

# Modeling the Transition to a Unified Post-Acute Care Prospective Payment System

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*A memo by staff from the Urban Institute for the  
Medicare Payment Advisory Commission*

**June 2017**

From: Doug Wissoker  
To: Carol Carter  
Re: Modeling the transition to a unified post-acute care prospective payment system  
Date: May 18, 2017

This memo provides a brief description of the methods and parameters underlying the MedPAC estimates of the transition to a unified payment system (MedPAC, [Report to Congress: Medicare and the Health Care Delivery System](#), June 2017). The basic approach used for the transition estimates is detailed in the contractor's report: (Wissoker and Garrett, 2016; <http://medpac.gov/docs/default-source/contractor-reports/designing-a-unified-prospective-payment-system-for-postacute-care.pdf?sfvrsn=0>). Here, we describe how the methods used for the earlier study were extended to estimate the impacts for the transition period.

As described in Wissoker and Garrett (2016), we estimated parameters of a post-acute care (PAC) prospective payment system (PPS) or PAC-PPS using Medicare claims for 2013. The system is based on multivariate Poisson models of the costs of therapy plus routine costs in all post-acute settings and for non-therapy ancillary costs in institutional post-acute settings. The model predictors included primary diagnoses, comorbidities, measures of frailty and cognitive functioning, and use of services such as a ventilator (See Table 1). PAC-PPS payments were set to be proportional to the predictions for each stay, imposing the budget-neutrality constraint that the average PAC-PPS payment equals the average current payment. Our estimates include an illustrative short-stay/low utilization payment adjustment (SSO/LUPA), and, separately, a high-loss outlier policy.

For the current analysis of transition to a unified payment system, all costs and payments were adjusted to 2017 values, based on the thru date of each stay and MedPAC staff expectations of the change in costs and payments from the stay thru date through 2017. The cost and payment multipliers used to simulate the 2017 data are reported in Table 2. The cost models underlying our earlier work were then re-estimated using the simulated cost data from 2017. The updated cost-model coefficient estimates are reported in Table 3. As before, PAC-PPS payments were set to be proportional to the prediction from the updated cost models, imposing that the average PAC-PPS payment equals the average of current payments adjusted to 2017.

### **Including outlier policies in estimated PAC PPS payments**

The payments are adjusted to include both a SSO/LUPA component and a high-loss outlier system. The SSO/LUPA cases were defined as having four or fewer visits in a home health episode and stays in the bottom decile of spell length within each institutional setting. 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 five percent of payments. The combined outlier payment is calculated in the following steps:

1) For SSO/LUPA cases, expected costs are set equal to 1.2\*average cost per day or visit for SSO/LUPA cases by setting for the first day/visit to reflect higher initial costs and set equal to average cost and average cost per day or visit for subsequent days; for other stays, expected costs are set equal to the model prediction; payments (prior to the addition of a high-loss outlier) are then set to be proportional to the expected cost, imposing that the average implied PAC-PPS payment equals the average of current payments.

2) For non-SSO/LUPA stays, PAC-PPS payments are reduced by five percent, with the pool used to pay 80 percent of losses above \$1,842 in home health agencies and above \$11,216 in institutional settings.

The impacts of a PAC-PPS with outliers are reported in Table 4. These estimates are based on the assumption that the PAC-PPS is fully implemented in 2017.

### **Estimated payments in the first year of a three-year transition**

We also estimated payments if the PAC PPS was implemented over three years, with the first year's payments estimated using a blend of 1/3 PAC-PPS and 2/3 current setting-specific payments in 2017. The impacts of a PAC PPS would be reduced to 1/3 of the impact of a fully implemented PAC PPS. For example, if with a fully-implemented PAC-PPS the payment ratio would be 1.06, with a 1/3 blend, the payment ratio would be 1.02.

TABLE 1

## Description and Source of Predictors for Models

Characteristic	Model Predictors	
	Predictor	Source
Age	Three predictors: Age - 50, (Age - minus 50) <sup>2</sup> , and age less than 50	HCC risk score file
Cognitive function	Dementia, Alzheimer's, schizophrenia, major depressive disorder, bipolar disorder, paranoid disorder	Based on diagnoses from prior hospital stay and current PAC stay
Ability to function	Ability to function (components of JEN Frailty Index include: minor ambulatory limitations, severe ambulatory limitations, cognitive development disability, chronic mental illness, dementia, sensory disorders, self-care impairment, syncope, cancer, chronic medical disease, pneumonia, renal disorders, systemic disorders (e.g. septicemia)	Based on diagnoses from prior hospital stay and current PAC stay
Primary reason for treatment	MS-DRGs were assigned to broad categories (see note)	From prior hospital stay MS-DRG if available; imputed MS-DRG for PAC stay if no stay found. Current ventilator cases were excluded from these groupings.
Ventilator care	Patient was on a ventilator during PAC stay	PAC diagnosis
Patient comorbidities	Comorbidities	From prior hospital stay if available; from PAC stay if not none
Treatments and impairments	Indicators of bowel incontinence, continuous positive airflow pressure (CPAP), and difficulty swallowing	PAC diagnoses
Risk score	Risk score	CMS-HCC risk score
Total number of ICU and CCU days	Total number of ICU and CCU days (capped at 22)	From prior hospital stay claim
Severity level	APR-DRG Severity Level 1-4	Stay assigned to APR-DRG Severity of Illness Level 1-4 using claim from prior hospital stay (or imputed if no prior hospital stay within 30 days was found)
Severe wound	Includes non-healing surgical wound, an infected wound, a wound for a patient who is morbidly obese, a fistula, osteomyelitis, or with a stage III, stage IV, or an unstageable pressure wound.	PAC diagnoses
Number body systems >= 5	Diagnoses includes 5 or more body systems	Count of # comorbidities from prior hospital stay, if any; from PAC stay if none
Disabled	Original reason for entitlement is disabled	Medicare enrollment file
Home health agency patient	Patient treated in a home health agency	Home health claim

**Note:** PAC = post-acute care; HHA = home health agency; SNF = skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital; ICU = intensive care unit; CCU = coronary care unit; Broad groups for primary reason for treatment are stroke, neurological surgical, neurological medical, Respiratory with tracheostomy or ventilator care, respiratory surgical, respiratory medical, COPD, cardiovascular vascular surgical, cardiovascular cardiac surgical, cardiovascular medical, orthopedic minor surgical, orthopedic spinal, orthopedic minor medical, orthopedic major medical, skin surgical, skin medical, endocrine surgical, endocrine medical, kidney and urinary surgical, kidney and urinary medical, infections surgical, infections medical, infections septicemia, transplant, gastrointestinal and liver minor surgical, gastrointestinal & liver major surgical, gastrointestinal and liver minor medical, gastrointestinal and liver major medical, hematology surgical, hematology medical, other surgery, other medical, no group. 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, transplant.

TABLE 2

## Multipliers Used to Update 2013 Payments and Costs to 2017, by Setting and Discharge Date

	Discharge date			
	Jan-Feb 2013	March-Sept 2013	Oct-Dec 2013	2014
<b>HHA</b>				
Effective total payment update	0.965	0.965	0.965	0.980
Cost update	1.002	1.002	1.002	0.975
<b>SNF</b>				
Effective total payment update	1.039	1.057	1.063	1.063
Cost update	1.095	1.095	1.108	1.108
<b>IRF</b>				
Effective total payment update	1.022	1.042	1.0497	1.0497
Cost update	1.0782	1.0782	1.0803	1.0803
<b>LTCH</b>				
Effective total payment update	1.065	1.087	1.082	1.082
Cost update	1.076	1.076	1.092	1.092

Notes: HHA=home health agency; SNF= skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long-term care hospital; the column for 2014 is used for stays that began in 2013 and had a discharge date in 2014.

TABLE 3

## Administrative Models of Costs per Stay: 2013 PAC Stays Updated to 2017 Costs

Predictor	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)
<b>Age minus fifty (capped at 45)</b>								
Age - 50	-0.0013	0.0003	-5.00	0.9987	0.0001	0.0006	0.20	1.0001
Age -50 squared	0.00007	0.00000	16.80	1.0001	-0.00022	0.00001	-20.31	0.9998
Age less than 50	-0.0673	0.0036	-18.71	0.935	0.1043	0.0099	10.57	1.110
<b>Cognitive function</b>								
Coma	0.057	0.007	7.88	1.059	0.147	0.014	10.41	1.158
Dementia with complications (HCC51)	-0.019	0.004	-4.72	0.981	-0.019	0.007	-2.68	0.981
Dementia without complications (HCC52)	0.007	0.004	1.57	1.007	0.038	0.009	4.18	1.039
Schizophrenia (HCC57)	-0.048	0.008	-5.87	0.953	0.078	0.016	5.00	1.081
Major Depressive, Bipolar, and Paranoid Disorders (HCC58)	0.054	0.007	7.42	1.055	0.169	0.012	14.16	1.184
<b>Ability to function (JFI index components)</b>								
Minor ambulatory limitations	0.121	0.003	37.49	1.128	0.053	0.008	7.00	1.055
Severe ambulatory limitations	0.090	0.002	58.96	1.094	-0.019	0.004	-4.92	0.982
Cognitive developmental disability	0.034	0.001	24.14	1.035	0.043	0.004	10.63	1.044
Chronic mental illness	0.100	0.006	15.62	1.105	-0.043	0.020	-2.15	0.958
Dementia	0.066	0.004	15.03	1.069	0.052	0.009	5.74	1.054
Sensory disorders	-0.003	0.003	-1.00	0.997	0.005	0.005	0.99	1.005
Selfcare impairment	0.045	0.002	26.26	1.046	0.141	0.006	23.94	1.152
Syncope	0.019	0.002	10.46	1.019	-0.032	0.005	-6.95	0.969
Cancer	-0.007	0.003	-2.76	0.993	-0.025	0.007	-3.68	0.975
Chronic medical disease	0.021	0.001	14.17	1.021	0.078	0.004	21.97	1.081
Pneumonia	0.011	0.002	4.61	1.011	0.161	0.006	24.93	1.174
Renal disorders	0.033	0.003	10.09	1.034	0.255	0.009	29.64	1.290
Systemic disorders (e.g., septicemia)	0.100	0.001	67.99	1.105	0.162	0.004	38.68	1.176
<b>Primary reason for treatment<sup>a</sup></b>								
Stroke	0.237	0.005	49.78	1.267	0.164	0.008	20.87	1.178
Neurological surgical	0.220	0.007	31.68	1.246	0.239	0.025	9.51	1.270
Neurological medical	0.107	0.004	27.32	1.113	0.115	0.007	15.51	1.122
Respiratory trach/vent	0.231	0.007	34.93	1.260	0.354	0.015	23.13	1.425
Respiratory surgical	0.022	0.007	3.16	1.022	0.235	0.017	13.84	1.265
Respiratory medical	0.031	0.004	7.84	1.032	0.197	0.009	21.92	1.218
COPD	0.005	0.005	1.01	1.005	0.394	0.011	35.53	1.483
Cardiovascular vascular surgical	0.163	0.005	31.26	1.177	0.279	0.023	12.34	1.322
Cardiovascular cardiac surgical	-0.011	0.005	-2.27	0.989	-0.036	0.010	-3.65	0.965
Cardiovascular general medical	-0.010	0.004	-2.25	0.991	0.093	0.008	11.48	1.098
Orthopedic minor surgical	0.236	0.003	68.37	1.266	0.408	0.007	62.51	1.504
Orthopedic spinal	0.146	0.006	23.18	1.157	0.087	0.009	9.44	1.091

Predictor	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)
Orthopedic minor medical	0.155	0.005	33.57	1.168	0.283	0.007	39.03	1.328
Orthopedic major medical	0.205	0.004	46.04	1.228	0.240	0.008	28.95	1.272
Skin surgical	0.327	0.010	33.74	1.386	0.683	0.033	20.78	1.979
Skin medical	0.100	0.005	20.69	1.105	0.329	0.014	24.31	1.390
Endocrine surgical	0.170	0.008	19.98	1.185	0.397	0.018	22.14	1.488
Endocrine medical	0.096	0.005	19.3	1.101	0.085	0.009	9.87	1.089
Kidney & urinary surgical	-0.091	0.007	-13.21	0.913	0.083	0.016	5.08	1.087
Kidney & urinary medical	-0.082	0.004	-18.66	0.921	0.020	0.007	2.71	1.020
Infections surgical	0.194	0.006	33.12	1.214	0.403	0.012	33.16	1.496
Infections medical	0.116	0.007	17.25	1.123	0.447	0.015	29.97	1.564
Infections septicemia	-0.094	0.005	-19.42	0.910	0.127	0.012	10.67	1.135
Transplant	0.091	0.031	2.90	1.095	0.529	0.046	11.46	1.696
GI & liver minor surgical	0.062	0.005	11.35	1.063	0.099	0.013	7.48	1.104
GI & liver major surgical	0.253	0.005	46.97	1.288	0.218	0.015	14.42	1.244
GI & liver minor medical	0.060	0.005	13.28	1.062	0.128	0.010	13.44	1.136
GI & liver major medical	-0.073	0.005	-15.59	0.930	0.039	0.009	4.50	1.039
Hematology surgical	-0.022	0.013	-1.72	0.978	0.239	0.031	7.79	1.271
Hematology medical	-0.100	0.006	-16.08	0.905	0.067	0.012	5.78	1.069
Other surgery	0.083	0.005	16.00	1.086	0.345	0.012	28.96	1.412
Other medical	0.073	0.005	15.19	1.076	0.145	0.009	16.12	1.156
Other (not otherwise grouped)	-0.471	0.212	-2.23	0.624	0.222	0.398	0.56	1.249
Death	-0.864	0.222	-3.89	0.422	-1.099	0.246	-4.47	0.333
Vent	0.970	0.012	80.99	2.639	1.746	0.018	95.61	5.729
<b>Comorbidities</b>								
Alcohol or drug disease	0.012	0.004	3.12	1.012	-0.166	0.007	-23.58	0.847
Cancer	-0.021	0.003	-7.94	0.979	-0.008	0.007	-1.21	0.992
Cardiac and Vascular	0.010	0.001	9.64	1.010	0.037	0.003	13.00	1.037
Complications of device or graft	-0.060	0.004	-17.24	0.941	0.115	0.008	14.4	1.122
Dementia	-0.047	0.003	-14.84	0.954	-0.104	0.008	-12.59	0.901
Eye disorders	0.203	0.015	13.73	1.225	-0.056	0.035	-1.57	0.946
GI and liver	-0.001	0.002	-0.48	0.999	0.070	0.005	14.15	1.072
Head and spine	0.108	0.002	48.56	1.114	0.060	0.006	9.74	1.062
Hematologic + immunologic disease	-0.009	0.002	-5.30	0.991	0.003	0.004	0.75	1.003
HIV/AIDS	-0.029	0.011	-2.56	0.972	0.346	0.024	14.67	1.413
Mental illness	0.028	0.007	4.12	1.028	-0.155	0.011	-13.61	0.856
Metabolic endocrine	0.046	0.001	42.54	1.047	0.131	0.003	38.73	1.140
Neuro excluding stroke	0.032	0.001	21.67	1.033	0.047	0.004	12.36	1.048
Obesity	-0.029	0.002	-13.01	0.971	0.064	0.006	11.26	1.066
Orthopedic	0.047	0.002	30.00	1.048	0.077	0.004	17.67	1.080
Renal	-0.042	0.003	-13.34	0.958	-0.214	0.009	-25.13	0.808
Respirator dependence	0.049	0.010	4.77	1.050	-0.019	0.015	-1.27	0.981
Respiratory	-0.001	0.001	-0.99	0.999	0.133	0.003	38.62	1.142



Predictor	Routine and Therapy Costs per Stay				Nontherapy Ancillary Costs per Stay			
	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)	Coefficient	Cluster robust standard error	t-statistic	Exp (coef)
Septicemia + Other systemic infection	0.121	0.003	40.91	1.128	0.046	0.007	6.86	1.047
Skin disorders	0.071	0.002	36.63	1.073	0.050	0.006	8.49	1.051
Stroke	0.176	0.002	76.66	1.193	0.092	0.005	18.31	1.097
Transplant	-0.025	0.010	-2.38	0.976	0.145	0.023	6.18	1.156
<b>Treatments and impairments</b>								
Bowel incontinence	0.162	0.012	13.47	1.176	0.241	0.022	10.90	1.272
Continuous positive airflow pressure	0.268	0.016	16.69	1.307	0.770	0.024	31.65	2.160
Swallowing	0.149	0.003	53.02	1.161	0.062	0.007	8.72	1.064
Risk score	0.003	0.000	6.36	1.003	0.018	0.001	18.55	1.018
Total number of ICU and CCU days (capped)	0.008	0.000	28.64	1.009	0.013	0.001	19.36	1.013
<b>Severity level</b>								
Zero	0.532	0.200	2.66	1.702	-0.024	0.350	-0.07	0.977
Two	-0.013	0.002	-7.79	0.987	0.010	0.003	3.11	1.010
Three	-0.041	0.002	-19.22	0.960	0.063	0.005	12.44	1.065
Four	-0.050	0.003	-16.09	0.952	0.165	0.008	19.62	1.180
<b>Wound care</b>								
Pressure ulcer, stage III	0.127	0.008	16.06	1.136	0.236	0.015	15.48	1.267
Pressure ulcer, stage IV	0.149	0.008	17.95	1.160	0.363	0.017	21.81	1.438
Pressure ulcer, unstageable	0.168	0.010	16.48	1.183	0.017	0.018	0.92	1.017
Wound with morbid obesity	0.054	0.008	6.57	1.055	0.174	0.014	12.52	1.190
Severe wound	0.078	0.008	9.16	1.081	0.340	0.013	25.72	1.405
Osteomyelitis	0.157	0.010	16.13	1.170	0.423	0.015	27.73	1.526
Fistula	0.457	0.023	19.57	1.580	0.736	0.040	18.18	2.088
Infected wound	0.110	0.008	13.5	1.116	0.293	0.014	21.69	1.340
Non-healing surgical wound	0.242	0.013	17.98	1.274	0.340	0.022	15.22	1.405
<b>Number of body systems ≥ 5</b>	-0.122	0.002	-64.65	0.885	-0.031	0.005	-6.46	0.970
<b>Disabled</b>	-0.014	0.002	-9.57	0.986	0.013	0.005	2.82	1.013
<b>Home health agency patient</b>	-1.511	0.005	-287.75	0.221				
<b>Constant</b>	8.901	0.008	1157.16	7336.095	6.875	0.014	477.21	967.749

Notes: JFI = Jen Frailty Index. Coefficients from Poisson models of 2013 post-acute stays with costs updated to 2017. Standard errors are clustered by provider. <sup>a</sup> Orthopedic major surgery is the omitted group.

TABLE 4

**Comparison of Actual Costs, Predicted Costs, Actual Payments, and Payments (Including Outliers) under a PAC PPS for PAC Stays in 2017, with 5% Outlier Pool and Short Stay Outlier Payments**

Reporting category	Actual cost (\$)	Predicted cost (\$)	Ratio of predicted to actual cost	Actual payment (\$) (2013)	Payment under PAC PPS (\$)	Ratio of PAC PPS payment to actual 2017 payment	Stay count	Distribution of Stays by Setting			
								HHA	SNF	IRF	LTCH
HHA	2,265	2,265	1.00	2,643	2,619	0.99	6,108,960				
SNF	12,508	13,542	1.08	14,287	15,230	1.07	2,266,204				
IRF	16,692	14,898	0.89	19,740	16,692	0.85	378,163				
LTC	39,402	27,216	0.69	41,324	35,175	0.85	136,665				
LTC_CCI_by_law*	44,740	33,975	0.76	46,792	42,533	0.91	78,378				
All	6,061	6,061	1.00	6,933	6,933	1.00	8,889,992				
Hospital based	7,976	6,621	0.83	6,758	7,518	1.11	964,562	64.2%	15.4%	20.4%	0.0%
Freestanding	5,828	5,993	1.03	6,954	6,862	0.99	7,925,430	69.3%	26.7%	2.3%	1.7%
Frontier	5,430	5,230	0.96	5,572	6,122	1.10	26,818	71.5%	28.2%	0.3%	0.0%
Metro	6,099	6,100	1.00	7,010	6,972	0.99	7,593,994	68.8%	24.8%	4.6%	1.7%
Rural micropolitan	6,132	6,034	0.98	6,712	6,926	1.03	805,321	66.8%	29.6%	3.0%	0.7%
Rural adjacent	5,649	5,817	1.03	6,509	6,690	1.03	286,384	67.4%	32.1%	0.4%	0.1%
Rural nonadjacent	4,944	5,066	1.02	5,532	5,830	1.05	204,293	74.1%	25.2%	0.7%	0.1%
Urban CBSA based	6,110	6,112	1.00	7,027	6,986	0.99	7,450,169	68.8%	24.8%	4.7%	1.7%
Rural CBSA based	5,804	5,795	1.00	6,445	6,658	1.03	1,439,823	68.5%	28.9%	2.1%	0.5%
Low income share	15,909	14,570	0.92	18,745	16,161	0.86	71,163	0.0%	0.0%	100.0%	
0-20th percentile (IRF only)											0.0%
Low income share 20-40th percentile (IRF only)	15,783	14,581	0.92	18,996	16,211	0.85	89,643	0.0%	0.0%	100.0%	
Low income share 40-60th percentile (IRF only)	16,636	14,946	0.90	19,562	16,755	0.86	76,171	0.0%	0.0%	100.0%	
Low income share 60-80th percentile (IRF only)	16,419	15,074	0.92	19,944	16,835	0.84	80,672	0.0%	0.0%	100.0%	
Low income share 80+ percentile (IRF only)	19,448	15,500	0.80	22,175	17,830	0.80	56,088	0.0%	0.0%	100.0%	
Teaching (IRF only)	18,166	15,372	0.85	21,184	17,531	0.83	45,066	0.0%	0.0%	100.0%	
Nonprofit	6,722	6,480	0.96	6,733	7,360	1.09	1,975,362	64.6%	26.0%	8.5%	0.9%
For profit	5,767	5,884	1.02	6,945	6,741	0.97	6,638,037	70.4%	25.1%	2.8%	1.7%
Government	8,383	7,311	0.87	8,075	8,495	1.05	276,593	58.1%	30.9%	9.4%	1.5%
Ventilator	55,317	55,317	1.00	59,188	64,708	1.09	34,324	6.1%	13.9%	1.0%	79.0%
Severe wound	8,642	8,415	0.97	9,072	9,960	1.10	404,877	71.2%	15.4%	3.8%	9.6%
Stroke	13,241	13,222	1.00	15,238	14,921	0.98	176,508	30.1%	41.0%	28.1%	0.8%
Other neurology medical	4,637	4,631	1.00	5,671	5,348	0.94	672,372	80.3%	16.6%	2.8%	0.3%
Other neurology surgical	11,966	11,988	1.00	12,913	13,443	1.04	53,125	37.5%	34.1%	26.7%	1.7%
Orthopedic medical	4,403	4,391	1.00	5,366	5,058	0.94	871,921	83.0%	15.0%	1.9%	0.2%
Orthopedic surgical	8,377	8,395	1.00	9,862	9,557	0.97	849,303	44.3%	43.6%	11.7%	0.4%
Respiratory medical	6,330	6,412	1.01	6,924	7,250	1.05	774,504	62.3%	33.5%	2.3%	1.8%
Respiratory surgical	7,017	7,092	1.01	7,400	7,946	1.07	32,211	56.9%	34.1%	5.9%	3.1%

Reporting category	Actual cost (\$)	Predicted cost (\$)	Ratio of predicted to actual cost	Actual payment (\$) (2013)	Payment under PAC PPS (\$)	Ratio of PAC PPS payment to actual 2017 payment	Distribution of Stays by Setting				
							Stay count	HHA	SNF	IRF	LTCH
Cardiovascular medical	4,006	4,012	1.00	4,588	4,611	1.00	1,287,716	80.8%	17.5%	1.3%	0.5%
Cardiovascular surgical	7,523	7,606	1.01	8,010	8,548	1.07	252,272	52.8%	36.1%	9.5%	1.7%
Infection medical	9,547	9,637	1.01	10,785	10,889	1.01	262,852	35.0%	57.4%	3.6%	3.9%
Infection surgical	12,785	13,314	1.04	12,535	15,005	1.20	41,438	31.2%	54.7%	7.4%	6.6%
Hematology medical	3,752	3,768	1.00	4,010	4,152	1.04	157,558	80.2%	18.3%	1.1%	0.4%
Hematology surgical	6,801	6,907	1.02	7,314	7,751	1.06	6,198	53.8%	37.5%	7.1%	1.6%
Rehabilitation medical	5,022	4,968	0.99	6,456	5,622	0.87	456,306	76.0%	14.8%	9.1%	0.0%
Skin medical	3,866	3,783	0.98	4,291	4,422	1.03	351,877	86.9%	12.0%	0.6%	0.5%
Skin surgical	8,305	9,230	1.11	8,556	10,466	1.22	20,787	57.1%	36.6%	2.3%	4.0%
Serious mental illness	7,932	7,905	1.00	9,062	9,100	1.00	423,076	56.7%	35.7%	4.3%	3.3%
Other medical	4,706	4,703	1.00	5,379	5,403	1.00	1,370,189	76.1%	22.0%	1.3%	0.5%
Other surgical	9,243	9,173	0.99	9,451	10,416	1.10	234,105	48.3%	41.0%	7.1%	3.6%
Other (not otherwise grouped)	5,071	5,020	0.99	7,142	5,743	0.80	173	68.8%	31.2%	0.0%	0.0%
Least frail	2,744	2,759	1.01	3,289	3,151	0.96	634,513	91.9%	7.5%	0.5%	0.0%
Most frail	10,503	10,420	0.99	11,756	11,892	1.01	945,950	38.0%	49.3%	8.7%	4.0%
Cognitively impaired	7,541	7,536	1.00	8,969	8,625	0.96	1,764,720	57.1%	37.7%	3.5%	1.7%
Severely ill (SOI level =4)	19,390	19,393	1.00	20,707	21,996	1.06	384,955	0.0%	71.1%	11.8%	17.1%
Highest acuity	32,064	25,884	0.81	33,270	32,185	0.97	3,446	0.0%	33.6%	12.0%	54.5%
Multiple body systems	17,561	17,566	1.00	19,336	20,007	1.03	483,717	0.0%	76.2%	10.3%	13.5%
Chronically critically ill (CCI)	14,375	14,445	1.00	15,772	17,128	1.09	422,126	30.6%	45.9%	10.2%	13.3%
Region 1	5,537	6,102	1.10	6,450	6,864	1.06	530,546	66.1%	29.3%	3.4%	1.2%
Region 2	6,830	7,084	1.04	7,861	7,990	1.02	622,660	58.3%	36.6%	4.7%	0.4%
Region 3	6,522	6,793	1.04	7,297	7,655	1.05	828,826	62.5%	30.7%	5.8%	1.0%
Region 4	5,653	5,605	0.99	6,551	6,432	0.98	2,148,640	72.9%	22.4%	3.6%	1.2%
Region 5	6,459	6,494	1.01	7,238	7,388	1.02	1,568,457	64.8%	30.1%	3.7%	1.3%
Region 6	5,302	4,942	0.93	6,145	5,825	0.95	1,648,037	78.9%	13.4%	4.8%	2.9%
Region 7	7,331	7,467	1.02	8,018	8,489	1.06	325,867	55.9%	37.1%	5.4%	1.6%
Region 8	7,100	6,697	0.94	7,551	7,750	1.03	168,067	62.9%	30.8%	4.8%	1.5%
Region 9	6,290	6,311	1.00	7,509	7,177	0.96	864,173	68.3%	25.6%	4.2%	1.8%
Region 10	6,776	6,590	0.97	7,266	7,540	1.04	184,719	63.5%	32.6%	3.1%	0.8%
HHA therapy share of stay cost=0	1,205	2,199	1.82	1,868	2,343	1.25	2,593,492	100.0%	0.0%	0.0%	0.0%
HHA therapy share of stay cost LE 50%	1,941	2,325	1.20	2,106	2,555	1.21	460,980	100.0%	0.0%	0.0%	0.0%
HHA therapy share of stay costs 50-75%	2,947	2,317	0.79	2,967	2,829	0.95	1,527,225	100.0%	0.0%	0.0%	0.0%
HHA therapy share of stay costs >75%	3,480	2,307	0.66	3,795	2,896	0.76	1,527,240	100.0%	0.0%	0.0%	0.0%
Institutional PAC therapy share of stay costs 0-25%	15,655	16,690	1.07	14,706	17,313	1.18	695,252	0.0%	67.6%	13.2%	19.2%
Institutional PAC therapy share of stay costs 25-50%	13,427	13,902	1.04	14,377	15,955	1.11	695,251	0.0%	76.8%	22.9%	0.4%

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							Stay count	HHA	SNF	IRF	LTCH
Institutional PAC therapy share of stay costs 50–75%	13,982	13,643	0.98	17,236	16,225	0.94	695,252	0.0%	86.7%	13.3%	0.0%
Institutional PAC therapy share of stay costs > 75%	14,531	13,360	0.92	19,108	16,144	0.84	695,258	0.0%	94.9%	5.1%	0.0%
SNF shortest 10th percentile	3,345	13,502	4.04	1,129	5,646	5.00	229,973	0.0%	100.0%	0.0%	0.0%
IRF shortest 10 percentile	9,186	14,211	1.55	9,709	7,162	0.74	44,847	0.0%	0.0%	100.0%	0.0%
LTCH shortest 10th percentile	13,487	25,534	1.89	8,325	9,574	1.15	14,550	0.0%	0.0%	0.0%	100.0%
HHA LUPA	771	2,190	2.84	335	1,011	3.01	540,432	100.0%	0.0%	0.0%	0.0%
Community admitted	2,926	2,930	1.00	3,538	3,402	0.96	4,447,900	93.5%	5.2%	1.1%	0.3%
Stays with prior hospital stay	9,200	9,196	1.00	10,332	10,468	1.01	4,442,092	43.9%	45.9%	7.5%	2.8%
Disabled	5,903	5,903	1.00	6,687	6,773	1.01	2,314,264	71.8%	22.0%	3.8%	2.4%
Dual eligible	5,974	5,935	0.99	7,014	6,835	0.97	2,876,623	71.0%	24.5%	2.5%	2.0%
ESRD	7,382	7,400	1.00	8,249	8,422	1.02	386,250	61.6%	29.8%	4.6%	4.0%
Very old (85+ years old)	6,112	6,102	1.00	7,136	6,969	0.98	2,647,695	67.0%	29.2%	3.1%	0.7%

**Source:** 2013 Medicare acute hospital and PAC claims, Medicare 2013 risk score file, and Medicare cost reports for 2013.

**Note:** HHA=home health agency; SNF= skilled nursing facility; IRF = inpatient rehabilitation facility; LTCH = long term care hospital; LUPA = low utilization payment adjustment; SOI = severity of illness; CCI = chronically critically ill; ESRD = end-stage renal disease. The table shows the ratios of average predicted costs compared to the average actual costs for the stays included in each group. A predicted-to-actual ratio of 1.0 indicates that the average predicted costs are equal to the average actual costs and that the model would establish accurate relative weights for a payment system. The sample is based on stays with post-acute claims in 2013 (n = 8,889,992). The model is based on claims information from PAC stays and preceding hospital stays, demographic information from the Medicare enrollment files, beneficiary risk scores, and cost report information for PAC providers. The model combines the results of a model that predicts the costs of routine and therapy combined and one that predicts nontherapy ancillary costs. Patients' level of frailty was determined using a frailty index. CCI stays include patients who spent 8 or more days in an intensive care unit during the preceding hospital stay or were on a ventilator in the PAC setting. Severely ill stays include institutional setting patients who were categorized as SOI level 4 during the immediately preceding hospital stay. Multiple body systems include institutional patients with diagnoses involving five or more body systems. Highest acuity patients were institutional patient categorized as SOI level 4, were on dialysis, and had severe wounds or pressure ulcer.

