Factors Associated with Prolonged Observation Services Stays and the Impact of Long Stays on Patient Cost

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Background. Patients are treated using observation services (OS) when their care needs exceed standard outpatient care (i.e., clinic or emergency department) but do not qualify for admission. Medicare and other private payers seek to limit this care setting to 48 hours.

Data Source/Study Setting. Healthcare Cost and Utilization Project data from 10 states and data collected from two additional states for 2009.

Study Design. Bivariate analyses and hierarchical linear modeling were used to examine patient- and hospital-level predictors of OS stays exceeding 48 (and 72) hours (prolonged OS). Hierarchical models were used to examine the additional cost associated with longer OS stays.

Principal Findings. Of the 696,732 patient OS stays, 8.8 percent were for visits exceeding 48 hours. Having Medicaid or no insurance, a condition associated with no OS treatment protocol, and being discharged to skilled nursing were associated with having a prolonged OS stay. Among Medicare patients, the mean charge for OS stays was \$10,373. OS visits of 48–72 hours were associated with a 42 percent increase in costs; visits exceeding 72 hours were associated with a 61 percent increase in costs.

Conclusion. Patient cost sharing for most OS stays of less than 24 hours is lower than the Medicare inpatient deductible. However, prolonged OS stays potentially increase this cost sharing.

Key Words. Observation services, observation unit, patient cost, Medicare payment policy

Following a hospital clinic or emergency department (ED) visit, patients are either discharged, admitted, or their outpatient visit is continued as an “observation service” (OS). The Centers for Medicare and Medicaid Services (CMS) defines observation care as “a well-defined set of specific, clinically appropriate services, which include ongoing short-term treatment, assessment, and reassessment before a decision can be made regarding whether the patient will require further treatment as a hospital inpatient or if they are able to be

discharged from the hospital” (CMS 2009). Medicare expects OS duration to be less than 48 hours with only rare and exceptional cases spanning beyond that timeframe (CMS 2009). Some private payers have expressly stated similar OS payment policies to that of Medicare on this issue (Cigna 2010; Blue Cross of North Carolina Corporate Medical Policy 2011).

In the last several years the use of OS has increased (Bissey 2008; Venkatesh et al. 2011), potentially exposing more Medicare beneficiaries to the increased cost sharing (Feng, Wright, and Mor 2012; Baugh and Schuur 2013). This difference in cost sharing stems from OS being an outpatient service delivered in a hospital setting, and the differences in copayment, coinsurance, and deductibles between Medicare part A and part B. In addition, Medicare’s policy is that skilled nursing visits are only covered if preceded by a 3-day inpatient stay, which time in OS does not count toward. As Baugh and Schuur (2013) show, this cost can be substantially higher than the inpatient deductible. In contrast with this concern is evidence that protocol-driven OS is clinically and economically beneficial for several conditions, and operationally advantageous to hospitals (Rydman et al. 1997; Farkouh et al. 1998; Goodacre et al. 2004; Diercks et al. 2006; Greenberg, Dudley, and Rittichier 2006; Sikka, Ornato, and Gonzalez 2006; Baugh, Venkatesh, and Bohan 2011).

Despite the concern over the financial consequences for patients and how these might be exacerbated in the case of longer observation stays, there are a limited number of studies on the variations in hospitals’ use of OS specifically on the prevalence of and determinants associated with prolonged observation stays, and an even more limited number of studies examining all-payer patients. Recent work has noted a sharp rise in the number of Medicare enrollees being treated in observation relative to inpatient care (Feng, Wright, and Mor 2012). We expand on their contribution by describing the use of OS by time in OS in the all-payer population, hospital-level variations in the use of OS, and examining the patient and hospital characteristics associated with long OS stays. To provide this insight, we combined and analyzed multiple statewide databases made available to the Agency for Healthcare Research

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and Quality (AHRQ), selecting states which had complete datasets that allowed us to identify OS and represented diverse regions of the United States. We then examined patient- and hospital-level factors associated with prolonged OS stays. In addition, we test whether there is additional cost associated with extended time in OS, and we use these estimates to calculate the additional patient cost burden associated with long OS stays.

METHODS

Data

The data were drawn from 12 states providing 2009 outpatient OS data to the Healthcare Cost and Utilization Project (HCUP), which is sponsored by AHRQ. Two state data organizations (NE and WA) provided discrete outpatient OS databases to HCUP. For 10 statewide data organizations, OS data were captured as part of their State Emergency Department Databases (SEDD) and State Ambulatory Surgery Databases (SASD; GA, IA, KY, MD, MN, SC, SD, TN, VT, and WI; AHRQ-HCUP). State Inpatient Databases were employed to allow us to examine the proportion of OS to the sum of OS and inpatient encounters (AHRQ-HCUP). HCUP data include standard patient demographic information, expected primary payer, patient disposition, and International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnoses and procedure codes and/or current procedural terminology (CPT) codes. ICD-9-CM diagnosis codes were used to assign three-digit Clinical Classification Software (CCS) diagnosis codes (AHRQ-CCS).

Defining OS. We identified patient encounters at acute care community hospitals that resulted in OS use by revenue codes, CPT codes, and observation charges and/or identification by the state (see Appendix SA2 for details). Since many payers, such as Medicare, only pay for OS which exceed 8 hours, and we are interested in prolonged OS rather than very short OS, we limited our analysis to patients whose observation stay was at least 8 hours in length (CMS 2012). We also excluded records with labor and delivery diagnoses. Details of the selection process are in the Appendix SA2.

Analysis

We first constructed the hospital-level distribution of the proportion of OS encounters to the sum of OS and inpatient encounters for the hospital. We

then constructed the distribution, by encounter, of hours spent in observation status to examine the patterns of OS stay length.

Visits were then grouped by time in observation status (8–24, 25–48, 49–72, and 73+ hours) for bivariate analyses of the factors associated with longer OS stays. The factors examined include age, gender, race, expected primary payer, patient disposition, community income quartile, and the top 25 CCS codes, the ratio of OS-only encounters to the total of OS and inpatient encounters, Critical Access Hospital (CAH) status, hospital teaching status, hospital size, hospital urban/rural location, hospital ownership/control, and Medicare case mix index.

We then proceeded to use multivariable regression to examine predictors of long observation stays. Because hospitals vary in their adoption and use of OS and OS-related organizational structures, we used hierarchical logistic regression modeling with the hospital being the nesting structure. Finally, to test the extent to which additional time in OS increased costs, we estimated multivariable regression models where the outcome of interest was the log of charges for the stay. These cost models were estimated both on the entire sample, and then for the subsample of those covered by Medicare. All regression models were estimated using the GLIMMIX procedure in SAS, specifying fixed slopes, random coefficients, and clustering at the hospital level.

Dependent Variable. To assess factors associated with long observation stays, we examined a binary outcome of whether the patient had a long observation stay. CMS policy dictates that observation should not last longer than 48 hours. Thus, we used this as the initial cut-off in setting the binary outcome of whether the patient's OS stay was prolonged. We then conducted sensitivity analysis using 72 hours as the cut-off point for defining a long OS stay.

To assess the extent to which long OS stays increase cost, we use the log of charges as the dependent variable. We did this for two reasons. First, health care cost data tend to be highly skewed, and the log transformation is a reasonable approach to dealing with this issue using generalized linear models, with the main concern being loss of precision (Manning and Mullahy 2001). Second, charges are not a direct representation of cost differences. However, when the interest is in the differences in cost, the coefficients estimated in the log transformed model, which can be interpreted as the percentage difference in charges, provide a good estimate of relative cost, as long as clustering of patients within hospitals is taken into account in the estimation approach.

Covariates. There is little, if any, literature addressing the factors associated with long observation stays. Patient-level factors included in the models were age, race, community income quartile, insurance status, primary clinical condition (by CCS category), and discharge destination. Hospital-level factors included in the model were teaching status, hospital location (large metro, small metro, and nonmetro), hospital ownership, hospital bed size, CAH status, hospital market competitiveness (Herfindahl-Hirschmann Index with county as the definition of hospital market area and accounting for system ownership within the market area), and categorical variables based on hospital utilization of OS (i.e., the encounters a hospital treats in OS as a proportion of all OS and inpatients).

The main covariates of interest in the relative cost estimations are categorical indicator variables for patients who spent 25–48, 49–72, and 72+ hours in OS (patients spending under 24 hours being the referent group). In these models, we also controlled for the same characteristics as the models above.

RESULTS

Of the 1,076 acute care and community hospitals in these states, 962 (89 percent) hospitals reported patient encounters resulting in OS, and 13 (1.2 percent) had proportions of encounters resulting in OS use greater than 50 percent of all encounters (OS plus inpatient). The median rate of hospital patient encounters resulting in OS use was 12; 26 percent of hospitals had less than 5 percent of patient encounters result in OS use, and 73 percent of hospitals had 20 percent or less of their patient encounters result in OS use.

The bivariate analyses of patient characteristics associated with prolonged OS are shown in Table 1. Of the 696,732 observation visits of 8 hours or more, 30.9 percent were for visits 25–48 hours in length, 4.6 percent were for visits 49–72 hours in length, and 4.2 percent were for visits 73 or more hours in length. Relative to those who had observation visits 8–24 hours long, those treated in observation for 49–72 and 73+ hours tended to be adults of older age, female, and to be discharged to SNF care ($p < .01$ in each case).

Bivariate analysis of the hospital factors related to prolonged OS are in Table 2. On a hospital level, the proportion of patients with prolonged OS was lower in smaller hospitals, CAHs, and in hospitals in nonmetropolitan areas. A larger proportion of patients with stays of 73 hours or more were treated in large hospitals, in small metropolitan area hospitals, and in not-for-profit hospitals.

Table 1: Patient Characteristics of OS by Time in OS*

Characteristic	Time in Observation				
	8-24 hours	25-48 hours	49-72 hours	73+ hours	p-value
Total number of OS visits	420,407	215,006	32,188	29,131	
Age of patient					
Average age in years	48.8	52.5	57.6	56.4	.00
Percentage of OS by gender [†]					
Male	45.4	42.1	39.7	42.3	.00
Female	54.6	57.9	60.3	57.6	.00
Percentage of OS by expected primary payer [†]					
Medicare	30.2	39.0	47.3	42.7	.00
Medicaid	14.4	14.9	14.2	12.5	.00
Private	43.0	34.5	26.3	32.8	.00
Uninsured (includes self-pay and no charge)	8.3	8.4	9.6	8.6	.11
Other	3.6	2.7	2.2	3.3	.01
Missing/invalid	0.5	0.4	0.4	0.2	.00
Percentage of OS by patient race/ethnicity ^{†,‡}					
White	66.3	67.1	68.1	78.7	.00
Black	12.9	15.4	16.2	13.9	.00
Hispanic	2.2	2.2	2.1	1.3	.00
Asian or Pacific Islander	0.8	0.7	0.8	0.6	.00
Native American	0.6	0.6	0.5	0.2	.00
Other	1.4	1.4	1.3	0.9	.00
Missing/invalid	15.8	12.5	11.0	4.4	.00
Percentage of OS by discharge disposition [†]					
Skilled nursing facility	1.0	2.1	4.3	4.1	.00
Home or home health services	90.1	89.0	83.2	87.2	.00
Against medical advice	0.7	0.4	0.4	0.6	.29
Expired	0.1	0.1	0.1	0.2	.00

continued

Table 1. *Continued*

Characteristic	Time in Observation				
	8-24 hours	25-48 hours	49-72 hours	73+ hours	p-value
Percentage of OS by community income quartile [†]					
1st quartile (<\$37,000/year)	33.1	36.6	34.6	35.2	.00
2nd quartile (\$37,000 to <\$46,000)	30.2	30.0	29.3	32.8	.00
3rd quartile (\$46,000 to <\$62,000)	22.1	20.9	22.4	19.8	.00
4th quartile (\$62,000 +)	13.0	11.0	12.0	10.4	.00

*p-values are calculated using the 8-24 hour group as the reference using the chi-squared (categorical) or t-test (continuous).

[†]Percentages are within each group of time in observation.

[‡]Race/ethnicity data based on information for 10 states; no information available for MN and NE.

OS, observation services.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Databases, 2009.

Table 2: Hospital Characteristics of OS by Time in OS*

Characteristic	Time in Observation					
	8–24 hours	25–48 hours	p-value	49–72 hours	p-value	73+ hours
Total number of OS visits	420,407	215,006		32,188		29,131
Percentage of OS by hospital ratio of OS to OS + Inpatient Encounters†	4.57					
Hospitals with ratio <5%		4.28	.00	4.66	.49	4.80
Hospitals with ratio of 5–10%	23.30	21.04	.00	22.42	.00	12.99
Hospitals with ratio of 11–20%	46.97	47.99	.00	48.73	.00	49.85
Hospitals with ratio of 21–30%	18.54	19.67	.00	18.85	.17	28.91
Hospitals with ratio of 31% or more	6.62	7.02	.00	5.35	.00	3.45
Percentage of OS by hospital type†						
Critical access hospital	9.87	8.48	.00	4.98	.00	3.24
Teaching hospital	39.27	37.93	.00	38.35	.00	26.22
Percentage of OS by hospital bed size†						
Small	19.34	19.03	.00	17.12	.00	10.96
Medium	25.19	25.71	.00	25.66	.07	25.50
Large	55.47	55.26	.11	57.22	.00	63.54
Percentage of OS by hospital location†						
Large metropolitan (pop. over 200,000)	35.06	34.23	.00	34.75	.27	15.53
Small metropolitan (pop. under 200,000)	39.98	40.60	.00	44.99	.00	71.68
Nonmetropolitan	24.96	25.16	.08	20.26	.00	12.79
Percentage of OS by hospital ownership†						
Government owned	18.26	16.56	.00	13.25	.00	7.80
Private not-for-profit	68.29	69.98	.00	73.40	.00	87.76
Private for-profit	13.45	13.46	.92	13.35	.69	4.44
Average Medicare 2009 provider-specific case mix index (CMI)	1.51	1.49	.00	1.51	.08	1.53

*p-values are calculated using the 8–24 hour group as the reference using the chi-squared (categorical) or t-test (continuous).

†Percentages are within each group of time in observation.

OS, observation services.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Databases, 2009.

Results of the hierarchical logistic modeling are shown in Table 3. Our large sample size resulted in most coefficient estimates being tightly estimated (i.e., being statistically significant at generally accepted levels). Of clinical and policy significance, however, those discharged to an SNF had a much higher odds (OR = 2.71) of having an OS encounter beyond 48 hours. Relative to Medicare patients, privately insured patients had a much lower odds of an OS stay greater than 48 hours (OR = 0.61) while those with Medicaid coverage (OR = 1.13) and the uninsured (1.18) had higher odds of a long OS stay. Relatedly, those from communities in the lowest income quartile were more likely to have an OS visit last beyond 48 hours (OR = 1.16). Those with CCS conditions which do not have well-studied treatment protocols have a higher odds of having an observation stay beyond 48 hours. These include fluid and electrolyte disorders (OR = 1.19), abdominal pain (OR = 1.40), and spondylosis (OR = 1.15). Conversely, those with well-studied protocols and admission criteria, such as chest pain (OR = 0.57), syncope (OR = 0.85), and cardiac dysrhythmias (OR = 0.56) had much lower odds of an OS stay lasting longer than 48 hours (Ross et al. 2012). Finally, hospital ownership structure appeared to have meaningful impacts on having an observation stay greater than 48 hours. OS stays in for-profit hospitals had lower odds of resulting in a long stay relative to public hospitals (OR = 0.69) while OS stays in not-for-profit hospitals had higher odds (OR = 1.16), although the confidence interval on this latter estimate was quite wide given the sample size.

Results of the cost difference estimations are in Table 4. When estimated using the full sample, being in OS for 25–48 hours increased cost by 21 percent, 49–72 hours increased cost by 42 percent, and greater than 72 hours increased costs by 60 percent. Among the Medicare subpopulation the results were similar. Stays of 25–48 hours increased cost by 22 percent, 49–72 hours increased costs by 41 percent, and stays of greater than 72 hours increased costs by 61 percent

Medicare patients have a 20 percent copayment burden for OS because it is an outpatient service. Based on the Medicare subpopulation estimates, we calculated the approximate out-of-pocket costs to Medicare patients with the referent group being those who were treated and discharged from OS within 24 hours. We provide upper bound estimates using charges, and lower bound estimates using cost estimates. To calculate costs, we converted charges to estimated costs using an adjusted cost-to-charge ratio that factors in the difference between inpatient and ED costs within each state.

The cost share for OS for Medicare patients is 20 percent, capped at the inpatient deductible (\$1,156 in 2012) for each service delivered. The mean

Table 3: Predictors of Observation Stays That Exceed Forty-Eight or Seventy-Two Hours Estimated Using Hierarchical Linear Models

Long OS Stay Defined as	> 48 hours			> 72 hours		
	OR	CI Low	CI High	OR	CI Low	CI High
<i>Patient characteristics</i>						
Age (continuous)	1.01	1.01	1.01	1.01	1.01	1.02
Female (male reference)	1.13	1.11	1.15	1.12	1.07	1.16
Payer (Medicare reference)						
Medicaid	1.13	1.09	1.18	1.14	1.06	1.23
Private	0.61	0.60	0.63	0.60	0.57	0.64
Uninsured	1.18	1.13	1.23	1.31	1.21	1.42
Other	0.68	0.64	0.73	0.72	0.63	0.81
Disposition (relative to Home/Home Health)						
Discharged to skilled nursing facility	2.71	2.57	2.85	3.54	3.28	3.83
Left against medical advice	0.57	0.49	0.67	0.56	0.41	0.77
Died	1.42	1.08	1.86	1.48	0.95	2.29
All other	1.54	1.47	1.61	1.97	1.83	2.12
ZIP income quartile (relative to highest income)						
1st quartile (<\$37,000/year)	1.16	1.11	1.22	1.18	1.09	1.28
2nd quartile (\$37,000 to <\$46,000)	1.09	1.05	1.14	1.07	0.99	1.15
3rd quartile (\$46,000 to <\$62,000)	1.05	1.01	1.09	1.05	0.98	1.13
CCS 102 Nonspecific chest pain	0.57	0.56	0.59	0.51	0.48	0.54
CCS 101 Coronary atherosclerosis	0.81	0.77	0.85	0.69	0.63	0.77
CCS 55 Fluid and electrolyte disorders	1.19	1.12	1.26	1.12	1.01	1.24
CCS 245 Syncope	0.85	0.80	0.90	0.75	0.67	0.83
CCS 251 Abdominal pain	1.40	1.32	1.48	1.52	1.37	1.68
CCS 106 Cardiac dysrhythmias	0.56	0.52	0.61	0.57	0.50	0.66
CCS 205 Spondylosis	1.15	1.08	1.23	1.41	1.26	1.56
CCS 149 Biliary tract disease	0.88	0.82	0.95	0.85	0.74	0.99
CCS 142 Appendicitis	0.44	0.39	0.50	0.44	0.35	0.56
CCS 160 Calculus of urinary tract	0.60	0.54	0.67	0.50	0.40	0.63
<i>Hospital characteristics</i>						
Nonteaching	1.17	0.98	1.40	1.27	1.04	1.54
Hospital location (relative to large metro)						
Small metro (pop. under 200,000)	1.13	0.95	1.34	1.27	1.05	1.54
Nonmetro	0.57	0.47	0.69	0.50	0.39	0.62
Hospital ownership (relative to public)						
Not-for-profit	1.16	1.00	1.35	1.23	1.02	1.49
For-profit	0.69	0.56	0.86	0.71	0.54	0.93
Hospital bed size (relative to large hospital)						
Small hospital	0.78	0.65	0.93	0.73	0.59	0.91
Medium hospital	0.94	0.81	1.10	0.93	0.78	1.11
Critical access hospital	0.48	0.40	0.57	0.42	0.33	0.54
HHI (Higher HHI -> more concentration)	1.12	0.86	1.45	0.95	0.70	1.30
OS ratio (medium use [12–17%] ref)						
Low use (ratio 0–11%)	0.84	0.72	0.98	0.98	0.81	1.18
High use (ratio 18% or higher)	0.92	0.79	1.08	0.94	0.77	1.14

CCS, Clinical Classification Software; HHI, Herfindahl-Hirschmann Index; OS, observation services.

Table 4: Factors Associated with Observation Stay Charges Estimated Using Hierarchical Linear Models

	<i>All Payers</i>		<i>Medicare</i>	
	<i>Coefficient</i>	<i>p-value</i>	<i>Coefficient</i>	<i>p-value</i>
Mean of total charges	\$10,597		\$10,373	
Mean of total costs	\$3,745		\$3,726	
<i>N</i>	696,732		238,539	
<i>Patient characteristics</i>				
Time in OS (less than 25 hours reference)				
25–48 hours	0.2131	<.0001	0.2248	<.0001
49–72 hours	0.4176	<.0001	0.4143	<.0001
>72 hours	0.5971	<.0001	0.6056	<.0001
Age (continuous)	0.0065	<.0001	–0.0018	<.0001
Female (male reference)	0.0215	<.0001	–0.0216	<.0001
Payer (Medicare reference)				
Medicaid	0.0771	<.0001		
Private	0.2058	<.0001		
Uninsured	0.1442	<.0001		
Other	0.2325	<.0001		
Disposition (relative to Home/Home Health)				
Discharged to skilled nursing facility	–0.2094	<.0001	–0.1280	<.0001
Left against medical advice	–0.1985	<.0001	–0.2572	<.0001
All other	–0.1449	<.0001	–0.0954	<.0001
ZIP income quartile (relative to highest income)				
1st quartile (<\$37,000/year)	0.0186	<.0001	0.0126	.02
2nd quartile (\$37,000 to <\$46,000)	0.0180	<.0001	0.0153	<.01
3rd quartile (\$46,000 to <\$62,000)	0.0032	.26	0.0017	.73
CCS 102 Nonspecific chest pain	0.0089	<.0001	0.0165	<.0001
CCS 101 Coronary atherosclerosis	0.6433	<.0001	0.6225	<.0001
CCS 55 Fluid and electrolyte disorders	–0.3800	<.0001	–0.2448	<.0001
CCS 245 Syncope	–0.0280	<.0001	0.0057	.31
CCS 251 Abdominal pain	0.0218	<.0001	0.0094	.25
CCS 106 Cardiac dysrhythmias	0.1555	<.0001	0.1858	<.0001
CCS 205 Spondylosis	0.4051	<.0001	0.1155	<.0001
CCS 149 Biliary tract disease	0.5400	<.0001	0.5125	<.0001
CCS 142 Appendicitis	0.7809	<.0001	0.7181	<.0001
CCS 160 Calculus of urinary tract	0.2585	<.0001	0.3037	<.0001
<i>Hospital characteristics</i>				
Nonteaching	–0.0597	.07	–0.0745	.02
Hospital location (relative to large metro)				
Small metro (pop. under 200,000)	0.0123	.70	0.0006	.98
Nonmetro	–0.2031	<.0001	–0.2329	<.0001
Hospital ownership (relative to public)				
Not-for-profit	0.1305	<.0001	0.1080	<.0001
For-profit	0.4614	<.0001	0.4049	<.0001

continued

Table 4. Continued

	All Payers		Medicare	
	Coefficient	p-value	Coefficient	p-value
Hospital bed size (relative to large hospital)				
Small hospital	−0.0848	.01	−0.1184	<.01
Medium hospital	−0.0127	.66	−0.0458	.11
Critical access hospital	−0.2125	<.0001	−0.1873	<.0001
HHI (higher HHI -> more concentration)	−0.1887	<.0001	−0.2021	<.0001
OS ratio (medium use [12–17%] ref)				
Low use (ratio 0–11%)	0.0012	.97	−0.0006	.98
High use (ratio 18% or higher)	−0.1246	<.0001	−0.1034	<.01

CCS, Clinical Classification Software; HHI, Herfindahl-Hirschmann Index; OS, observation services.

charge for the 238,539 Medicare patient OS stays was \$10,373, which translates into \$3,726 in costs. Based on charges, this would translate into patient out-of-pocket payments of about \$2,075 (assuming no individual service exceeded \$5,780, at which point the inpatient deductible cap would take effect). Based on our estimate of costs rather than charges, the out-of-pocket payments would total \$745.

DISCUSSION

Our analysis of the use of observation status among 696,732 patient encounters at 962 acute care community hospitals across 12 states reveals a few points of interest. First, while the majority of OS encounters are under 48 hours, 61,319 (8.8 percent) are longer. Second, the propensity to use OS varies widely across hospitals. Third, financial considerations and whether the specific clinical condition of the patient has a well-established treatment protocol appear to impact whether patients have a long OS stay.

There is considerable variation in the frequency of OS use among hospitals regardless of payer type. The ratio of OS patient encounters to the sum of OS and inpatient encounters has a skewed distribution whose peak was around 11–20 percent. This peak is consistent with a 2011 study by Wiler, Ross, and Ginde (2011), where the authors found 15 percent of patients stayed in the hospital following an ED visit, with 26 percent of these patients either admitted to an observation unit or for a brief stay (<48 hours) in an inpatient bed in 2007. However, it is also notable that roughly 26 percent of hospitals in

the 12 states for which we have data reported using observation for less than 5 percent of admissions (11 percent did not use OS at all). This variation is potentially driven by the presence, or lack thereof, of a dedicated observation unit in the hospital, although we do not have the ability to examine this in these data currently.

As payment policies shift and more attention is paid to this growing area of service delivery, there is substantial potential for the use of observation to grow both within and across hospitals which may have consequences for patient cost sharing. To be specific, in 2012 a patient admitted as an inpatient faces a \$1,156 deductible per admission, and 0 percent coinsurance up to a 60-day stay under Medicare Part A. A patient admitted to observation, on the other hand, faces a \$140 annual deductible per year, but coinsurance of 20 percent of Medicare's approved amount for each service provided, and treatment in OS often involves multiple services. The \$1,156 inpatient copay amounts to 20 percent of the \$5,780 allowable amount, which could easily be exceeded for an observation stay involving a condition like chest pain. Furthermore, drugs administered to the patient in observation would not be covered as they would if the patient were admitted, and frequently these are not covered under a patient's part D plan, further increasing the cost share of an observation stay.

Based on our estimates, patients staying in OS longer than 24 hours are likely to face substantially increased out-of-pocket costs. Medicare patients who stay 25–48 hours had additional out-of-pocket costs ranging from \$170 to \$470; for stays of 48–72 hours this range was \$310–\$860 and for stays greater than 72 hours this range was \$455–\$1,260. For an inpatient stay this cost would have been capped at the inpatient deductible of \$1,156, which is about 55 percent *more* than our low-end estimate of the mean OS visit patient cost share, but about 80 percent *less* than our high-end estimate of the mean OS visit patient cost share.

To put this in context of a Medicare recipient's income, consider that about 70 percent of Medicare recipients have income below 300 percent of the federal poverty level (AARP 2009). In 2012, this equated to \$34,000 for a household of one and \$45,000 for a household of two (DHHS 2013). So our estimates suggest that a single long OS stay (>48 hours) for a married Medicare recipient with income at 300 percent of the poverty threshold could consume, at minimum, an additional 0.7–2.8 percent of the patient's gross income.

This additional out-of-pocket cost is beyond the 2.6 percent of gross income that the inpatient deductible would have consumed. Furthermore, this does not take into account that some of these patients then also incur

additional costs for skilled nursing because they did not meet the 3-day inpatient stay requirement. Another final consideration, which we are not able to assess in our data, is that if the patient were admitted and returned and was admitted within 60 days, which occurs about 20–25 percent of the time for Medicare patients, the inpatient deductible paid on the first visit covers the subsequent visit, whereas in the case of returns to OS no such limit is in place.

There is no systematic public data on private payer policies for OS and patient cost shares. However, private payers often adopt policies similar to Medicare's, and in the case of OS this appears to be true as well. For example, we examined the Federal Employee Health Benefits Blue Cross and Blue Shield policy on OS patient cost sharing (<http://www.opm.gov/healthcare-insurance/healthcare/plan-information/plan-codes/2012/brochures/71-005.pdf>). In this plan, OS care is treated as outpatient care similar to Medicare. Under the standard option, patients are responsible for 15–35 percent (preferred vs. member provider) of the allowable charges after the deductible is met. This contrasts with a \$250–\$350 inpatient deductible under the same plan.

There are several other potential reasons why hospitals vary so widely in their use of OS. One of these would be the complexity of the reimbursement rules for OS, how they have shifted over time, and hospitals' differing interpretations of the rules. Historically, payment system designs like Medicare's diagnosis-related group-based prospective payment system incented admitting short-stay patients because payment for these is higher than for cost-based payments associated with observation. In 2000, when CMS began using the Ambulatory Payment Categories, payment for OS were packaged into other associated visits, such as ED visits (CMS 2009). This encourages the use of inpatient services over OS. To counter this, CMS has made four major changes in how it pays hospitals for OS and instituted the Recovery Audit Contractor (RAC) program to review Medicare claims and recover payment for admissions deemed unnecessary (RAC 2008).

In the aftermath of these multiple changes, it is not surprising to see considerable variation in hospital practices. Looking ahead, the recently implemented Hospital Readmission Reduction Program (HRRP), which penalizes hospitals with higher than expected readmission rates, is likely to further exacerbate this variation in practice (HRRP 2011). This is because hospitals with higher readmission rates could potentially use OS to manage their readmission rate to avoid penalties. To the extent that CMS policy changes alter overall hospital managerial policies, these shifts are likely to have consequences for all patients, not just Medicare patients.

CONCLUSION

Across the 12 states we examined, we found wide variation in the use of observation and the proportion of patients experiencing long OS stays. The role of observation medicine in the continuum of health services is still developing, which has created some concerns over Medicare coverage policies. Given the promise this care setting has shown, aligning incentives to encourage appropriate use of this care and to alleviate the cost-sharing burden for patients would likely allow for more efficient and effective care.

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REFERENCES

- AARP. 2009. Fact Sheet. The Medicare Population [accessed on July 17, 2013]. Available at http://assets.aarp.org/rgcenter/health/fs149_medicare.pdf

- AHRQ. Clinical Classification Software (CCS) [accessed on March 2012]. Available at <https://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp>
- AHRQ Health Care Utilization Project. Information on Data [November 19, 2006]. Available at <https://www.hcup-us.ahrq.gov/>; SASD: <https://www.hcup-us.ahrq.gov/sasd> overview.jsp; SEDD: <https://www.hcup-us.ahrq.gov/seddoverview.jsp>; SID: <https://www.hcup-us.ahrq.gov/sidoverview.jsp>
- AMA CPT Catalog Description [accessed on April 2, 2012]. Available at <https://catalog.ama-assn.org/MEDIA/ProductCatalog/m900015/Prin%20of%20CPT-4ed.pdf>
- Baugh, C. W., and J. D. Schuur. 2013. "Observation Care—High-Value Care or a Cost-Shifting Loophole?" *New England Journal of Medicine* 369: 302–5.
- Baugh, C. W., A. K. Venkatesh, and J. S. Bohan. 2011. "Emergency Department Observation Units: A Clinical and Financial Benefit for Hospitals." *Health Care Management Review* 36: 28–37.
- Bissey, B. 2008. Observation, Admission, and RAC-The Next Perfect Storm? (No. 12) [accessed on March 2012]. Philadelphia, PA: IMA Consulting. Available at http://www.ima-consulting.com/insights/IMA_Insights_1208.pdf
- Blue Cross of North Carolina Corporate Medical Policy. 2011. Observation Room Services [accessed on March 2012]. Available at http://www.bcbsnc.com/assets/services/public/pdfs/medicalpolicy/observation_room_services.pdf
- Cigna. 2010. Cigna Medical Coverage Policy: Subject Observation Care [accessed on March 2012]. Available at http://www.cigna.com/assets/docs/health-care-professionals/coverage_positions/mm_0411_coveragepositioncriteria_observation_care.pdf
- CMS. 2009. Manual System, July 2009 Update of the Hospital Outpatient Prospective Payment System (OPPS), Pub 100-02 Medicare Benefit Policy, Transmittal 10, Change Request 6492 [accessed September 8, 2010]. Department of Health & Human Services (DHHS), Centers for Medicare & Medicaid Services (CMS). Available at <https://www.cms.gov/transmittals/downloads/R107BP.pdf>
- CMS. 2012. Medicare Claims Processing Manual. Chapter 4, Part B Hospital. Rev. 2611 [accessed on December 14, 2012].
- DHHS. 2013. Federal Poverty Guidelines, 2012 [accessed on July 17, 2013]. Available at <http://aspe.hhs.gov/poverty/12poverty.shtml>
- Diercks, D. B., W. F. Peacock, J. D. Kirk, and J. E. Weber. 2006. "ED Patients with Heart Failure: Identification of an Observational Unit-Appropriate Cohort." *American Journal of Emergency Medicine* 24 (3): 319–24.
- Farkouh, M. E., A. Aneja, G. S. Reeder, A. R. Zinsmeister, R. W. Evans, T. D. Meloy, S. L. Kopecky, M. Allen, T. G. Allison, R. J. Gibbons and S. E. Gabriel. 1998. "A Clinical Trial of a Chest-Pain Observation Unit for Patients with Unstable Angina. Chest Pain Evaluation in the Emergency Room (CHEER) Investigators." *New England Journal of Medicine* 339: 1882–8.
- Feng, Z., B. Wright, and V. Mor. 2012. "Sharp Rise in Medicare Enrollees Being Held in Hospitals for Observation Raises Concerns about Causes and Consequences." *Health Affairs* 31 (6): 1251–9.

- Goodacre, S., J. Nicholl, S. Dixon, E. Cross, K. Angelini, J. Arnold, S. Revill, T. Locker, S. J. Capewell, D. Quinney, S. Campbell and F. Morris. 2004. "Randomised Controlled Trial and Economic Evaluation of a Chest Pain Observation Unit Compared with Routine Care." *British Medical Journal* 328 (7434): 254.
- Greenberg, R. A., N. C. Dudley, and K. K. Rittichier. 2006. "A Reduction in Hospitalization, Length of Stay, and Hospital Charges for Croup with the Institution of a Pediatric Observation Unit." *American Journal of Emergency Medicine* 24 (7): 818–21.
- HRRP (Hospital Readmissions Reduction Programs). 2011. 76 Fed. Reg. 51660 (August 18, 2011).
- Manning, W. G., and J. Mullahy. 2001. "Estimating Log Models: To Transform or Not to Transform?" *Journal of Health Economics* 20: 461–94.
- RAC. 2008. Program Details [accessed on November 19, 2013]. Available at https://www.cms.gov/Research-Statistics-Data-and-Systems/Monitoring-Programs/Recovery-Audit-Program/Downloads/RecoveryAuditDemonstration_vj508.pdf
- Ross, M. A., T. Aurora, L. Graff, P. Suri, R. O'Malley, A. Ojo, S. Bohan and C. Clark. 2012. "State of the Art: Emergency Department Observation Units." *Critical Pathways in Cardiology* 11 (3): 128–38.
- Rydman, R. J., R. J. Zalenski, R. R. Roberts, et al. 1997. "Patient Satisfaction with an Emergency Department Chest Pain Observation Unit." *Annals of Emergency Medicine* 29: 109–15.
- Sikka, V., J. P. Ornato, and M. S. Gonzalez. 2006. "The Financial and Operational Impact of an Observation Unit and Holding Area on an Emergency Department and Its Inpatient Hospital." *Academic Emergency Medicine* 13 (5): S129.
- Venkatesh, A. K., B. P. Geisler, J. J. G. Chambers, C. W. Baugh, J. S. Bohan, and J. D. Schuur. 2011. "Use of Observation Care in US Emergency Departments, 2001 to 2008". *PLoS ONE* 6 (9): e24326. doi:10.1371/journal.pone.0024326.
- Wiler, J. L., M. A. Ross, and A. A. Ginde. 2011. "National Study of Emergency Department Observation Services." *Academic Emergency Medicine* 18 (9): 959–65.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

Appendix SA2: Analytic File Creation Details.