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Geographic and Age-Based Variations in Medicare Reimbursement Among ASSH Members.

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ABSTRACT

BACKGROUND

The purpose of this study was to investigate how American Society for Surgery of the Hand (ASSH) members' Medicare reimbursement depends on their geographical location and number of years in practice.

METHODS

Demographic data for surgeons who were active members of the ASSH in 2012 was obtained using information publicly available through the United States Centers for Medicare and Medicaid Services (CMS). "Hand-surgeons-per-capita" and average reimbursement per surgeon were calculated for each state. Regression analysis was performed to determine a relationship between (1) each state's average reimbursement versus the number of ASSH members in that state, (2) average reimbursement versus number of hand surgeons per capita and (3) total reimbursement from Medicare versus number of years in practice. ANOVA analysis was used to detect a difference in reimbursement based on categorical range of years as an ASSH member.

RESULTS

A total of 1,667 ASSH members satisfied inclusion in this study. Though there was significant variation among states' average reimbursement, reimbursement was not significantly correlated with the state's hand surgeons per capita or total number of hand surgeons in that given state. Correlation between years as an ASSH member and average reimbursement was significant, but non-linear; the highest reimbursements were seen in surgeons who had been ASSH members from 8-20 years.

CONCLUSIONS

Peak reimbursement from Medicare for ASSH members appears to be related the time of surgeons' peak operative volume, rather than any age-based bias for or against treating Medicare beneficiaries. Additionally, though geographic variation in reimbursement does exist, this does not appear to correlate with density or availability of hand surgeons.

Introduction:

In April 2014, the United States Centers for Medicare and Medicaid Services (CMS) announced the release of information regarding services provided to Medicare beneficiaries for 2012 in an effort to promote transparency of the United States health care system. [7] This information includes data for payment and utilization of Medicare Part B services, and provides a potentially powerful analytical tool not only for patients, but for providers, policy-makers and invested businesses.

Studies across many fields of medicine have illustrated regional variations in treatment and reimbursement rates. [10-12, 16, 20, 25] Among hand surgery patients, studies have shown that patient demographic factors such as age can predict surgical timing, as well as overall surgical volume for conditions such as Rheumatoid Arthritis (RA). [23, 26] Specific to hand surgeons, other studies have demonstrated that surgeon-dependant demographic factors, such as age or membership in the American Society for Surgery of the Hand (ASSH) predict treatment selection for distal radius fractures (DRF). [9, 24] However, no study to date has examined the direct relationship between hand surgeon demographic factors and their rates of reimbursement.

The purpose of this study was to investigate which demographic factors may have an impact on hand surgeons' reimbursement rates from Medicare. In particular, using the data provided by the CMS, we aim to illustrate how ASSH-member hand surgeons' reimbursement from Medicare depends on their geographical location and the number of years they have been in practice.

Methods:

Data was obtained from the CMS Provider Utilization and Payment Data: Physician and Other Supplier Public Use File ("Physician and Other Supplier PUF") covering the calendar year 2012. [8] Because files contain no patient indentifying information and are made publicly available by CMS, this study was exempt from institutional review board

approval. We identified all active American Society for Surgery of the Hand (ASSH) members for the year 2012 and used each member's unique National Provider Identifier (NPI) number to match ASSH members with corresponding CMS PUF data. [8]

International members of ASSH were excluded from this study. Additionally, providers with inconsistent or inaccurate data between the two datasets were excluded. ASSH members who did not accept Medicare payment as part of their practice in 2012 were not found in the PUF, and thus excluded by design. After compiling a database for all ASSH members with matching PUF data, the number of years as an ASSH member (as of 2012) was calculated for each member based on the year they were elected into the ASSH (Year elected = 2013 was designated as 0 years as ASSH member, year 2012 as 1 year, etc.). This number was assumed to be a direct correlation with number of years in practice and was analyzed as a both a continuous variable, and as a categorical variable (Group A = 0-7 years, B = 8-20 years and C = Greater than 20 years) for the purpose of this study.

For geographic classification, each surgeon was designated to one state, as listed in the CMS PUF. For surgeons with entries across multiple states, the state with the highest total amount paid by Medicare was designated as their primary state of practice. An estimate of each state's total population for 2012 was obtained using projections available from the United States Census Bureau. [21] This census data was used in conjunction with the number of ASSH members per state to determine each state's 'hand-surgeons-per-capita.' Average reimbursement per surgeon was also calculated for each state. Regression analysis was performed to determine a relationship between (1) each state's average reimbursement versus the number of ASSH members in that state, (2) average reimbursement versus number of hand surgeons per capita and (3) total reimbursement from Medicare versus number of years in practice. ANOVA analysis was used to detect a difference in mean reimbursement based on number of years as an ASSH member, categorized into groups A, B and C as described above. For each state, the aggregate amount of reimbursement from ancillary services and office visits relative to total reimbursement was recorded, and compared using ANOVA.

Results:

A total of 1,667 ASSH members satisfied inclusion in this study. Mean total CMS reimbursement among all ASSH members was 68,139.63 USD +/- 71,623.52 (distribution shown in Figure 1). Mean number of years as an ASSH Member was 14.21 +/- 9.88 across all members (Figure 2). Average reimbursement per surgeon for each state and the corresponding number of ASSH member surgeons per state are shown numerically in Table 1. Figure 3 depicts the total CMS reimbursement per surgeon across the entire United States. Percentages of total Medicare reimbursement obtained from both ancillary services and office visits were not significantly different between any states. Correlation between state's average reimbursement per surgeon and its total number of ASSH members was not found to be of statistical significance (R^2 = 2.8%, p = 0.238). Similarly, average reimbursement was not significantly correlated with hand surgeons per capita (R^2 = 2.5%, p = 0.270). When classifying number of years as an ASSH member as a continuous variable, there was no significant relationship found between number of years as an ASSH member and total CMS Reimbursement per surgeon. However, when years as an ASSH member was analyzed as a categorical variable, surgeons in Group B ($74,952.34) had a significantly higher reimbursement per surgeon than both Groups A ($60,501.16) and C ($64,352.63, p = 0.005).

Discussion:

With the continually changing landscape of the U.S. healthcare economy, increased scrutiny has been placed on government expenditures, particularly regarding reimbursement rates for care providers. The 2012 Medicare data released by the CMS is the largest publicly accessible volume of data available to analyze these trends. For surgeons in particular, this information is of major interest and concern. A 2004 report by the American Academy of Orthopaedic Surgeons (AAOS), which surveyed over 10,000 practicing, board-certified (ABOS) orthopaedic surgeons, found that of the five issues deemed most concerning to surgeons, "Insurance or CMS Reimbursement Levels" had the highest percentage of surgeons endorsing concern, at 91%. [2] That same report also

demonstrated that proportion of total income for orthopaedic surgeons from Medicare/Medicaid was at an all-time high, at 31.2%, with a concomitant decrease in income from private insurance. [2] With the passage of the Affordable Care Act (ACA) in 2010, some of these concerns may be magnified, particularly amongst hand surgeons. [4, 18]

Among the many provisions of the ACA that may directly affect hand surgeons are tax increases on medical devices, mandated reduction in payment for surgical services and greater focus on funding for education of primary care physicians versus surgeons. [4] Another mandate of the ACA was the establishment of a Patient-Centered Outcomes Research Institute (PCORI). [4, 18] A priority of the PCORI has been the increased funding of comparative effectiveness research, in an effort to promote "patient-centeredness," and is specifically prohibited from analyzing cost-effectiveness. [4, 18] But with reimbursement tied closely to referral rates and treatment selection, it may be unfeasible to compare the efficacy of different treatment options while simultaneously excluding consideration of the associated costs. [14, 15, 19] Thus, it should be of interest for hand surgeons to understand the impact of their own demographics on reimbursement rates, and not just those of their patients.

Surgeon age has been shown to play a role in both treatment selection, as well as outcomes for various of upper-extremity conditions. [1, 24] However, little is known regarding the direct relationship between surgeon age and their respective reimbursement levels. In our analysis, we used the surgeons' number of years as an ASSH member as to determine an approximation of their age: Assuming the average age for an entering medical student to be 24 years, [3] one would expect the average age of a surgeon first eligible to become an ASSH member to be roughly 35 years (24 + 4 years medical school + minimum 6 years post-graduate training + minimum 1 year in practice for candidate membership). Based on our analysis, this would suggest that among ASSH members, the highest level of total Medicare reimbursement would be in surgeons 43 to 55 years of age (designated as Group B in out analysis), which most closely aligns with surgeons' period of peak operative volume, as demonstrated in previous studies. [2, 5, 6, 22]

In addition to age, numerous studies have illustrated significant geographical variations in Medicare spending. [10-12, 16, 20, 25] It has been suggested that regions with higher levels of Medicare spending do not necessarily correlate to areas with patients of poorer health or socioeconomic status, but rather these regions are associated with a larger supply of care providers who perform higher-costing services. [11, 12, 16] Studies looking specifically at RA patients found higher rates of wrist arthroplasty and arthrodesis in regions with a higher density of orthopaedic surgeons, and an inverse relationship between rates of those same surgeries and density of rheumatologists. [23, 26] This would suggest that regional variations in Medicare reimbursement among hand surgeons would correlate with a measure of surgeon supply, such as our calculated hand surgeons per capita. However, though this study does demonstrate geographic variations in Medicare reimbursement among hand surgeons, we were unable to demonstrate any dependence on hand surgeon density or availability. We were also unable to find any difference in proportion of ancillary services provided that would explain these geographic variations. Further study is warranted to determine which factors might account for these regional variations among hand surgeons.

This study is certainly not without limitations. We found the data provided by CMS to have a significant number of flaws regarding specialty designation, similar to the report by Chung et al on the effect of ASSH membership on treatment choice for DRF. [9] Also, missing data between the ASSH membership list and the CMS PUF forced us to exclude some ASSH members from our analysis. In addition, as ASSH membership itself does not include all hand surgeons or surgeons who treat conditions of the hand and wrist, this data may not represent all surgeons whose practice is composed of a significant proportion of hand and wrist patient-care. However, as the largest verifiable hand surgery society, as well as the significant variability in training paths potentially leading to certification as a hand surgeon, we feel it was the best option for collecting a maximal cohort of U.S. hand surgeons. Another potential limitation is the use of year inducted as an ASSH member to estimate the number of years in practice or surgeon age, particularly in cases where surgeons decide to apply for membership later in their careers. However,

we do feel this number should provide an accurate correlation for the vast majority of ASSH members. Of course, as with any study using Medicare data as the basis for analysis, the ability to generalize this data to hand surgeon reimbursement from all sources of payment and across multiple years, is debatable. Lastly, the general breakdown of geographical region by states has some inherent flaws. This does not allow us to account for variations between rural and urban populations, and how these discrepancies may contribute to the state as a whole. In addition, states with a lower total number of ASSH members are subject to data skewing by ASSH members with outlying reimbursement rates. Thus, future studies of this nature may be best served by classifying geographical regions in a broader manner than by state. However, despite these limitations, we feel this study gives useful insight into geographic differences in Medicare reimbursement among hand surgeons. Future studies should be aimed at examining specific factors leading to reimbursement variation based on both geography and surgeon-age, including total surgical volume and number of patients seen and treated and the severity of disease of those patients treated.

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Conflict of Interest

All authors have declared no conflict(s) of interest.

Statement of Human and Animal Rights

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

Statement of Informed Consent

There were no human subjects required for this study and therefore informed consent was not required.

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FIGURE LEGEND:

1. Distribution amongst ASSH members of total CMS reimbursement (in USD) per surgeon in 2012.
2. Distribution amongst ASSH members of years of experience (as estimated by number of years as an ASSH member) as of 2012.
3. Geographic distribution of average CMS reimbursement per ASSH member in 2012.