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Regional Variations of Medicare Physician Payments for Hand Surgery Procedures in the United States

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Abstract

Background: Medicare reimbursement is known to exhibit geographic variation for inpatient orthopedic procedures. This study determined whether US geographic variations also exist for commonly performed hand surgeries. **Methods:** Using the Medicare Provider Utilization and Payment Data (2012-2013) from Centers for Medicare & Medicaid Services, we analyzed regional physician charges/payments for common outpatient hand surgeries. **Results:** The most commonly performed procedures in the United States were open carpal tunnel release (n = 21 944), trigger finger release (n = 15 345), endoscopic carpal tunnel release (n = 7106), and basal joint arthroplasty/ligament reconstruction and tendon interposition (n = 2408). A range of average Medicare physician reimbursements existed based on geographic region for basal joint arthroplasty ($669-$571), endoscopic carpal tunnel release ($400-$317), open carpal tunnel release ($325-$261), and trigger finger release ($215-$167). The latter three exhibited statistically significant variation across geographic regions with regard to both charges and physician reimbursement. However, the overall percentage physician reimbursement (70%-79%) to charges was similar across all geographic regions. **Conclusions:** In conclusion, further research is warranted to determine why regional or geographic variations in physician payments exist in the United States for commonly performed hand surgeries.

Keywords: Medicare reimbursement, commonly performed hand surgeries, open carpal tunnel release, trigger finger release, endoscopic carpal tunnel release, basal joint arthroplasty, regional variations in Medicare reimbursement

Introduction

In an effort to increase transparency and accountability in government-related health care spending, Centers for Medicare & Medicaid Services (CMS) began releasing an annual data set in 2012 containing payment data for Medicare Part B.[14] Release of Medicare-related payment data was previously not available; therefore, the recent release of this information has been controversial, raising questions regarding the variation in charges and payments for physicians, hospitals, and health care organizations.[16] Accurate interpretation of this large data set is important for orthopedic surgeons to understand what accounts for the variation in cost and payments for the common procedures they perform. As health care spending continues to increase and Medicare and Medicaid access increases, further pressure to control costs will likely occur particularly for high-volume surgical procedures in orthopedic surgery.[3] While total joint arthroplasty remains in particular focus, it is just a matter of time before other high-volume orthopedic procedures in other subspecialties garner increased attention as well.

In 2014, US health care spending increased 5.3%, or $9523 per person, and accounted for 17.5% of the gross domestic product. Medicare and Medicaid spending grew 5.5% and 11%, respectively. Health care spending comprised 17.5% of the total economy, up from 17.3% in 2013.[3] The increased spending for hospital-care and physician services, including outpatient surgeries, was primarily driven

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by the increase in health insurance coverage provided by the Affordable Care Act. This is particularly true in the area of carpal tunnel surgery, one of the most commonly performed procedures in orthopedics with more than 500 000 surgeries annually in the United States.[5]

Previous studies have shown regional variations in orthopedic surgery facility reimbursements, particularly in the areas of total joint arthroplasty and spine surgery.[9,18] The Northeast and West regions of the United States demonstrated the highest hospital charges and payments, while the Midwest and South generally exhibited the lowest. In total joint arthroplasty, hospital charges and Medicare reimbursement payments had either weak or no correlation to wage index, cost of living, low-income care, or teaching institution status.[18] In spine surgery, there was a strong correlation between total procedure cost (professional and facility-level fees) and cost of living in a given state, although this correlation did not fully explain the major discrepancies in procedure costs among the different regions of the United States.[9]

In 2013, the CMS[3] began to release an annual report which included utilization and payment data for the 100 most common inpatient procedures and 30 most common outpatient procedures spanning over 3000 hospitals. Included in the data are the number of procedures performed, the mean hospital charge, and mean total payment for each of the above procedures. In addition, individual physician charges and payments for each procedure are included in the database. According to this report, the top 4 most common outpatient hand surgery procedures were: (1) open carpal tunnel release; (2) trigger finger release; (3) endoscopic carpal tunnel release; and (4) basal joint arthroplasty.

The purpose of this study is to assess whether similar geographic variations exist in Medicare physician reimbursement charges and payments, excluding facility and anesthesia costs. Our hypothesis is that physician reimbursement payments in the United States for these 4 common hand surgeries vary based on geographic region.

Materials and Methods

This study was deemed Not Human Subjects Research by our local institutional review board. Average allowed physician charges and reimbursement payments for the 4 most common hand surgeries were evaluated using the 2012 and 2013 Medicare Provider Utilization and Payment Data provided by the CMS.[3] The CMS database contains information about the utilization, payments, and submitted charges of different services and procedures provided by health care professionals to Medicare fee-for-service patients.

The 4 most common hand surgery procedures were identified by Current Procedural Terminology (CPT) code. The 4 most common procedures by CPT code were open carpal tunnel release (64721, neuroplasty and/or transposition; median nerve at carpal tunnel), trigger finger release (26055, tendon sheath incision), endoscopic carpal tunnel release (29848, endoscopy, wrist, surgical, with release of transverse carpal ligament), and basal joint arthroplasty/ligament reconstruction and tendon interposition (LRTI) (25447, interposition arthroplasty, intercarpal or carpometacarpal joints).

All providers who identified as hand surgeons in each state were determined by using the *Wall Street Journal* (WSJ) physician search tool.[4] In total, 955 hand surgeons were identified across the United States. The CMS physician look-up tool was subsequently used to find specific data for these individual providers. Providers were searched and verified by name and corresponding National Provider Identification (NPI) number. The CMS database lists all chargeable services and procedures with a specific CPT code through the Healthcare Common Procedure Coding System (HCPCS). For each provider, all HCPCS codes had a corresponding number of services rendered, average submitted charge, average Medicare allowed amount, and average Medicare payment amount. A total of 606 hospitals or surgery centers and 48 127 procedures were included.

The Medicare payment data were then sorted by both procedure and geographic region. Four geographic regions and 9 geographic divisions were determined based on the US Census Bureau classifications (Figure 1).[2] All charges and payments were recorded in terms of mean and standard deviation. One-way analysis of variance with Tukey post hoc tests was utilized to assess differences between geographic division and Medicare cost data. Statistical analysis was performed using Statistical Analysis System (version 9.3).[12]

Results

Open carpal tunnel release was the most commonly performed procedure (n = 21 944) followed by trigger finger release (n = 15 345), endoscopic carpal tunnel release (n = 7106), and basal joint arthroplasty (n = 2408). Open carpal tunnel release was most commonly performed in the East North Central division (24.0%), while all other surgeries were most commonly performed in the South Atlantic division (23.1%; 25.1%, and 32.9%, respectively; Figure 2). The average Medicare reimbursement payment and physician work relative value units (wRVU)[1] of the 4 procedures are shown in Table 1. From highest to lowest, the overall mean provider reimbursement based on procedure was as follows: basal joint arthroplasty, $613, 11.14 wRVU; endoscopic carpal tunnel release, $363, 6.39 wRVU; open carpal tunnel release, $295, 4.97 wRVU; and trigger finger release, $195, 3.11 wRVU.

The average Medicare charges and payments for the 4 most common surgeries performed based on geographic division are shown in Table 1. In terms of Medicare charges

Figure 1. Four geographic regions and 9 divisions as defined by the US Census Bureau.

(Table 2; Figure 3, Figures S1-S3), the Pacific division had the highest mean charges for 3 of the 4 surgeries: open carpal tunnel release ($434 ± $149), trigger finger release ($284 ± $112), and basal joint arthroplasty ($1005 ± $840). New England had the highest mean charges for endoscopic carpal tunnel release ($508 ± $23). The lowest charges came from the East South Central region for open carpal tunnel release ($336 ± $23) and trigger finger release ($215 ± $55). The West South Central division had the lowest charges for endoscopic carpal tunnel release ($402 ± $88) with the West North Central division demonstrating the lowest charges for basal joint arthroplasty ($726 ± $135). Overall, the Northeast and West regions had the highest charges, whereas the Midwest and South regions had the lowest. Three of the 4 procedures (open carpal tunnel release, trigger finger release, endoscopic carpal tunnel release, and basal joint arthroplasty) demonstrated statistically significant variation across geographic regions with regard to charges.

When assessing payments (Table 2; Figure 3, Figures S1-S3), New England received the highest mean payments for open ($325 ± $20) and endoscopic carpal tunnel release ($400 ± $17). The Middle Atlantic received the highest reimbursements for basal joint arthroplasty ($669 ± $42) and the Pacific received the highest payments for trigger finger release ($215 ± $70). The lowest reimbursements or payments were found in the East South Central region for open carpal tunnel release ($261 ± $39) and trigger finger release ($167 ± $45). The West South Central region demonstrated the lowest reimbursements for endoscopic carpal tunnel release ($317 ± $68). The lowest reimbursement for basal joint arthroplasty/LRTI was from the Pacific ($571 ± $179). Consistent with the trend in charges, the Northeast and West regions generally received higher average payments, whereas the other regions received lower average payments. All procedures demonstrated statistically significant variation across geographic regions for reimbursement payments.

The percentage of physician payment compared with the amount charged for the above surgeries is shown in Table 3. Overall, the percentage of reimbursement remained relatively stable across most regions. For all 4 procedures, the maximum average reimbursement was approximately 79% and the average minimum reimbursement was approximately 77% with the exception of basal joint arthroplasty in the Pacific, which was reimbursed at 70.9%.

For the 4 common hand surgery procedures, there were discrepancies across divisions in terms of the amount of payment to the individual physician (Table 4). For open carpal tunnel surgery, the highest payment was $325 ± $20 (New England) versus the lowest payment was $261 ± $39 (East South Central). For endoscopic carpal tunnel release, highest payment was $400 ± $17 (New England) and the lowest payment was $317 ± $68 (West South Central). For trigger finger release, the highest payment was $215 ± $70 (Pacific) versus the lowest payment $167 ± $45 (East South Central). For basal joint arthroplasty/LRTI procedure, the highest payment is $669 ± $42 (Middle Atlantic) versus $571 ± $179 (Pacific) for the lowest payments.

Discussion

Passage and implementation of the Affordable Care Act has placed a strong emphasis on the management of health care

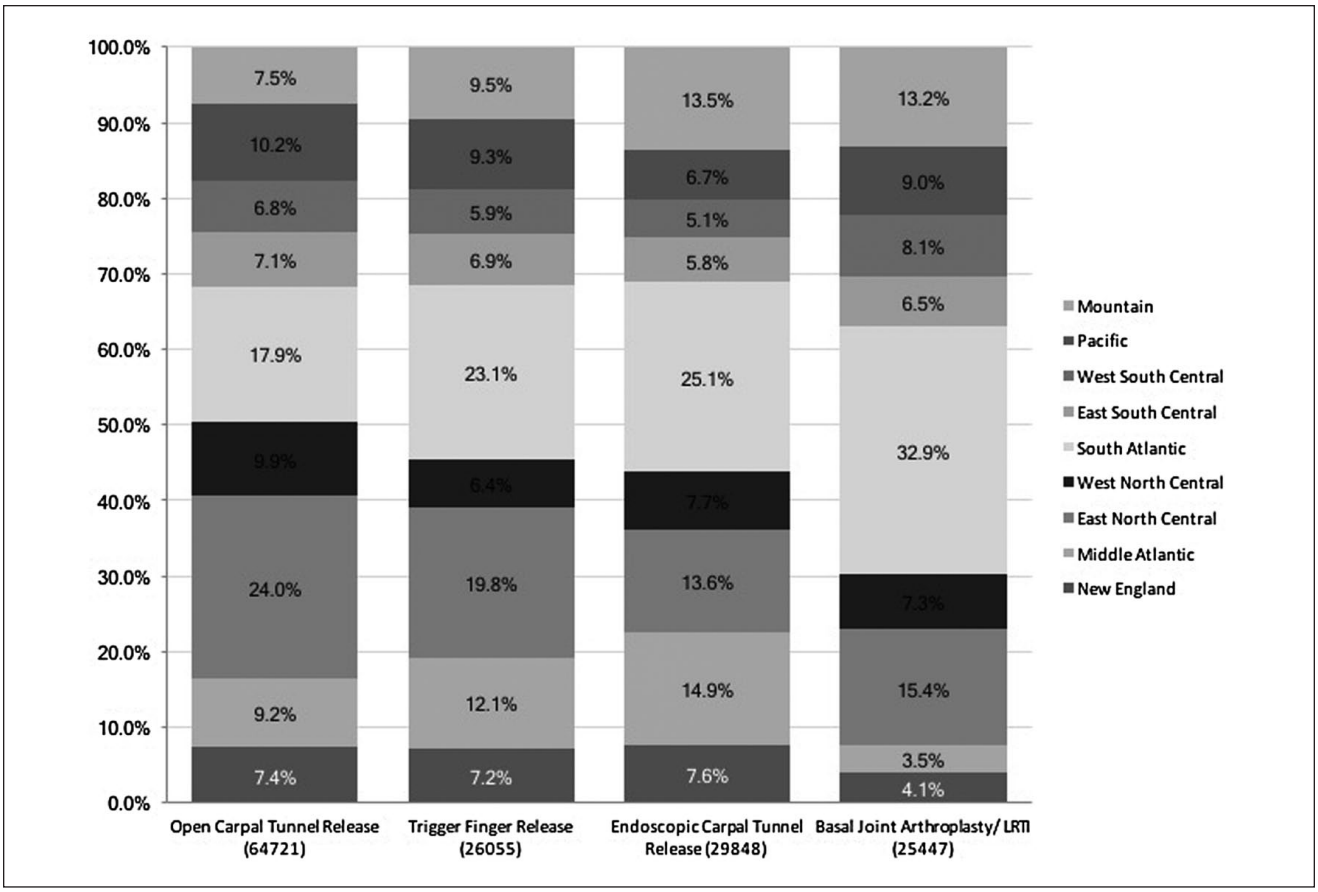

Figure 2. Distribution of surgeries performed across the 9 geographic divisions.

Table 1. Average Medicare Physician Payments and wRVU for Outpatient Hand Surgeries.

Surgery	Physician wRVU	Average Medicare reimbursements ($)
Open carpal tunnel surgery (64721)	4.97	295
Trigger finger release (26055)	3.11	195
Endoscopic carpal tunnel surgery (29848)	6.39	363
Basal joint arthroplasty (25447)	11.14	613

Note. wRVU = physician work relative value unit.

costs and hospital payments; however, there has been less focus on physician reimbursements to date.[8] To better understand the implications of newly proposed payment systems, more attention needs to be placed on potential geographic differences and variation in physician charges and payments across the nation. Studies have shown considerable variation in hospital or facility payments as well as charge to payment ratios as they pertain to total joint arthroplasty across geographical regions and metropolitan areas. These geographic disparities in the hospital charges and payments may exist due to the difference in the efficiency of care, which translates to the duration of inpatient hospitalization. Several studies report that there is high regional variation in hospital length of stay, which correlates the hospital cost and payments from Medicare.[11,19] Furthermore, there is also a geographic variation in the percentage of hospital payments compared with the amount charged that suggest Medicare payments are not directly correlated with hospital charges.[20] In addition, such geographical differences in Medicare reimbursements have not been found to demonstrate any correlation with socioeconomic status, patient population,[7,17,21] or frequency of major surgeries.[6,22]

Despite the different reasons for geographic variations in hospital payments, physician reimbursements do not take into account length of stay or hospital efficiency of care. Medicare payments to physicians vary based on a complicated formula which takes into account factors such as geographic locale, practice expense, and malpractice cost.[13] Our study demonstrates that Medicare physician payments for hand surgery procedures exhibit statistically significant variation for the same procedures across geographic regions, with the majority of the highest reimbursements found in the Northeast (New England and Middle Atlantic regions) and West (primarily the Pacific region). Conversely, reimburse-

Table 2. Average Charges and Medicare Payments for Outpatient Hand Surgeries, by Division, in US Dollars.

	Open Carpal Tunnel Surgery (64721)		Trigger Finger Release (26055)		Endoscopic Carpal Tunnel Surgery (29848)		Basal Joint Arthroplasty / LRTI (25447)	
	Division	Charge (SD)	Payment (SD)	Charge (SD)	Payment (SD)	Charge (SD)	Payment (SD)	Charge (SD)
New England	412 (24)	325 (20)	266 (75)	209 (59)	508 (23)	400 (17)	844 (44)	664 (31)
Middle Atlantic	402 (73)	317 (57)	254 (78)	201 (60)	490 (65)	387 (55)	848 (52)	669 (42)
East North Central	379 (49)	298 (39)	237 (54)	186 (43)	477 (55)	376 (44)	787 (39)	617 (37)
West North Central	365 (32)	286 (24)	242 (70)	189 (56)	452 (37)	351 (33)	726 (135)	574 (106)
South Atlantic	380 (43)	297 (34)	255 (92)	200 (73)	469 (49)	366 (41)	793 (76)	625 (60)
East South Central	336 (50)	261 (39)	215 (55)	167 (45)	422 (66)	329 (52)	741 (23)	573 (27)
West South Central	345 (46)	268 (36)	230 (71)	179 (57)	402 (88)	317 (68)	760 (40)	596 (34)
Pacific	434 (149)	321 (40)	284 (112)	215 (70)	504 (61)	399 (49)	1005 (840)	571 (179)
Mountain	364 (51)	284 (40)	264 (102)	207 (80)	440 (94)	346 (72)	800 (40)	631 (35)
p-value	*<0.001*	*<0.001*	*0.005*	*0.008*	*<0.001*	*<0.001*	*0.322*	*0.033*

Note. Diagonal highlight indicates largest value and grey highlight indicates lowest value for each category.

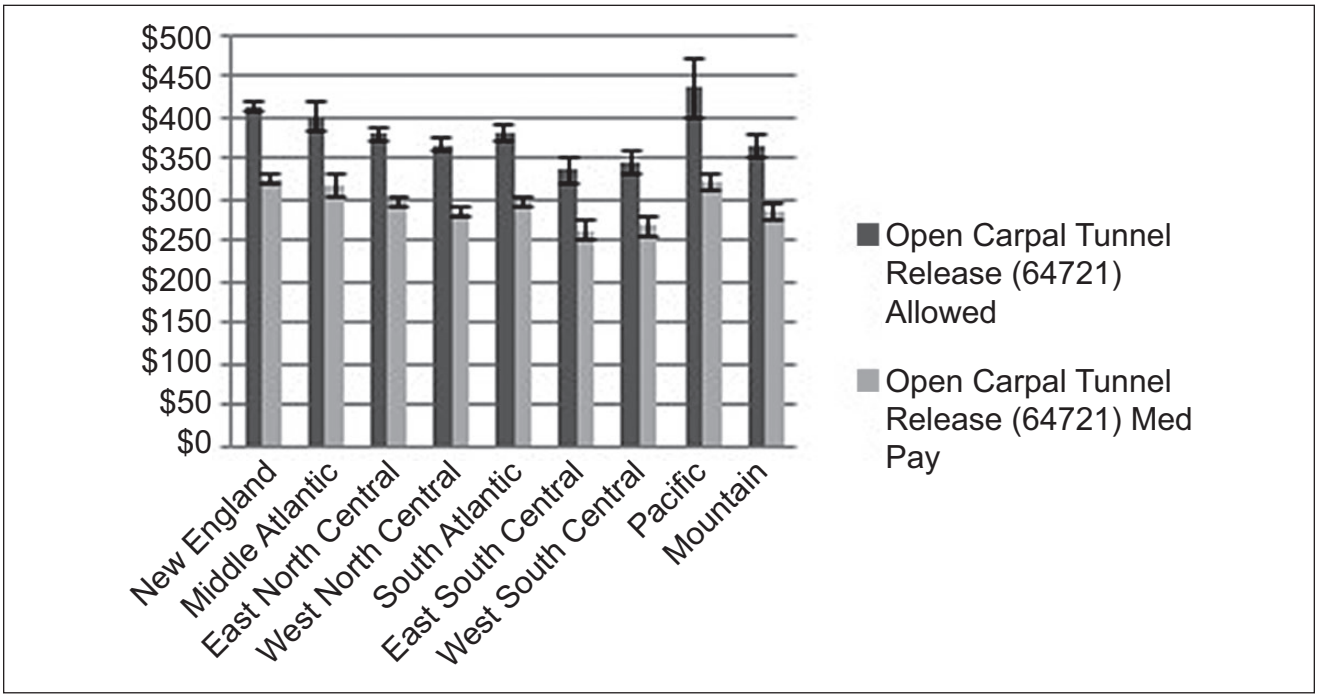

Figure 3. Open carpal tunnel charges (allowed) as compared with open carpal tunnel Medicare payments (Med Pay) to physicians across the 9 geographic divisions.

ment rates in the South, followed by the Midwest, generally received the lowest Medicare physician reimbursement payments. Similar to our findings, Thakore et al[20] also found that Northeast hospitals, on average, received $5744 more per total joint arthroplasty procedure than hospitals in the south for patients without a major complication or comorbidity versus $8135 more per total joint arthroplasty if the patient had a major complication or comorbidity. The authors attributed the difference in hospital payments to the cost of living, hospital wage index, or the socioeconomic characteristics of the patient population. Other authors evaluating common spine surgeries[9] and total joint arthroplasty[18] also identified the Midwest and South as the lowest reimbursed geographical regions for facility fees.

Table 3. Average Percent (%) Reimbursement for Outpatient Hand Surgeries, by Division.

Division	Open Carpal Tunnel Surgery (64721)	Trigger Finger Release (26055)	Endoscopic Carpal Tunnel Surgery (29848)	Basal Joint Arthroplasty /LRTI (25447)
New England	78.9%	78.3%	78.6%	78.7%
Middle Atlantic	79.0%	79.4%	79.0%	78.8%
East North Central	78.5%	78.3%	78.9%	78.4%
West North Central	78.4%	78.1%	77.5%	79.1%
South Atlantic	78.2%	78.5%	78.0%	78.8%
East South Central	77.8%	77.6%	78.1%	77.4%
West South Central	77.5%	77.8%	78.8%	78.4%
Pacific	76.4%	77.3%	79.1%	70.9%
Mountain	78.0%	78.6%	78.9%	78.8%

Note. Diagonal highlight indicates largest value and grey highlight indicates lowest value for each category.

Table 4. Average High and Low Physician Payments for Open Carpal Tunnel Surgery, Endoscopic Carpal Tunnel Surgery, Trigger Finger Release, and Basal Joint Arthroplasty/LRTI, in US Dollars.

Surgery type	Average high payment ± SD	Average low payment ± SD
Open carpal tunnel surgery	325 ± 20 (New England)	261 ± 39 (East South Central)
Trigger finger release	215 ± 70 (Pacific)	167 ± 45 (East South Central)
Endoscopic carpal tunnel surgery	400 ± 17 (New England)	317 ± 68 (West South Central)
Basal joint arthroplasty/LRTI	669 ± 42 (Middle Atlantic)	571 ± 179 (Pacific)

Note. LRTI = ligament reconstruction and tendon interposition.

Despite the regional differences in the charges and payments for 4 common hand surgeries we investigated, the percent physician reimbursement in terms of charge to payment ratio remained relatively constant in our study between the different geographic regions at 77% to 79%, with the notable exception of basal joint arthroplasty (70.9%) in the Pacific region. In contrast to our findings, Stryker et al[18] reported significant regional differences between the hospital facility charges for Diagnosis Related Group 469 (total joint with major complications or comorbidities) and 470 (total joint without major complications or comorbidities). Nationwide, the differences between the median hospital charge to payment based on regional variations for DRG 469 and 470 was $49 701.80 (25th-75th interquartile range [IQR], $33 522.61-$75 680.53) and $31 721.69 (25th-75th IQR, $21 094.56-$48 018.66), respectively. Despite the large difference between the hospital charges, the average median hospital payment for DRG 469 and 470 was $21 230.52 (25th-75th IQR, $19 061.50 - $24 396) and $13 742.98 (25th-75th IQR, $12 497.82 – $15 714.56), respectively. The variations for hospital or facility payments still exist between difference regions, but to a much smaller extent than the differences in the hospital charges. Hall et al[10] also reported similar findings in that there are significant differences in hospital billing for total joint arthroplasty (without medical complications and comorbidities—DRG 470) based on hospital profit status with the median average charges for nonprofit, government, and private institutions being $45 363.95, $44 956.57, and $62 715.39 ($P < .0001$), respectively. However, the variation between the median average hospital payments is much less with $14 461.95, $14 466.04, and $13 733.62, respectively.

One of the advantages to this study is that the CMS database focuses on surgeon reimbursement in isolation from the other costs associated with surgery such as implants, facilities fees, and anesthesia, thereby limiting variability in the data presented. For example, a recent study found the total average facilities charge of carpal tunnel surgery (including procedure room, hospital outpatient department, or ambulatory surgery center) was $2572.[15] However, carpal tunnel surgeries performed in hospital outpatient departments charged $500 more, on average, as compared with procedure rooms and ambulatory surgery centers.[15] Because facility costs account for a large portion of the variation among surgery charges, including these additional variables can lead to confounding results and inaccurate correlations between physician charges and reimbursements. In addition, when we evaluated the CMS geographical factors or the Geographic Cost Indices (GCI), the variations in the physician payments would occur around 7% to 10% between these procedures. In reality, our study showed that the difference in the physician reimbursements for the same procedures between the different geographic regions could be up to 20% that is not explained by the variations in the GCI.

As with similar studies, we recognize the limitations inherent to this particular study design. Our use of CPT billing codes allows for variability in the procedures being performed and billed. For example, CPT code 25447 is most commonly used for basilar joint arthroplasty/first carpometacarpal (CMC) LRTI. However, this code could be used for other procedures involving interpositional arthroplasty of the carpometacarpal or intercarpal joints. Although a retrospective database of Medicare patients allows us to evaluate datum representative of a large number of institutions and clinical environments, we are only able to draw correlations that must then be further investigated to fully determine causation. The presented data are also limited to hand surgery procedures in Medicare patients and may not necessarily apply to Medicaid or privately insured patients. In addition, determining whether differences in Medicare reimbursements exist based on surgeon's experience, training, facility, and practice type warrants further investigation.

The geographic variations in physician payments and charges for the 4 most common orthopedic hand surgeries found in our study are consistent with similar studies evaluating other areas of orthopedic surgery.[9,18] These payment differences have significant financial implications with respect to the future health care reimbursement models. While the extent to which Medicare reimbursement allocations may change given subsequent health care reform measures remains unknown, further research is needed to determine the root cause of these regional variations in physician reimbursements for the same surgical hand procedures. Our data set elucidates the actual physician reimbursement of outpatient hand procedures to allow for further progress toward the development of a cost-effective and value-driven health care system.

Ethical Approval

This study was approved by our institutional review board.

Statement of Human and Animal Rights

This article does not contain any studies with human or animal subjects.

Statement of Informed Consent

This is not applicable.

Declaration of Conflicting Interests

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