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Understanding the costs associated with surgical care delivery in the Medicare population

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Introduction

Medicare spending is projected to grow at an average rate of 7.4% per year over the next decade. [1]. Because this growth rate threatens the Program's solvency, a number of payment and delivery system reforms have been launched, most notably advanced payment models [e.g., payment bundling, accountable care organizations (ACOs)] and the patient-centered medical home. These programs are designed to reduce healthcare costs and improve (or at least maintain) quality. The collective focus of these reforms is on enhanced primary care for beneficiaries with multiple comorbid conditions. While such a focus is no doubt important, it turns a blind eye towards surgical care, which is not only a major source of morbidity and mortality among older adults, but also a large driver of healthcare resource consumption.

One possible reason is that the cost of surgical care is currently poorly understood. Older estimates suggest that inpatient surgical care represents nearly 50% of hospital expenditures and 30% of overall healthcare costs [2 3]. However, these estimates reflect only the care delivered during the initial hospitalization, and they fail to capture payments for expensive and common services that occur after discharge like those related to readmissions and post-acute care. Moreover, these estimates completely miss outpatient surgical episodes, encounters for which have risen rapidly over the last 20 years [4 5]. With the average

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American undergoing nine procedures during their lifetime [6], an accurate accounting of the costs of surgical care is needed.

In this context, we analyzed a nationally representative sample of Medicare data. After identifying beneficiaries who received surgical or procedural services, we measured payments made on their behalf during their inpatient and outpatient episodes of care. We then calculated total episode expenditures and assessed temporal trends in overall surgical spending. Finally, we examined spending trends outpatient status, site of care, and surgeon specialty. Findings from our study serve to inform policymakers and clinician leaders on where they are likely to find opportunities for reducing the costs of surgical care.

Methods

Data source and study population

For our study, we used medical claims from a 20% national sample of Medicare beneficiaries, including data from the Denominator, Medicare Provider Analysis and Review (MedPAR), Outpatient, and Carrier research identifiable files (RIFs) for calendar years 2008 to 2014. To obtain an accurate accounting of perioperative care, we required beneficiaries to have continuous part A and B enrollment during a given surgical episode (defined below) for inclusion. We excluded beneficiaries enrolled in Medicare Advantage plans because services provided to them are inconsistently captured in their claims.

Identifying inpatient and outpatient surgical episodes

To determine whether a beneficiary received surgical or procedural services, we used Health Care Procedure Coding System (HCPCS) codes for surgery on the integumentary (10000–19999), musculoskeletal (20000–29999), respiratory (30000–32999), cardiovascular (33000–37799, 93451–93662), hemic and lymphatic Systems (38000–38999), mediastinum and diaphragm (39000–39999), digestive (40000–49999), urinary (50000–53999), male (54000–55899), and female genital (55900–58999), maternity care and delivery (59000–59999), endocrine (60000–60999), nervous (61000–64999), ocular (65000–68999), or auditory systems (69000–69999) to identify relevant claims in the Carrier RIF. For the remainder of our manuscript, we will refer to surgical and procedural care as surgical care.

Place of Service and Type of Service codes allowed us to distinguish between inpatient and outpatient procedures, as well as outpatient procedures carried out in hospital outpatient departments (HOPDs) versus ambulatory surgery centers (ASCs) versus the physician office. We excluded beneficiaries whose surgical procedures took place in a skilled nursing facility (SNF) or extended-stay rehab facility. For measurement purposes, if a beneficiary underwent an outpatient procedure within 30 days of discharge from the surgical admission, we considered it part of the inpatient episode.

Calculating episode payments

To estimate the costs of surgical care, we first summed all payments for claims filed on a beneficiary's behalf during the surgical episode. For inpatient procedures, we summed all payments for claims beginning 3 days prior to admission and extending 30 days after

discharge. We further categorized the major components of payments, including those for the index hospitalization, readmissions, physician services, and post-acute care [7]. For each readmission, we identified whether it was planned or unplanned according to previous methods [8]. We treated planned readmissions as events distinct from the surgical episode and did not include payments associated with them in our estimates. Given that postoperative complications and planned readmissions are uncommon following outpatient procedures [9], we defined the outpatient surgical episode as including all claims for services delivered within a 24-hour window around the index outpatient procedure.

To determine the surgical specialty for which a given inpatient or outpatient episode was responsible, we used a plurality algorithm. Specifically, we summed up all payments during the episode by Medicare provider specialty codes (Appendix Table 1), attributing the episode to the specialty that billed for the largest amount. We then totaled all inpatient and outpatient episode payments by study year and surgical specialty. Since we were working with a 20% sample, we multiplied our totals by 5 to attain surgical cost estimates for all of Medicare fee-for-service. We inflation-adjusted payment data using the Consumer Price Index and express all totals in constant 2014 U.S. dollars [10].

Calculating total Program spending

To estimate total Program spending, we summed all payments for claims filed in the MedPAR, Carrier, and Outpatient RIFs by study year. For comparison to our surgical cohort, we used the same inclusion and exclusion criteria. Namely, Part A payments excluded those to a skilled nursing or extended-stay rehab facilities. Part B payments included payments made for office-based care, inpatient and outpatient hospital departments, and ASCs.

Statistical Analyses

For our initial analytic step, we plotted total, inpatient, and outpatient surgical payments in 2014 U.S. dollars over time. We then examined trends in component payments for inpatient surgery, site of care for outpatient surgery, surgical specialty, and total surgical payments by specialty. Finally, to determine statistical significance of these trends, we fit linear regression models, where our dependent variable was a specific payment type, and our independent variable was study year. We used SAS version 9.4 (Cary, NC) for all analyses. Tests were two-tailed, and we set the probability of Type 1 error at 0.05. The University of Michigan's Institutional Review Board deemed our study to be exempt from its oversight.

Results

Over our study period, we identified a total of 78,830,444 surgical episodes, (93.4% and 6.6% of which were performed on an outpatient and inpatient basis, respectively). Table 1 characterizes our population at three time points, revealing that the sociodemographic characteristics and levels of comorbid illness among fee-for-service beneficiaries undergoing surgery were consistent across study years. Total Medicare payments for surgical care are substantial (Table 2). For instance, they represented 51% of Program spending in 2014. Figure 1 displays estimated annual Medicare payments for surgical care by study year. They declined over the study period, from $133.1 billion in 2008 to $124.9 billion in 2014

(−6.2%, *P*=0.085 for the temporal trend). The average payment per beneficiary declined over our study period from $7773 in 2008 to $7012 in 2014.

Figure 1 also shows that while payments for inpatient surgery declined, they still accounted for the majority of Medicare spending for surgery (69.4% in 2014). Payments for the index hospitalization were the largest single component of inpatient surgical spending, followed by payments for physician services, post-acute care, and readmissions. Figure 2 highlights that payments for the index hospitalization (−16.7%, *P*=0.002), readmissions (−27.0%, *P*=0.003), post-acute care services (−5.2%, *P*=0.40), and physician services (−18.9%, *P*=0.010) declined over the study period.

As opposed to spending on inpatient surgery, Figure 1 shows that payments for outpatient surgical care increased by $8.5 billion [28.7%, compound annual growth rate (CAGR) 3.7%] between 2008 and 2014 (*P*<0.001). In 2014, fifty-two percent of outpatient surgical spending was attributable to HOPDs, while services rendered in the physician office and ASCs represented 34.8% and 12.8%, respectively. Figure 3 illustrates that there was rapid growth in spending across all three of these sites over the study period. Specifically, payments for HOPDs, the physician office, and ASCs rose by 36.6% (CAGR 4.6%; *P*<0.001 for trend), 22.1% (CAGR 2.9%; (*P*<0.001), and 18.3% (CAGR 2.4%; *P*=0.001), respectively.

Figure 4 depicts total surgical payments by specialty. Orthopedic surgery and general surgery accounted for the greatest share of payments (17.8% and 11.2% in 2014, respectively). Payments for many specialties rose over the study period, with ophthalmology and hand surgery experiencing 2 of the largest increases (31.6%, and 70.5%, respectively) as shown on Figure 4. In contrast, payments for thoracic surgery and cardiology decreased sharply (−28.5% and −27.2%, respectively). Figure 4 also depicts that in contrast, payments for general surgery and cardiac surgery decreased sharply (−25.9% and −23.9% (CAGR −4.2% and −3.8%), respectively). While payments for inpatient procedures decreased across the majority of specialties, those for outpatient procedures increased across most specialties, with surgical oncology, interventional radiology, neurosurgery, and vascular surgery experiencing the greatest growth (Appendix Table 2).

Discussion

Our study has 3 principal findings. As of 2014 Medicare payments for surgical care exceed $120 billion annually. Second, despite declines in inpatient surgical payments and total surgical payments, payments for outpatient surgery have increased across sites of care. Third, although payments for outpatient surgery are increasing for all specialties, most of its growth is concentrated among a handful. Collectively, these findings suggest that surgical spending is a key area for policymakers to target for savings.

Our analysis is the first to comprehensively evaluate Medicare spending on surgical care. The observed trends generally mirror those for the program as a whole, where rates of spending growth in outpatient care exceed that for inpatient services [11]. The shift from inpatient to outpatient spending is explained, in part, by advances in anesthesia and surgical

techniques that have increased patient acceptance of outpatient surgery [12], as well as changes in reimbursement that encourage care delivery in the outpatient setting [13]. Our findings on differences between specialties in their affinity for outpatient surgery are also consistent with all-payer data from Florida [14]. Importantly, the complexity of patients as shown in Table 1 did not change significantly over the study period. Thus there is a low likelihood that a changing Medicare population biased our study results.

Our study has several limitations that merit further discussion. First, our analysis was based entirely on Medicare data. As such, the observed spending patterns may not be generalizable to commercial insurers. That said, the Medicare program accounted for 19.2% and 20% of all healthcare spending in the United States in 2008 and 2014 respectively [15]. Second, while we defined surgical episode lengths using standards from the literature, we acknowledge that some relevant spending may fall outside of the claims windows for inpatient and outpatient surgery that we used [9]. Therefore, our spending totals may underestimate actual Medicare spending on surgery. Third, our analysis only captures payments made by Medicare, missing other direct and indirect costs associated with surgical care. After 65 years of age beneficiaries may have supplemental insurance coverage; therefore, expenditures in our analysis may be underestimating the total cost of surgical care. Nonetheless, our focus is important from a payment policy perspective. Fourth, the payment data that we analyzed are from the Medicare Fee-for-Service population only. Due to inconsistent capture of claims for Medicare Advantage enrollees, we had to exclude these beneficiaries from our analyses. Given that there has been considerable growth in Medicare Advantage enrollment (representing 30% of overall Medicare in 2014), total Program spending on surgical and procedural care is anticipated to be higher than what we report. That said, the case mix stability that we observed suggest that we did not bias our population with this exclusion.

These limitations notwithstanding, our findings serve to inform decision makers at the Centers for Medicare and Medicaid Services (CMS). Some of the decline in inpatient spending relates to decreasing payments for readmissions, likely owing to spillover effects from the Hospital Readmission Reduction Program [16–18]. Although joint replacement and coronary artery bypass grafting recently became targeted conditions, the inclusion of other surgical service lines could help reduce spending on inpatient surgery further. To tackle outpatient spending, CMS could extend inpatient episode-based bundling programs, such as the Bundled Payments for Care Improvement Initiative, to outpatient surgical procedures.

More broadly, CMS may want to better integrate surgeons into their value-based purchasing programs. For instance, perioperative surgical homes, in which surgeons and anesthesiologists play key roles in care coordination, have been shown to lower surgical costs, while increasing patient satisfaction [19]. Alternatively, CMS might encourage more surgeon participation in Medicare ACOs [20]. If surgeons participating in an ACO reduce their expenditures below benchmarks, they are rewarded with a portion of the savings. To the extent that such shared savings motivate surgeons to lower their treatment costs, they may limit their procedure use, lowering spending.

Conclusions

In summary, our findings demonstrate that Medicare's spending on surgical care is substantial, exceeding $120 billion annually and accounting for approximately 51% of Program spending in 2014. Moreover, they highlight the greatest growth in payments and therefore potential opportunities, especially around outpatient surgery, for CMS to rein in costs. Moving forward, future research should evaluate the extent to which spending on outpatient surgical care is driven by discretionary (versus non-discretionary) procedures. A better understanding of this will aid in the design of interventions to reduce surgery spending.

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Appendix

Appendix Table 1:

Medicare provider specialty codes and specialty group cross-walk

HCFA Specialty Code	Description	Specialty Group	Specialty Group Description
00	Carrier wide	ZZ	Non-surgical specialty
01	General practice	ZZ	Non-surgical specialty
02	General surgery	02	General surgery
03	Allergy/immunology	ZZ	Non-surgical specialty
04	Otolaryngology	04	Otolaryngology
05	Anesthesiology	05	Anesthesiology
06	Cardiology	06	Cardiology
07	Dermatology	ZZ	Non-surgical specialty
08	Family practice Interventional Pain Management (IPM)	ZZ	Non-surgical specialty
09	(eff. 4/1/03)	05	Anesthesiology
10	Gastroenterology	10	Gastroenterology
11	Internal medicine	ZZ	Non-surgical specialty
12	Osteopathic manipulative therapy	ZZ	Non-surgical specialty
13	Neurology	ZZ	Non-surgical specialty
14	Neurosurgery	14	Neurosurgery
15	Obstetrics (osteopaths only) (discontinued 5/92 use code 16)	16	Obstetrics/gynecology
16	Obstetrics/gynecology	16	Obstetrics/gynecology
17	Ophthalmology, otology, laryngology, rhinology (osteopaths only) (discontinued 5/92 use codes 18 or 04 depending on percentage of practice)	18	Ophthalmology
18	Ophthalmology	18	Ophthalmology
19	Oral surgery (dentists only)	85	Maxillofacial surgery (eff 5/92)

HCFA Specialty Code	Description	Specialty Group	Specialty Group Description
20	Orthopedic surgery	20	Orthopedic surgery
21	Pathologic anatomy, clinical pathology (osteopaths only) (discontinued 5/92 use code 22)	ZZ	Non-surgical specialty
22	Pathology	ZZ	Non-surgical specialty
23	Peripheral vascular disease, medical or surgical (osteopaths only) (discontinued 5/92 use code 76)	77	Vascular surgery (eff 5/92)
24	Plastic and reconstructive surgery	24	Plastic and reconstructive surgery
25	Physical medicine and rehabilitation	ZZ	Non-surgical specialty
26	Psychiatry	ZZ	Non-surgical specialty
27	Psychiatry, neurology (osteopaths only) (discontinued 5/92 use code 86)	ZZ	Non-surgical specialty
28	Colorectal surgery (formerly proctology)	28	Colorectal surgery (formerly proctology)
29	Pulmonary disease	ZZ	Non-surgical specialty
30	Diagnostic radiology	ZZ	Non-surgical specialty
31	Roentgenology, radiology (osteopaths only) (discontinued 5/92 use code 30) Anesthesiologist Assistants (eff. 4/1/03--previously grouped with	ZZ	Non-surgical specialty
32	Certified Registered Nurse Anesthetists (CRNA))	ZZ	Non-surgical specialty
33	Thoracic surgery	33	Thoracic surgery
34	Urology	34	Urology
35	Chiropractic	ZZ	Non-surgical specialty
36	Nuclear medicine	ZZ	Non-surgical specialty
37	Pediatric medicine	ZZ	Non-surgical specialty
38	Geriatric medicine	ZZ	Non-surgical specialty
39	Nephrology	ZZ	Non-surgical specialty
40	Hand surgery	40	Hand surgery
41	Optometry (revised 10/93 to mean optometrist)	ZZ	Non-surgical specialty
42	Certified nurse midwife (eff 1/87)	ZZ	Non-surgical specialty
43	CRNA (eff. 1/87) (Anesthesiologist Assistants were removed from this specialty 4/1/03)	ZZ	Non-surgical specialty
44	Infectious disease	ZZ	Non-surgical specialty
45	Mammography screening center	ZZ	Non-surgical specialty
46	Endocrinology (eff 5/92)	ZZ	Non-surgical specialty
47	Independent Diagnostic Testing Facility (IDTF) (eff. 6/98)	ZZ	Non-surgical specialty
48	Podiatry	ZZ	Non-surgical specialty
49	Ambulatory surgical center (formerly miscellaneous)	ZZ	Non-surgical specialty
50	Nurse practitioner	ZZ	Non-surgical specialty
51	Medical supply company with certified orthotist (certified by American Board for Certification in Prosthetics And Orthotics)	ZZ	Non-surgical specialty

HCFA Specialty Code	Description	Specialty Group	Specialty Group Description
52	Medical supply company with certified prosthetist (certified by American Board for Certification In Prosthetics And Orthotics)	ZZ	Non-surgical specialty
53	Medical supply company with certified prosthetist- orthotist (certified by American Board for Certification in Prosthetics andOrthotics)	ZZ	Non-surgical specialty
54	Medical supply company not included in 51, 52, or 53. (Revised 10/93 to mean medical supply company for DMERC)	ZZ	Non-surgical specialty
55	Individual certified orthotist	ZZ	Non-surgical specialty
56	Individual certified prosthetist	ZZ	Non-surgical specialty
57	Individual certified prosthetist-orthotist	ZZ	Non-surgical specialty
58	Individuals not included in 55, 56, or 57, (revised 10/93 to mean medical supply company with registered pharmacist)	ZZ	Non-surgical specialty
59	Ambulance service supplier, e.g., private ambulance companies, funeral homes, etc.	ZZ	Non-surgical specialty
60	Public health or welfare agencies (federal, state, and local)	ZZ	Non-surgical specialty
61	Voluntary health or charitable agencies (e.g. National Cancer Society, National Heart Association, Catholic Charities)	ZZ	Non-surgical specialty
62	Psychologist (billing independently)	ZZ	Non-surgical specialty
63	Portable X-ray supplier	ZZ	Non-surgical specialty
64	Audiologist (billing independently)	ZZ	Non-surgical specialty
65	Physical therapist (private practice added 4/1/03) (independently practicing removed 4/1/03)	ZZ	Non-surgical specialty
66	Rheumatology (eff 5/92) Note: during 93/94 DMERC also used this to mean medical supply company with respiratory therapist	ZZ	Non-surgical specialty
67	Occupational therapist (private practice added 4/1/03) (independently practicing removed 4/1/03)	ZZ	Non-surgical specialty
68	Clinical psychologist	ZZ	Non-surgical specialty
69	Clinical laboratory (billing independently)	ZZ	Non-surgical specialty
70	Multispecialty clinic or group practice	ZZ	Non-surgical specialty
71	Registered Dietician/Nutrition Professional (eff. 1/1/02)	ZZ	Non-surgical specialty
72	Pain Management (eff. 1/1/02)	ZZ	Non-surgical specialty
73	Mass Immunization Roster Biller (eff. 4/1/03)	ZZ	Non-surgical specialty
74	Radiation Therapy Centers (added to differentiate them from Independent Diagnostic Testing Facilities (IDTF -eff. 4/1/03)	ZZ	Non-surgical specialty
75	Slide Preparation Facilities (added to differentiate them from Independent Diagnostic Testing Facilites (IDTFs -eff. 4/1/03)	ZZ	Non-surgical specialty
76	Peripheral vascular disease (eff 5/92)	77	Vascular surgery (eff 5/92)
77	Vascular surgery (eff 5/92)	77	Vascular surgery (eff 5/92)
78	Cardiac surgery (eff 5/92)	78	Cardiac surgery (eff 5/92)

HCFA Specialty Code	Description	Specialty Group	Specialty Group Description
79	Addiction medicine (eff 5/92)	ZZ	Non-surgical specialty
80	Licensed clinical social worker	ZZ	Non-surgical specialty
81	Critical care (intensivists) (eff 5/92)	ZZ	Non-surgical specialty
82	Hematology (eff 5/92)	ZZ	Non-surgical specialty
83	Hematology/oncology (eff 5/92)	ZZ	Non-surgical specialty
84	Preventive medicine (eff 5/92)	ZZ	Non-surgical specialty
85	Maxillofacial surgery (eff 5/92)	85	Maxillofacial surgery (eff 5/92)
86	Neuropsychiatry (eff 5/92)	ZZ	Non-surgical specialty
87	All other suppliers (e.g. drug and department stores) (note: DMERC used 87 to mean department store from 10/93 through 9/94; recoded eff 10/94 to A7; NCH cross-walked DMERC reported 87 to A7.	ZZ	Non-surgical specialty
88	Unknown supplier/provider specialty (note: DMERC used 87 to mean grocery store from 10/93 – 9/94; recoded eff 10/94 to A8; NCH cross- walked DMERC reported 88 to A8.	ZZ	Non-surgical specialty
89	Certified clinical nurse specialist	ZZ	Non-surgical specialty
90	Medical oncology (eff 5/92)	ZZ	Non-surgical specialty
91	Surgical oncology (eff 5/92)	91	Surgical oncology (eff 5/92)
92	Radiation oncology (eff 5/92)	ZZ	Non-surgical specialty
93	Emergency medicine (eff 5/92)	ZZ	Non-surgical specialty
94	Interventional radiology (eff 5/92)	94	Interventional radiology (eff 5/92)
95	Competative Acquisition Program (CAP) Vendor (eff. 07/01/06). Prior to 07/01/06, known as Independent physiological laboratory (eff. 5/92)	ZZ	Non-surgical specialty
96	Optician (eff 10/93)	ZZ	Non-surgical specialty
97	Physician assistant (eff 5/92)	ZZ	Non-surgical specialty
98	Gynecologist/oncologist (eff 10/94)	16	Obstetrics/gynecology
99	Unknown physician specialty	ZZ	Non-surgical specialty
A0	Hospital (eff 10/93) (DMERCs only)	ZZ	Non-surgical specialty
A1	SNF (eff 10/93) (DMERCs only)	ZZ	Non-surgical specialty
A2	Intermediate care nursing facility (eff 10/93) (DMERCs only)	ZZ	Non-surgical specialty
A3	Nursing facility, other (eff10/93) (DMERCs only)	ZZ	Non-surgical specialty
A4	HHA (eff 10/93) (DMERCs only)	ZZ	Non-surgical specialty
A5	Pharmacy (eff 10/93) (DMERCs only)	ZZ	Non-surgical specialty
A6	Medical supply company with respiratory therapist (eff 10/93) (DMERCs only)	ZZ	Non-surgical specialty
A7	Department store (for DMERC use: eff 10/94, but cross- walked from code 87 eff 10/93)	ZZ	Non-surgical specialty
A8	Grocery store (for DMERC use: eff 10/94, but cross- walked from code 88 eff 10/93)	ZZ	Non-surgical specialty
A9	Indian Health Service (IHS), tribe and tribal organizations (nonhospital or nonhospital based facilities. DMERC s shall process claims	ZZ	Non-surgical specialty

HCFA Specialty Code	Description	Specialty Group	Specialty Group Description
	submitted by IHS, tribe and nontribal organizations for DMEPOS and drugs covered by the DMERCs. (eff. 1/2005)		
B1	Supplier of oxygen and/or oxygen related equipment (eff. 10/2/07)	ZZ	Non-surgical specialty
B2	Pedorthic Personnel (eff. 10/2/07)	ZZ	Non-surgical specialty
B3	Medical Supply Company with Pedorthic Personnel (eff. 10/2/07)	ZZ	Non-surgical specialty
B4	Rehabilitation Agency (eff. 10/2/07)	ZZ	Non-surgical specialty

Appendix Table 2:

Percent change in total, inpatient, and outpatient payments by specialty

	Total	Inpatient	Outpatient
Anesthesiology	12.5%	−30.8%	45.0%
Cardiac surgery	−23.9%	−24.5%	9.2%
Cardiology	−27.2%	−39.3%	22.4%
Colorectal surgery	7.0%	3.9%	26.7%
Gastroenterology	−14.2%	−22.3%	13.3%
General surgery	−25.9%	−31.1%	11.8%
Hand surgery	70.5%	51.0%	92.7%
Interventional radiology	18.3%	5.8%	88.5%
Maxillofacial surgery	16.9%	9.4%	31.7%
Neurosurgery	12.7%	7.9%	97.8%
Obstetrics/gynecology	−7.5%	−35.7%	61.6%
Ophthalmology	31.6%	−34.5%	32.4%
Orthopedic surgery	0.1%	−1.3%	14.6%
Otolaryngology	6.4%	−19.5%	46.5%
Plastic and reconstructive surgery	7.8%	−5.8%	30.9%
Surgical oncology	4.9%	−6.8%	88.4%
Thoracic surgery	−28.5%	−29.0%	−6.5%
Urology	−8.0%	−18.7%	3.7%
Vascular surgery	6.2%	−5.7%	105.5%
Unknown physician specialty	66.9%	70.1%	17.8%
Non-surgical specialty	6.0%	−6.5%	33.0%

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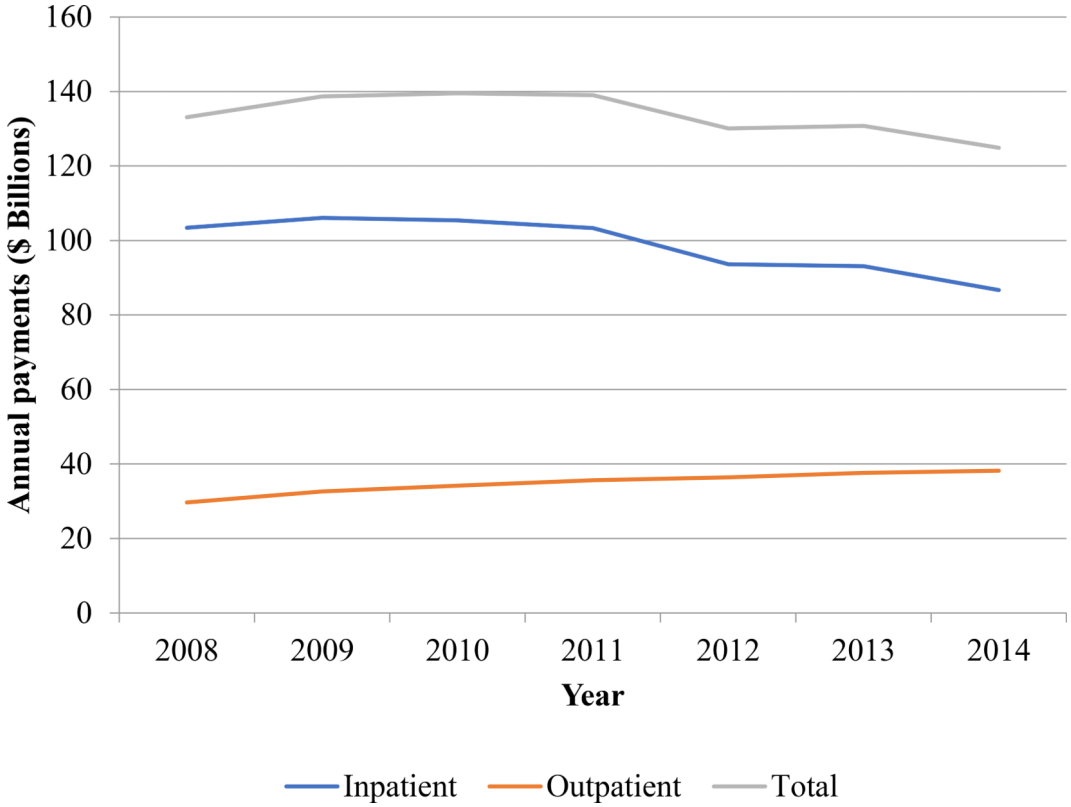

Figure 1.
Annual surgical payments (in $ Billions), by Inpatient and Outpatient procedures

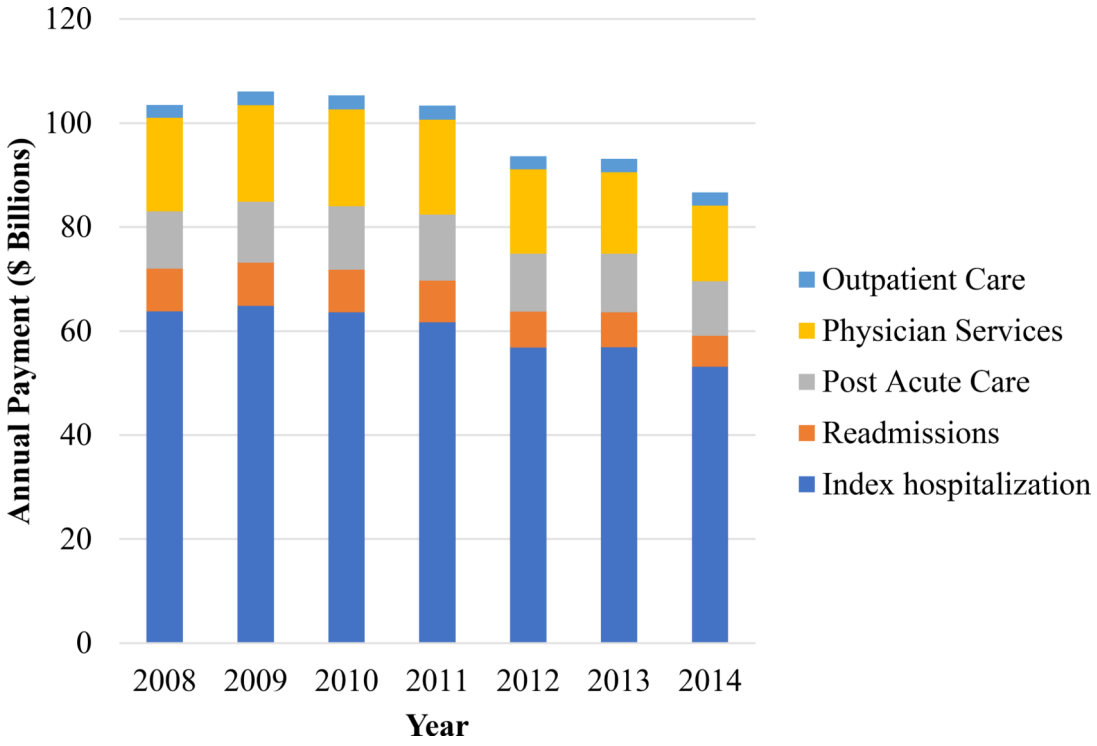

Figure 2.
Total annual outpatient surgical payments, by place of service

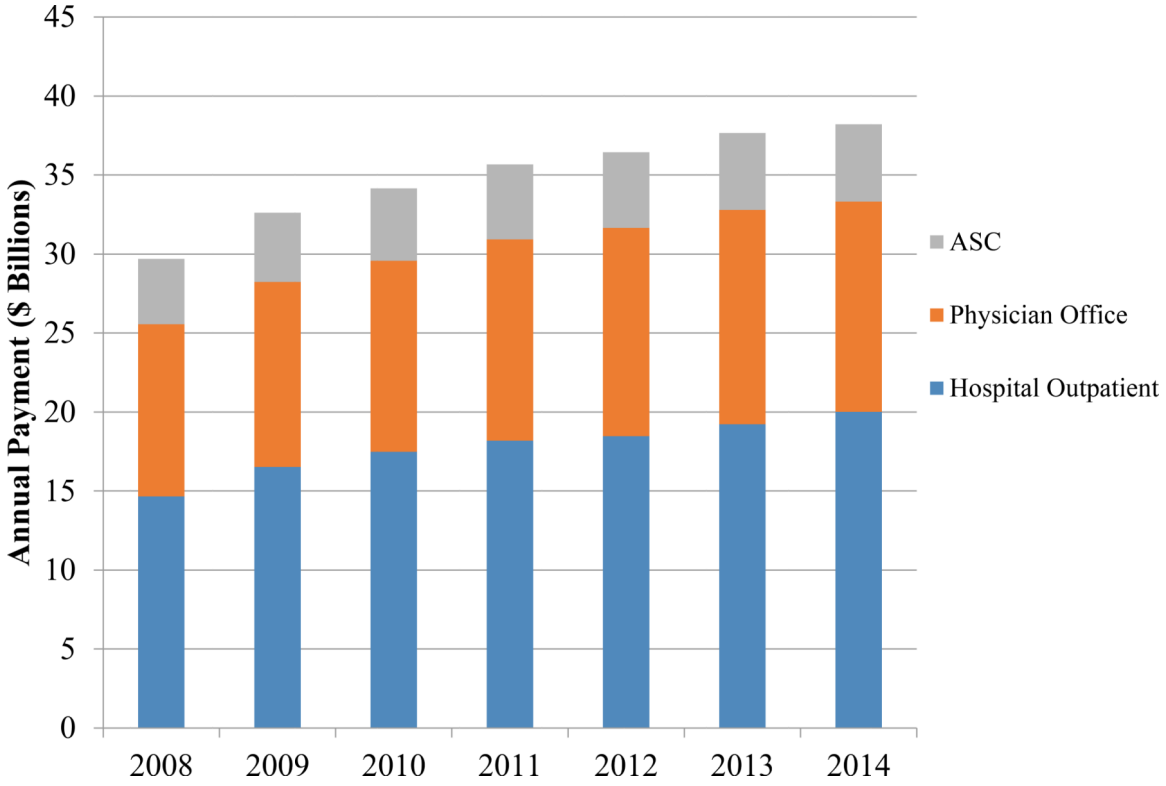

Figure 3.
Total annual inpatient surgical payments by component.

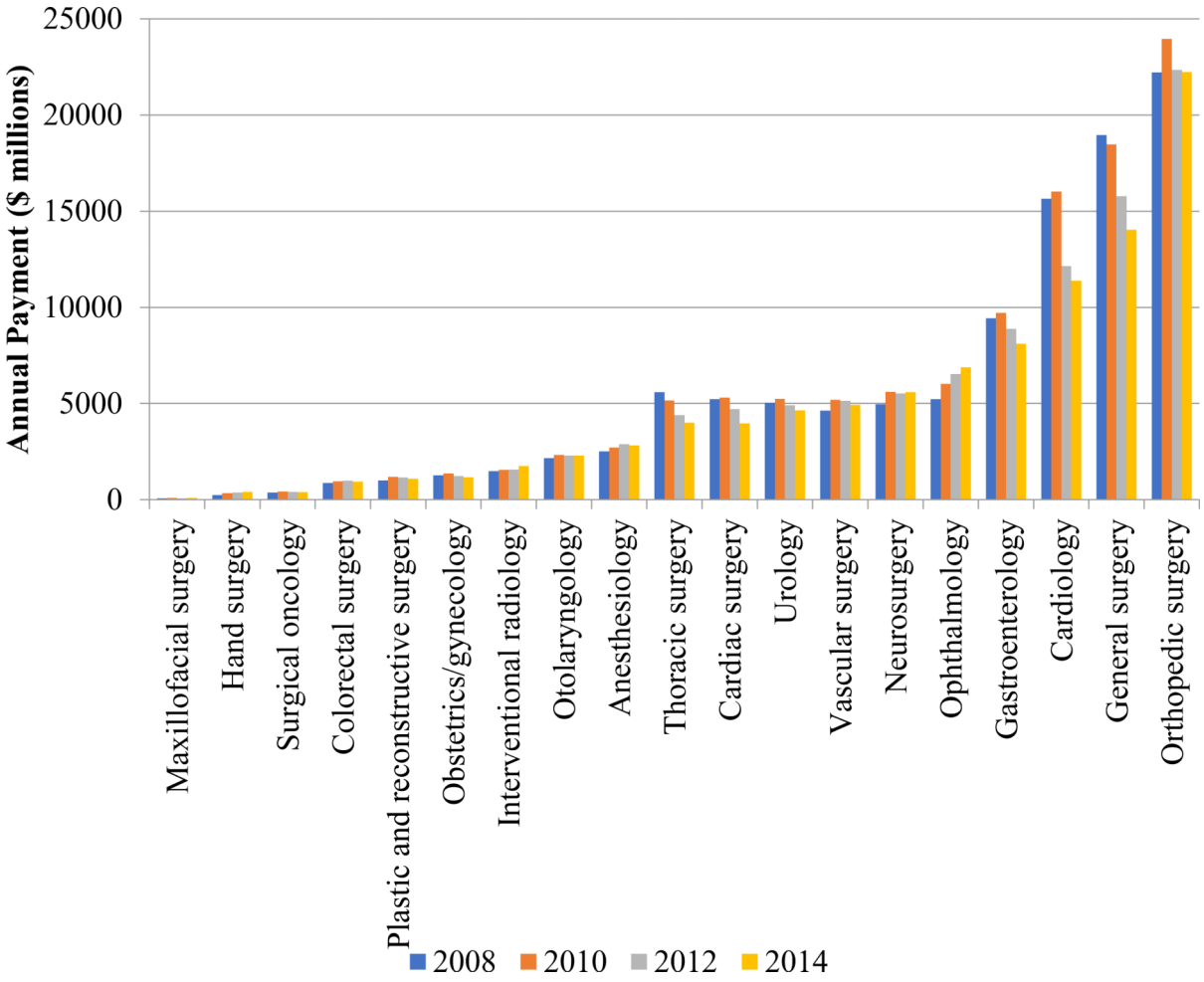

Figure 4.
Total Annual Payments by Surgical Specialty

Table 1.

Patient demographics and number of co-morbidities, by year

Characteristic	Calendar Year		
	2008	2011	2014
No. of eligible beneficiaries in the 20% sample	6,150,919	6,345,803	6,536,797
No. of surgical episodes	10,761,714	11,191,878	11,681,672
Average age at the time of surgery, in years (SD)	74.4 (10.9)	74.3 (11.1)	74.2 (11.0)
% of patients undergoing surgery who were male (SE)	44.6 (0.02)	44.9 (0.01)	45.3 (0.01)
% of patients undergoing surgery who were white (SE)	89.3 (0.01)	88.6 (0.01)	88.4 (0.01)
Average HCC community score at the time of surgery (SD)	1.48 (1.24)	1.54 (1.30)	1.54 (1.30)
No. of HCCs (SD)	2.5 (2.3)	2.6 (2.4)	2.6 (2.4)
Average per capita income, in 1,000 USD (SD)	40.2 (12.3)	41.6 (12.0)	46.2 (14.7)
% of population living below federal poverty limit (SE)	13.1 (0.002)	15.7 (0.002)	15.2 (0.002)
No. of active MDs, per 10,000 population (SD)	25.5 (18.4)	25.9 (19.4)	26.4 (19.7)

Note. No., number; SD, standard deviation; SE, standard error; HCC, Hierarchical Condition Category

Table 2.

Overall annual surgical and non-surgical payments for Inpatient and Outpatient services

Year	Inpatient	Outpatient	Total
2008	$ 138,416,693,835	$ 100,430,641,760	$ 238,847,335,595
2009	$ 141,877,684,566	$ 107,197,869,242	$ 249,075,553,808
2010	$ 140,374,476,212	$ 109,759,269,602	$ 250,133,745,814
2011	$ 138,137,383,726	$ 114,566,937,019	$ 252,704,320,745
2012	$ 125,908,595,152	$ 115,953,734,019	$ 241,862,329,171
2013	$ 125,434,530,858	$ 118,250,639,204	$ 243,685,170,062
2014	$ 123,001,302,975	$ 121,104,227,965	$ 244,105,530,940