	7,782	7,493	1.15	0.96	498,054	65.5	25.1	8.0	1.3
Dual/LIS share 80 – 100th percentile in setting	8,478	7,735	10,689	9,973	1.18	0.93	295,399	57.8	29.7	9.5	3.1
White Non-Hispanic share, top decile in setting	5,324	4,906	5,651	5,578	1.05	0.99	239,036	75.9	17.6	5.2	1.3

Reporting category	Actual cost ($)	Predicted cost ($)	Actual 2019 payment ($)	Payment under PAC PPS ($)	Ratio of PAC PPS payment to actual cost	Ratio of PAC PPS payment to actual 2019 payment	Stay count	Distribution of Stays by Setting			
								HHA (%)	SNF (%)	IRF (%)	LTCH (%)
Black Non-Hispanic share, top decile in setting	9,634	9,208	11,305	10,906	1.13	0.96	155,293	46.2	42.4	9.2	2.2
Other race/ethnicity share, top decile in setting	8,954	8,745	11,987	11,145	1.24	0.93	190,893	49.7	40.1	7.8	2.4
Geographic location											
Frontier	5,700	4,958	6,028	5,904	1.04	0.98	9,317	72.9	27.1	0.0	0.0
Metro	5,441	5,495	6,288	6,169	1.13	0.98	3,191,331	71.7	22.1	5.2	1.1
Rural micropolitan	5,915	5,554	6,183	6,153	1.04	1.00	326,658	69.8	26.5	3.3	0.5
Rural adjacent	5,905	5,546	6,186	6,165	1.04	1.00	106,236	69.0	30.6	0.4	0.0
Rural nonadjacent	5,411	5,158	5,761	5,731	1.06	0.99	67,812	72.0	26.8	1.1	0.0
Urban CBSA based	5,441	5,494	6,287	6,168	1.13	0.98	3,195,018	71.7	22.0	5.2	1.1
Rural CBSA based	5,847	5,503	6,131	6,103	1.04	1.00	496,901	69.9	27.5	2.3	0.3
Regions											
1: CT, MA, M, NH, RI, VT	4,417	5,052	5,535	5,472	1.24	0.99	243,902	72.5	23.6	3.2	0.6
2: NY, NJ	6,538	6,396	8,317	7,858	1.20	0.94	276,819	64.0	32.0	3.7	0.4
3: DE, DC, MD, PA, VA, WV	5,561	5,649	6,025	6,046	1.09	1.00	403,044	70.1	24.0	5.3	0.6
4: AL, FL, GA, KY, MS, NC, SC, TN	5,111	5,075	5,504	5,506	1.08	1.00	908,759	75.1	19.7	4.4	0.9
5: IL, IN, MI, MN, OH, WI	5,700	5,830	6,261	6,263	1.10	1.00	607,492	68.7	26.5	4.0	0.8
6: AR, LA, NM, OK, TX	6,021	5,589	6,681	6,498	1.08	0.97	472,780	71.8	17.3	8.5	2.4
7: IA, KS, MO, NE	6,494	6,481	6,861	6,919	1.07	1.01	154,319	63.4	29.5	6.0	1.2
8: CO, MT, ND, SD, UT, WY	6,312	5,731	6,321	6,327	1.00	1.00	79,673	69.0	25.6	4.7	0.6
9: AZ, CA, HI, NV	4,859	4,993	6,542	6,147	1.26	0.94	452,636	75.9	19.3	3.9	0.8
10: AK, ID, OR, WA	5,420	5,373	6,132	6,047	1.12	0.99	92,640	72.1	25.2	2.3	0.4

Sources: 2019 Medicare acute hospital and post-acute care claims and assessments, Medicare 2019 risk score file, and Medicare cost reports for 2019.
Notes: PAC = post-acute care. PPS = prospective payment system. HHA = home health agency. SNF = skilled nursing facility. IRF = inpatient rehabilitation facility. LTCH = long-term care hospital. I-PAC = institutional post-acute care. CBSA = core-based statistical area. LIS = Low-income subsidy program for Part D enrollees. Data are all stays that began between April and September 2019 and had the CARE function variables on a matched assessment. Race/ethnicity shares are based on the RTI race measure, with top decile based on shares in facilities within a setting with at least 25 stays.

Notes

[1] In Wissoker and Garrett (2018b), we found that costs and thus profitability varies for home health care by position in a sequence of stays. It led commissioners to ask whether undesirable incentives related to transfers and multiple stays for the same patient that could arise in a stay-based payment system might be avoided with an episode-based payment system. Wissoker and Garrett (2019) modeled the trade-offs between a stay- and episode-based payment model and concluded that while the episode-based PPS could, on average, pay with accuracy comparable to a stay-based system, it would also provide strong incentives to shorten episodes of care, with possible implications for efficiency and patient care.

[2] A small share of the IRF cases do not line up with the 2019 payment year. We include 3.4 percent of the IRF stays that were discharged under FY year 2020 rules, while excluding a similar share that began in FY 2018 but were discharged under FY 2019 rules.

[3] Hospital-based facilities (i.e., those based in acute-care hospitals) account for 8 percent of home-health stays, 4 percent of SNF stays, and 44 percent of IRF stays. No LTCH stays are considered hospital based.

[4] Stays or episodes are considered usable if they have fewer than three missing responses for the six relevant functional status items used in this analysis. Responses are considered missing if the patient refuses or if measurement was not attempted due to environmental imitations (e.g., lack of equipment, weather constraints).

[5] Because the overhead share of the total cost of a stay was similar across settings (though the levels differed), we did not model fixed and variable costs separately.

[6] We imputed medical social service cost per minute for 317 episodes as the median cost per minute for hospital-based and free-standing agencies.

[7] Severe wound care includes care for patients with a nonhealing surgical wound; patients who are morbidly obese with a wound; patients with a fistula; patients with osteomyelitis; and/or patients with a stage III, stage IV, or an unstageable pressure wound.

[8] The JEN Frailty Index is an algorithm developed by JEN Associates Inc., now part of Westat, to identify frail older adults who may be at risk of institutionalization. It is based on 13 grouped categories of diseases or signs found to be significantly related to need for long-term care services, either concurrently or in the future. The algorithm uses diagnoses codes from claims.

[9] We follow the LUPA policy under the current PDGM prospective payment system. The LUPA threshold ranges from two to six visits within a 30-day payment period and depends on the patient's clinical grouping.

[10] For home health stays, we include information from the prior hospital stay for both 30-day periods of the 60-day episode.

[11] A parallel, though weaker, pattern can be seen for institutional stays, with relatively low profitability for stays with high per diem therapy costs.

[12] Although payments in this analysis are simulated for the new payment systems for home health and SNFs, the use of therapy and other resources were determined under the old payment system. The findings might change when using data from 2020 and years after since incentives to provide more therapy are reduced under PDGM and PDPM.

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