ONLINE APPENDIXES 4

Paying for sequential stays in a unified prospective payment system for post-acute care

ONLINE APPENDIX 4-A

Sequential stays in a unified payment system for post-acute care

The Commission's analysis of the 2013 PAC stays was based on 8.9 million stays across the four PAC settings—skilled nursing facilities (SNFs), home health agencies (HHAs), inpatient rehabilitation facilities (IRFs), and long-term care hospitals (LTCHs). (About 10 percent of stays had missing data and were dropped.) The costs per stay include all Medicare-allowed expenses, including overhead costs and the costs associated with teaching programs and treating low-income patients (in IRFs). We estimated the costs of therapy and nontherapy ancillary (NTA) services (such as drugs) by converting the charges for these services (found in claims data) to costs using facility-specific and department-specific cost-to-charge ratios (from each provider's cost report).[1] All costs were standardized using the provider's wage index.

We did not have measures of routine resource use at the patient or stay level for the PAC stays in 2013. Since we had estimates of routine costs for the stays specially collected in CMS's Post-Acute Care Payment Reform Demonstration (PAC–PRD), we developed a model to predict routine costs using patient and stay characteristics.[2] We then applied this model to the 2013 PAC stays to predict their routine costs. We calculated an average routine cost per stay from each provider's Medicare cost report and used the model prediction to adjust a stay's routine cost up or down relative to the facility average. We expect the Secretary would use a full year of PAC claims and a recent cost reporting period to establish the design of a PAC PPS.

Estimating PAC PPS payments per stay in 2013 using patient and stay characteristics

To establish payments, the PAC PPS design relies on models that predict the cost of stays using patient and stay characteristics. The total predicted cost of each stay was adjusted by a uniform multiplier to establish a PAC PPS payment and ensure that aggregate PAC PPS payments under the new design equaled those under the current PPSs (that is, the new payment system is "budget neutral" and does not raise or lower aggregate spending).

We used the following information to predict the cost of stays:

- patient age and disability status;
- primary reason to treat (approximated by the Medicare severity–diagnosis related groups (MS–DRGs)[3];
- patient comorbidities;
- 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 (APR–DRGs);
- the number of body systems involved in the patient's comorbidities;
- the patient's risk score;
- the patient's frailty[4];
- the patient's cognitive status; and
- other aspects of care (bowel incontinence, severe wounds or pressure ulcers, use of certain high-cost service items, and difficulty swallowing).[5]

We included these factors because they captured different dimensions of a patient that could influence the cost of care. The Secretary may wish to consider other dimensions or other measures of the same dimensions in the final design.

We used Poisson regression models and developed one model to predict the costs of routine and therapy care for stays in the four PAC settings and a separate model to predict NTA costs for stays in skilled nursing facilities (SNFs), independent rehabilitation facilities (IRFs), and long-term care hospitals (LTCHs).[6] We developed a separate model for NTA services because the home health care benefit does not cover these services. Because routine and therapy costs are so much lower for stays treated by home health agencies (HHAs) compared with stays treated in the institutional settings (SNFs, IRFs, and LTCHs), we included a home health indicator in the model predicting routine and therapy costs. Without this adjustment, the model would predict costs that are too high for HHA stays and too low for stays in institutional PAC settings; if used to establish payments, the model would substantially overpay HHAs and underpay the other PAC providers. Our analyses suggest that this adjustment would be substantial (Medicare Payment Advisory Commission 2016). The predicted costs for routine and therapy services and the predicted costs for NTA services were combined for a total predicted cost per stay.

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). However, we did include indicators for ventilator care, tracheostomy care, and continuous positive airflow pressure because the cost of these services is significant and use is much less likely to be influenced by payment policy.

Adjusting PAC PPS payments to include outlier policies

Because some patients' care needs are considerably higher or lower than expected, we developed two outlier policies that would adjust PAC PPS payments for these stays. A high-cost outlier policy would protect providers from incurring exceptionally large losses from treating unusually high-cost stays and would help ensure beneficiary access to services. We modeled an illustrative high-cost outlier policy setting two pools (one for home health care stays and one for institutional PAC stays) at 5 percent of spending. Providers would receive the PAC PPS payment plus 80 percent of the difference between the fixed loss amount and the remaining cost of the stay.

A short-stay policy protects the program and taxpayers from excessive payments that would otherwise result for unusually short stays. Instead of being paid a full stay amount, short stays would be paid a daily rate for the duration of the stay. We defined short home health stays using the definition for a low-utilization payment adjustment under the current home health care PPS (four or fewer visits) and short institutional PAC stays as the lowest 10 percent of stays in each institutional PAC setting, with cutoffs set separately for each setting. We calculated the average cost per day for short stays across all institutional PAC stays and multiplied this amount by the number of days in the stay. Similarly, for home health stays, we calculated an average per visit cost for short stays and multiplied this amount for the duration of the short stay. We added 20 percent to the first day (or visit) to acknowledge the higher costs typically incurred the first day of the stay. We reimposed a budget-neutrality adjustment after establishing the short-stay outlier payment to again ensure that payments under the new system would equal payments under current PPSs.

Updating the costs and payments to 2017 levels

To evaluate the need for a transition and the level of payments, we first updated the costs and payments of the 2013 stays to the level of costs and payments in 2017. This updating provides a more current picture of the need for a transition and whether payments in 2017 are aligned to the costs of stays. The estimated costs and payments in 2017 are the starting point for all analyses included in this chapter.

To update the costs to 2017 levels, we inflated our estimates of the costs of 2013 stays using the average cost increases by PAC setting. For the institutional PAC settings, we used the market basket increases estimated by CMS for each setting. Because HHAs typically hold their cost increases significantly below market basket, we conservatively assumed that HHA costs grew at a rate slightly higher than the average actual changes in the cost per visit between 2011 and 2015. Because we are estimating the 2017 costs for the same 2013 PAC stays, we do not factor in any change in case mix. We also factored in estimates of any additional costs projected for 2016 and 2017, such as the costs of implementing the long-term care regulations that SNFs will incur beginning in 2017.

To estimate payments in 2017, we updated each stay's payment by the update included in each setting's final rules between 2013 and 2017 (based on the end date of the stay). These factors include the market basket updates, the reductions to payments to IRFs and LTCHs mandated by the Patient Protection and Affordable Care Act of 2010, forecast error corrections, required rebasing, coding adjustments, and other changes to payments. ■

TABLE 4–A1

The 25 most frequent sequences of post-acute care

Sequence	Frequency	Percent	Cumulative percent
H	2,290,337	42.9%	42.9%
S	969,965	18.2	61.1
HH	400,527	7.5	68.6
SH	322,159	6.0	74.7
HHH	144,493	2.7	77.4
SS	125,440	2.4	79.7
I	123,523	2.3	82.0
HHHHHH	112,255	2.1	84.2
IH	97,679	1.8	86.0
HS	95,162	1.8	87.8
HHHH	72,678	1.4	89.1
L	51,367	1.0	90.1
HHHHH	46,424	0.9	91.0
SHH	36,372	0.7	91.6
SSH	27,253	0.5	92.2
IS	23,711	0.4	92.6
SSS	21,014	0.4	93.0
SHS	20,724	0.4	93.4
HSH	19,917	0.4	93.8
LS	18,733	0.4	94.1
HHS	16,322	0.3	94.4
HI	15,218	0.3	94.7
HSS	13,242	0.3	94.9
IHH	12,035	0.2	95.2
ISH	10,860	0.2	95.4
All other	246,966	4.6	100

Note: H (home health stay), S (skilled nursing facility stay), I (inpatient rehabilitation facility stay), L (long-term care hospital stay). The sequence shows the order and count of the stays. For example, a HH refers to a two-stay sequence and both stays were home health care. The 8.9 million PAC stays in 2013 were provided in 5,334,377 sequences of post-acute care.

Source: Analysis of 2013 PAC stays conducted for the Commission by the Urban Institute (Wissoker and Garrett 2018).

TABLE 4–A2

Beneficiary characteristics by position of the stay in the PAC sequence

Position in sequence	Number of stays	Very old	Dual eligible	ESRD	Disabled	Cognitively impaired	Community admission	Least frail	Most frail	CCI	Multiple body systems	Severely ill
All PAC stays	8,877,513	30%	32%	4%	26%	20%	50%	7%	11%	5%	N/A	N/A
Home health stays												
All	6,099,989	29%	33%	4%	27%	16%	68%	10%	6%	2%	N/A	N/A
Solo	2,290,337	28	29	3	24	16	55	11	7	3	N/A	N/A
First of multiple	1,020,688	30	38	4	29	17	73	9	6	2	N/A	N/A
Second	1,388,388	29	32	4	26	17	66	8	7	3	N/A	N/A
Third	581,866	30	36	4	30	17	86	9	4	1	N/A	N/A
Fourth	319,637	30	39	4	32	17	90	8	4	1	N/A	N/A
Fifth	196,815	30	41	4	33	18	92	8	4	0	N/A	N/A
Sixth	125,718	31	43	4	34	18	94	8	3	0	N/A	N/A
Institutional post-acute care stays												
All	2,777,524	31%	30%	5%	23%	27%	10%	2%	21%	11%	17%	14%
Solo	1,144,855	32	33	5	24	31	11	2	21	11	18	15
First of multiple	847,483	30	24	5	21	21	7	2	21	12	15	14
Second	479,783	33	31	6	24	28	12	2	22	8	18	13
Third	164,420	32	32	7	25	28	15	2	22	6	19	11
Fourth	59,590	32	33	8	26	28	15	2	22	6	21	11
Fifth	24,018	32	34	8	27	28	15	2	23	6	23	12
Sixth	9,255	34	35	8	27	29	15	2	23	7	23	13

Note: PAC (post-acute care), ESRD (end-stage renal disease), CCI (chronically critically ill), N/A (not applicable). "Institutional post-acute care" refers to stays in skilled nursing facilities (SNFs), inpatient rehabilitation facilities (IRFs), and long-term care hospitals (LTCHs). The table shows the share of stays with the respective characteristic(s). Because each row and column is independent, the rows and columns will not sum to 100 percent. "First-of-multiple" PAC stays are stays discharged to subsequent PAC settings—either home health or institutional PAC. Second, third, fourth, fifth, and sixth stays could be preceded and/or followed by PAC stays of any type, home health or institutional. For example, a third home health stay was third in a sequence of PAC stays, and the sequence could include home health and institutional PAC stays before and after the third stay. Dual-eligible beneficiaries are eligible for Medicare and Medicaid. "Least frail" and "most frail" refer to stays assessed as having the least and most frail patients using the JEN Frailty Index. (The JEN Frailty Index is an algorithm that identifies frail older adults who may be at risk for institutionalization.) "CCI" refers to stays for beneficiaries who spent eight or more days in an intensive care or coronary care unit. "Severely ill" refers to stays for patients who were treated in institutional PAC and categorized as severity of illness level 4 during the immediately preceding hospital stay. "Multiple body systems" refers to stays for patients with diagnoses that involved five or more body systems and were treated in institutional PAC settings (thus, "not applicable" in the home health portion of the table). Other combinations of visits with seven or more stays in the sequence are not shown.

Source: Analysis of 2013 PAC stays conducted for the Commission by the Urban Institute (Wissoker and Garrett 2018).

TABLE 4–A3

Mix of clinical conditions, by position of the stay in the sequence of PAC

Position in sequence	Outliers	Ventilator care	Severe wound care	Stroke	Other neurology medical	Orthopedic		Respiratory medical	Cardiovascular		Infectious disease medical	Hematology medical
						Medical	Surgical		Medical	Surgical		
All PAC stays	11%	0.4%	5%	2%	8%	10%	10%	9%	15%	3	3	2
Home health stays												
All	11%	0.03%	5%	1%	9%	12%	6%	8%	17%	2%	2%	2%
Solo	8	0.02	3	1	8	12	10	8	13	4	2	1
First of multiple	16	0.03	5	1	10	12	2	9	19	2	1	2
Second	11	0.03	5	2	8	12	9	8	17	2	2	2
Third	11	0.05	6	0	10	12	1	7	21	1	1	3
Fourth	10	0.07	7	0	11	11	1	7	22	1	11	4
Fifth	9	0.08	6	0	11	11	0	7	22	0	1	5
Sixth	8	0.10	6	0	11	10	0	6	22	0	0	6
Institutional post-acute care stays												
All	10%	1.2%	4%	4%	5%	5%	17%	11%	9%	4%	6%	1%
Solo	11	1.4	3	4	5	5	17	11	9	4	7	1
First of multiple	9	1.1	4	5	4	6	25	8	7	5	5	1
Second	11	0.8	5	4	5	5	10	11	11	4	6	2
Third	11	0.9	6	3	6	5	8	11	12	3	6	2
Fourth	11	1.0	7	3	6	5	8	11	12	3	6	2
Fifth	12	1.0	8	3	5	5	8	11	12	3	7	2
Sixth	15	1.3	8	3	5	5	8	11	12	3	7	2

Note: PAC (post-acute care). "Institutional post-acute care" refers to stays in skilled nursing facilities (SNFs), inpatient rehabilitation facilities (IRFs), and long-term care hospitals (LTCHs). The table shows the share of stays with the respective characteristic(s). Because each row and column is independent, the rows and columns will not sum to 100 percent. "First-of-multiple" PAC stays are stays discharged to subsequent PAC settings—either home health or institutional PAC. Second, third, fourth, fifth, and sixth stays could be preceded and/or followed by PAC stays of any type, home health or institutional. For example, a third home health stay was third in a sequence of PAC stays, and the sequence could include home health and institutional PAC stays before and after the third stay. Other combinations of visits with seven or more stays in the sequence are not shown.

Source: Analysis of 2013 PAC stays conducted for the Commission by the Urban Institute (Wissoker and Garrett 2018).

TABLE 4–A4

Provider characteristics of post-acute care stays

Position in sequence	Number of stays	Nonprofit	For profit	Hospital based	Freestanding
All PAC stays	8,877,513	27%	70%	11%	89%
Home health stays					
All	6,099,989	27%	70%	10%	90%
Solo	2,290,337	36	61	14	86
First of multiple	1,044,654	21	76	8	92
Institutional post-acute care stays					
All	2,777,524	28%	67%	12%	88%
Solo	1,144,855	28	67	11	89
First of multiple	854,531	32	63	19	81

Note: PAC (post-acute care). "Institutional post-acute care" includes stays in skilled nursing facilities (SNFs), inpatient rehabilitation facilities (IRFs), and long-term care hospitals (LTCHs). "First-of-multiple" PAC stays include all stays discharged to subsequent PAC—either home health or institutional PAC.

Source: Analysis of 2013 PAC stays conducted for the Commission by the Urban Institute (Wissoker and Garrett 2018).

TABLE 4–A5

Estimated payments under the post-acute care prospective payment system, costs, and ratio of payments to costs by timing of the stay

Sequence length (in stays)	Stay number in the sequence	Average PAC PPS payment	Average cost	Average payment/ Average cost	Number of stays
Home health stays					
1	Solo	$2,530	$2,190	1.16	2,290,337
2	First	2,735	2,699	1.01	517,293
	Second	2,643	2,278	1.16	828,818
3	First	2,739	2,611	1.05	207,970
	Second	2,783	2,565	1.08	245,854
	Third	2,584	2,087	1.24	264,894
4	First	2,754	2,592	1.06	105,309
	Second	2,756	2,430	1.13	116,255
	Third	2,724	2,343	1.16	118,887
	Fourth	2,567	1,982	1.29	120,314
5	First	2,762	2,574	1.07	64,902
	Second	2,735	2,356	1.16	69,767
	Third	2,697	2,226	1.21	70,040
	Fourth	2,686	2,204	1.22	71,257
	Fifth	2,545	1,896	1.34	68,633
6	First	2,649	2,174	1.22	125,214
	Second	2,619	2,056	1.27	127,694
	Third	2,601	1,986	1.31	128,045
	Fourth	2,603	1,982	1.31	128,066
	Fifth	2,599	1,979	1.31	128,182
	Sixth	2,529	1,790	1.41	125,718
Institutional post-acute care stays					
1	Solo	$16,289	$14,245	1.14	1,144,855
2	First	16,277	13,948	1.17	604,592
	Second	16,135	14,318	1.13	293,067
3	First	17,060	15,191	1.12	159,089
	Second	16,321	14,334	1.14	121,205
	Third	16,056	14,100	1.14	102,165
4	First	17,655	16,097	1.10	53,085
	Second	16,599	14,785	1.12	42,139
	Third	16,504	14,821	1.11	39,507
	Fourth	16,329	14,287	1.14	38,080
5	First	18,097	16,740	1.08	20,958
	Second	16,929	15,162	1.12	16,093
	Third	16,682	15,205	1.10	15,820
	Fourth	16,739	15,052	1.11	14,603
	Fifth	16,586	14,677	1.13	17,227
6	First	18,381	17,506	1.05	9,759
	Second	17,362	16,147	1.08	7,279
	Third	17,116	15,966	1.07	6,928
	Fourth	17,041	15,784	1.08	6,907
	Fifth	17,242	16,016	1.08	6,791
	Sixth	17,267	16,246	1.06	9,255

Note: PAC (post-acute care), PPS (prospective payment system). Within each type of stay (home health or institutional PAC) and sequence length, the count of stays by stay number varies because not all stays were treated in that setting. For example, in the home health sequence with 4 stays, there were 116,255 second stays and 118,887 third stays because some second stays were furnished in institutional PAC settings. Other combinations of visits with seven or more stays in the sequence are not shown.

Source: Analysis of 2013 PAC stays conducted for the Commission by the Urban Institute (Wissoker and Garrett 2018).

Endnotes

1 Nontherapy ancillary services include drugs, respiratory care, ventilator services, and other miscellaneous ancillary services such as laboratory tests and radiological exams. They account for 13 percent of SNF and IRF stay costs and 35 percent of LTCH stay costs.

2 IMPACT required the Commission to evaluate and recommend features of a prospective payment system for the four PAC settings using data from CMS's PAC–PRD and to estimate the impacts of moving to a unified PAC PPS.

3 The diagnosis related group, comorbidities, severity of illness, and number of body systems were calculated from the hospital claim when there was a preceding hospital stay or simulated from PAC claims for stays without a preceding hospitalization.

4 The measure of frailty we used was the JEN frailty index, an algorithm developed by JEN Associates Inc. to identify frail older adults who may be at risk of institutionalization. The index is based on 13 categories of diseases or signs found to be significantly related to concurrent or future need for long-term care services. The algorithm uses diagnosis codes from claims. We included the 13 components of the index in the administrative models because functional status information was not available.

5 The following are classified as severe wounds: a nonhealing surgical wound; an infected wound; a wound for a patient who is morbidly obese; a fistula; osteomyelitis; or a Stage III, Stage IV, or unstageable pressure wound.

6 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 stays with no NTA or therapy costs).

References

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