Medicare's per-Beneficiary Potentially Avoidable Admission Measures Mask True Performance

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INTRODUCTION

The Agency for Healthcare Research and Quality's prevention quality indicators (PQIs) use hospital discharge data to identify admissions for ambulatory care-sensitive conditions (ACSCs).¹ Because they might have been avoided with better access to primary care resources, ACSC admissions are widely considered potentially avoidable, and, therefore, wasteful.^{2,3}

Designed to reflect area-level performance, PQIs are calculated using the covered population as the denominator. Because the proportion of admissions that are for ACSCs might better articulate the magnitude of potential waste,³ we sought to calculate those proportions and compare them to per-capita rates.

METHODS

From the Centers for Medicare and Medicaid Services (CMS), for each year (2008–2017) and 2 age groups (< 65 and 65+), we obtained the following: the distribution of Medicare fee-for-service enrollees across age groups; the number of fee-for-service Medicare beneficiaries

who were fully enrolled in Medicare Parts A & B (without gaps, throughout the year); the number that had a covered inpatient stay; the mean number of stays that those inpatient-using beneficiaries had; hospital re-admission rates; and numbers of 8 PQI-defined ACSC admissions per 100,000 age-group-specific beneficiaries (long-term diabetes complications, asthma or COPD, hypertension, congestive heart failure, dehydration, bacterial pneumonia, urinary tract infection, and lower extremity amputation).⁴

For each year and age group, we calculated the total number of inpatient and ACSC-specific admissions as well as the ACSC-specific and overall ACSC per-capita admission rates (aggregating ACSC admissions for 65–74 and 75+ age groups). We also calculated compound annual growth rates (CAGRs) for those measures. This work used publicly available data and was determined to be “Not Human Subjects Research” by Dartmouth College's Committee for the Protection of Human Subjects (CPHS00028121).

RESULTS

Over the 10-year period, the number of Medicare fee-for-service beneficiaries aged < 65 increased until 2012 and then decreased; those aged 65+ generally slowly increased (Table 1). In contrast, the number and proportion of fee-for-service beneficiaries with an inpatient admission fell for both groups, and the number of per-beneficiary inpatient admissions fell in the 65+ group. Overall, the number of inpatient

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Table 1 For 2008–2017 and Medicare Fee-for-Service Beneficiaries Who Are Younger than 65 (<65) or Aged 65 and Older (65+), the Total Number of Beneficiaries, Total Number of Admissions with an Inpatient Admission, and the Estimated Total Number of Admissions

Age group	Year									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number of Medicare fee-for-service beneficiaries	5,512,096	5,602,579	5,820,030	6,005,611	6,030,435	6,007,732	5,867,176	5,725,447	5,608,158	5,341,828
	26,881,440	26,650,079	26,840,306	27,238,019	27,494,158	27,634,069	27,595,806	27,825,970	28,383,382	28,383,995
Number of Medicare fee-for-service beneficiaries with an inpatient admission	1,089,000	1,108,797	1,136,644	1,150,306	1,122,200	1,105,418	1,068,710	1,033,172	1,012,841	957,506
	5,553,802	5,361,579	5,322,838	5,218,107	5,037,574	4,941,329	4,790,972	4,795,750	4,796,448	4,798,866
Proportion of Medicare fee-for-service beneficiaries with an inpatient admission	19.76%	19.79%	19.53%	19.15%	18.61%	18.40%	18.22%	18.05%	18.06%	17.92%
	20.66%	20.12%	19.83%	19.16%	18.32%	17.88%	17.36%	17.23%	16.90%	16.91%
Mean number of inpatient admissions per Medicare fee-for-service beneficiary	1.913	1.920	1.920	1.916	1.897	1.886	1.883	1.879	1.888	1.897
	1.607	1.601	1.598	1.592	1.572	1.555	1.549	1.549	1.539	1.544
Estimated number of inpatient admissions	2,083,572	2,128,980	2,182,511	2,204,059	2,128,744	2,084,683	2,012,441	1,940,927	1,912,382	1,816,222
	8,924,638	8,581,325	8,508,377	8,307,596	7,918,318	7,682,271	7,423,272	7,429,534	7,379,679	7,408,223

admissions fell by 13% for the < 65 group and by 17% for the 65+ group.

While the proportion of inpatient admissions that were for congestive heart failure (the most common ACSC admission category) increased over the study's time period (by 2.08% a year for <65 enrollees and 0.42% for 65+ enrollees, annually, on average), those for the next most common (COPD, urinary tract infection, and bacterial pneumonia) decreased, considerably for bacterial pneumonia (Table 2). Rates for relatively rare lower extremity amputation and hypertension admissions increased markedly. The ACSC admissions that we examined represented about 1/6 of all Medicare fee-for-service admissions; their rates modestly declined over time. CAGRs for ACSC admissions per beneficiary were invariably lower than those per admission. Readmission rates dropped modestly over time, seemingly much more quickly when number of beneficiaries was the denominator.

DISCUSSION

Among Medicare fee-for-service beneficiaries, between 2008 and 2017, overall admission rates fell, per-admission and per-beneficiary ACSC admission rates varied according to the ACSC examined, and ACSC rates per admission were invariably higher than those per beneficiary. ACSC admissions represented a high proportion of all Medicare fee-for-service admissions.

While per-admission and per-beneficiary ACSC admission rates were directionally the same in most cases, we believe that per-admission ACSC rates paint a more accurate and actionable performance picture. A per-admission metric not only reflects community-level performance but also conveys the proportion of potentially wasteful admissions among Medicare fee-for-service beneficiaries, particularly in the context of changing per-capita admission rates. Our analysis suggests that the large reduction in overall Medicare admissions that we saw was *not* driven by a reduction in wasteful admissions.

Our study was limited by its reliance on national data collected and aggregated by CMS, data restrictions that required us to aggregate PQI data for 65–74 and 75+ populations, and our inability to determine the degree of overlap of readmission and ACSC admission rates. Nonetheless, it demonstrated that opportunities for reducing potentially unwarranted admissions are substantial, and might be more actionable, focused, nuanced, and effective than focusing on readmission rates.⁵ Should those opportunities be addressed—for instance, through re-investment of avoided inpatient care funding into primary care services—further reductions in per-capita inpatient care utilization and costs, and improvements in healthcare value, should occur.

Table 2 For 2008–2017 and Medicare Fee-for-Service Beneficiaries Who Are Younger than 65 (<65) or Aged 65 and Older (65+), Ambulatory Care–Sensitive Condition Admissions (Defined by Several Agency for Health Research and Quality Defined Prevention Quality Indicators (PQIs)), as a Proportion of All Admissions, in Descending Order of 2017 Rates for the 65+ Group. Overall Summed Age-Specific Rates for All Examined PQIs Are Provided at the Bottom of the Table, as Are Age-Specific Readmission Rates. For Comparison Purposes, the Number of Potentially Unwarranted Admissions per 100,000 Beneficiaries for 2008 and 2017 and the CAGR from 2008 to 2017 for Those Measures Are Provided to the Right. CAGR Means Compound Annual Growth Rate

Ambulatory care–sensitive condition admission reason (PQI number)	Age group	Potentially unwarranted admissions														Number per 100,000 beneficiaries		
		Percentage of all admissions (%)																
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	CAGR (%)	2008	2017	CAGR (%)			
Congestive heart failure (PQI 8)	<65	3.19	3.14	3.04	2.93	2.92	2.91	3.05	3.16	3.33	3.84	2.08	1206	1306	0.89			
	65+	5.33	5.34	5.12	4.96	4.93	4.91	5.07	5.17	5.25	5.53	0.42	157	150	−0.50			
COPD or asthma (PQI 5 & PQI 15)	<65	4.41	4.56	4.38	4.44	4.28	4.05	3.95	3.77	3.53	3.86	−1.47	1922	1524	−2.55			
	65+	4.13	4.07	3.97	4.11	3.96	3.84	3.50	3.37	3.13	3.70	−1.19	1485	1106	−3.22			
Urinary tract infection (PQI 12)	<65	1.17	1.18	1.20	1.16	1.16	1.07	1.06	0.98	0.94	0.90	−2.87	442	306	−4.00			
	65+	2.37	2.47	2.52	2.52	2.57	2.40	2.40	2.31	2.25	2.14	−1.10	851	639	−3.14			
Bacterial pneumonia (PQI 11)	<65	2.39	2.43	2.26	2.26	2.21	2.09	2.00	1.85	1.68	1.20	−7.41	905	407	−8.50			
	65+	4.05	3.80	3.73	3.79	3.70	3.60	3.29	3.22	2.80	2.11	−6.99	1457	629	−8.90			
Dehydration (PQI 10)	<65	1.16	1.01	0.94	0.96	0.92	0.89	0.84	1.14	1.33	1.30	1.26	439	442	0.08			
	65+	1.81	1.55	1.41	1.41	1.34	1.25	1.15	1.76	2.05	1.99	1.08	1918	1652	−1.64			
Diabetes long-term complications (PQI 3)	<65	2.13	2.09	2.14	2.13	2.15	2.12	2.15	2.01	1.72	2.16	0.12	806	733	−1.05			
	65+	0.89	0.85	0.85	0.84	0.81	0.80	0.79	0.70	0.52	0.71	−2.41	294	186	−4.99			
Hypertension (PQI 7)	<65	0.41	0.41	0.43	0.42	0.43	0.40	0.38	0.36	0.41	0.71	6.29	156	243	5.05			
	65+	0.44	0.46	0.47	0.48	0.49	0.45	0.43	0.42	0.43	0.50	1.58	157	150	−0.50			
Lower extremity amputation (PQI 16)	<65	0.30	0.30	0.30	0.35	0.37	0.39	0.43	0.46	0.56	0.64	8.80	114	219	7.52			
	65+	0.14	0.13	0.13	0.16	0.17	0.17	0.18	0.19	0.21	0.24	6.22	50	71	4.04			
Overall sum of these PQIs	<65	15.17	15.14	14.69	14.66	14.44	13.93	13.85	13.74	13.50	14.61	−0.42	5990	5180	−1.60			
	65+	19.13	18.68	18.20	18.26	17.96	17.41	16.82	17.13	16.64	16.93	−1.35	6369	4583	−3.59			
Readmission rates	<65	23.1	23.3	23.4	23.4	23.0	22.6	22.7	22.8	23.0	23.3	0.08	8739	7915	−1.09			
	65+	18.4	18.2	18.2	18.0	17.5	16.9	16.9	16.8	16.7	16.8	−0.99	6102	4385	−3.61			

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