

# Patient Perception of Orthopedic Surgeon Reimbursement

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**Abstract:** Significant attention has been directed at evaluating reimbursement rates to orthopedic surgeons for various surgical procedures. To evaluate patients' understanding of the surgeon reimbursement process, studies using patient surveys have been conducted to determine patients' perceptions of orthopedic surgeon compensation. To date, there has been no systematic review to consolidate the data of these studies. This study aimed to synthesize the findings of these individual studies across multiple subspecialties of orthopedic surgery to evaluate the potential discrepancy between how much patients believe orthopedic surgeons are reimbursed and the actual reimbursement rate. We performed a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to identify studies that report findings of patient perceptions of orthopedic surgeon reimbursement for various procedures. Searches were conducted using MEDLINE through PubMed, Embase, and Scopus. Summary estimates of reimbursement discrepancies across subspecialties and overall were reported as unweighted averages of the individual study results within each group. Twelve studies were identified that met inclusion criteria, constituting 4309 surveys. These survey studies measured patients' perceptions of how much orthopedic surgeons are reimbursed for common procedures, including anterior cruciate ligament reconstruction, arthroscopic meniscectomy, carpal tunnel release, rotator cuff repair, multiple spine procedures and total shoulder, hip, and knee arthroplasty. It was found that patients reported reasonable surgeon's fees to be 11.2 times more than actual Medicare reimbursement. Among individual studies, the largest discrepancies were seen in total hip arthroplasty (26 times), whereas the smallest difference was in anterior cruciate ligament reconstruction (1.6 times). On average, patients estimated Medicare reimbursement rates to be 5.9 times higher than the actual surgeon reimbursement. Patients consistently overestimate how much orthopedic surgeons are reimbursed for common orthopedic procedures. The results of this systematic

review suggest that patients may value these procedures more than what Medicare reimburses. Such information may help educate the public, direct policy, and increase transparency between orthopedic surgeons and patients.

**Key Words:** Medicare reimbursement, orthopedic surgeon reimbursement, patient estimation, patient perception, reasonable surgeon fees

Healthcare economics has been one of the most controversial topics during the past decade and a consistent focus point in politics and the media, especially surrounding the topic of increased healthcare spending in the United States compared with other high-income countries.<sup>1</sup> Recently, specific attention has been directed at reimbursement rates for physicians as a gauge of the transparency of the healthcare system.<sup>2</sup> Herrick et al<sup>2</sup> found that patients are unfamiliar with physician reimbursement across multiple procedural specialties. They postulated that when patients are misinformed about the reality of physician reimbursement, they are more likely to support insurance cuts to provider fees, because they may assume that these cuts will not be detrimental to a medical practice.<sup>2</sup> The ability of an orthopedic total joint reconstruction practice to sustain a Medicare-only model has been shown to be unsustainable.<sup>3</sup> Medicare reimbursement rates are often set as a benchmark for private insurance companies<sup>4</sup>; however, Medicare reimbursement rates continue to decline, which highlights the importance of understanding patients' perceptions of physician reimbursement, because they could play a role in the political trends and trajectory of the US healthcare system.<sup>5</sup>

To better understand discrepancies between patients' perceptions of orthopedic surgeon reimbursement for procedures and actual reimbursement, recent studies have surveyed patients undergoing common orthopedic procedures. These studies have

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## Key Points

- Patients consistently overestimate how much orthopedic surgeons are reimbursed for common orthopedic procedures.
- Patients may value the surgeries more than what Medicare reimburses.
- Such information may help educate the public, direct policy, and increase transparency between orthopedic surgeons and patients.

shown that patients often overestimate reimbursement when compared with the Medicare schedules. To date, there has been no systematic review synthesizing these data to further understand perceived reimbursement rates and value of orthopedic procedures when compared with actual reimbursement.

There were two primary objectives of this systematic review. First, we aimed to find the difference between patient-reported reasonable surgeon's fees and Medicare reimbursement rates for common orthopedic procedures. We also sought to evaluate the differences in perceived Medicare reimbursement versus actual Medicare reimbursement. The secondary objective was to determine which subspecialties demonstrate larger discrepancies.

## Methods

This systematic review was performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

### Eligibility Criteria

Studies were included in this systematic review if they assessed patients' perceptions of orthopedic surgeon reimbursement for specific procedures. The exclusion criteria for this study were as follows: patient satisfaction studies, nonorthopedic specialties, and studies published in a language other than English.

### Data Sources and Searches

MEDLINE, through PubMed, SCOPUS, Embase, and PROSPERO, were used to search for relevant publications in May 2018. The search term used in PROSPERO was "patient perceptions of orthopedic surgeon compensation." The search terms used in PubMed, Embase, and SCOPUS were ((physician OR surgeon) AND (reimbursement OR compensation OR pay)) AND (orthopedics OR ligament OR spine OR arthroplasty OR tendon OR arthroscopy OR bone OR fracture) AND (perception OR idea OR think OR understanding OR perceive\*).

### Study Selection

Titles and abstracts were reviewed for the relevance of the studies. After nonpertinent studies were removed, the full texts of studies were reviewed for inclusion. Furthermore, the references in the relevant full-text studies were investigated for inclusion. This literature search was performed independently by two investigators (S.B. and A.D.). Any discrepancies between the two primary searches were discussed and settled by consensus.

## Results

The PROSPERO search produced no systematic reviews about patients' perceptions of orthopedic surgeon reimbursement. The literature search using PubMed, SCOPUS, and Embase databases produced 437 nonduplicate publications. After title and abstract reviews excluded nonpertinent publications, 22 full-text articles were pulled and reviewed. Twelve full-text articles met our inclusion criteria (Supplemental Digital Content figure [\[links.lww.com/SMJ/A183\]\(http://links.lww.com/SMJ/A183\)\). No references in these publications were used. All 12 publications were level of evidence IV.](http://</a></p>
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The 12 included articles were survey studies reporting on patient perceptions of orthopedic surgeon reimbursement for various procedures, including total shoulder, hip, and knee arthroplasty (TSA, THA, TKA); anterior cruciate ligament reconstruction (ACLR); meniscectomy; carpal tunnel release (CTR); rotator cuff repair (RCR); open reduction and internal fixation (ORIF) of distal radius fractures; and various spine procedures. Table 1 summarizes all of the included studies.

### Participant Demographics

The 12 studies that met inclusion criteria combine for a total of 4309 surveys assessing patient perceptions of orthopedic surgeon reimbursement. Participants ranged in age between 18 and 96 years. Of the 4309 participants, 40% identified as men. Nearly half, 49.2% (2120), of the survey participants were surveyed at postoperative follow-up appointments. Type of insurance, education level, and income brackets were collected in 9 of the 12 survey studies.

### Participant Recruitment and Survey

The surveys of all 12 studies were anonymous and voluntary. Surveys were administered to patients in outpatient orthopedic, sports medicine, or hand physical therapy clinic waiting rooms. These participants were being evaluated for the first time or for pre- or postoperative follow-up appointments. All but one of the studies were conducted in the United States (the one exception was located in Ontario, Canada). Studies also varied based on urban or suburban clinic locations.

The surveys followed a similar format. Each survey contained a description of the orthopedic procedure that was being investigated. The survey then asked what a reasonable fee would be for the orthopedic surgeon to receive for performing the described procedure. The participants would then be asked how much they believe that Medicare actually reimburses the surgeon, after which the participant would be informed of the average Medicare reimbursement for the procedure. Eight of the 12 studies then added a follow-up question, asking the participant to state whether the compensation was adequate. Given this information, survey investigators were able to determine the difference between patient-estimated Medicare reimbursement to physicians for specific procedures versus actual Medicare reimbursement. Furthermore, the investigators were able to assess how much patients valued the procedures based on the reported reasonable surgeon's fees. Schwartz et al took a slightly different approach to their survey.<sup>6</sup> Their survey was a preoperative "willingness to pay" (WTP) survey, which asked patients how much they would be willing to pay for a procedure. At a postoperative follow-up visit, the participants were then asked how they would distribute a bundled payment among the surgeon, implant manufacturer, and the hospital.

For the following subgroups of orthopedic procedures, summary estimates of reimbursement discrepancies are reported as unweighted averages of the individual study results within each

**Table 1. Summary of included studies**

Authors	Journal	LOE	Orthopedic procedure(s)	No. surveys	Response rate, %	Participant age, y	Participant recruitment
Okorooha et al	<i>Orthopedics</i> , 2016	IV	Arthroscopic meniscectomy ACLR	231	96	Mean 55.5 Range 18–87	Patients in waiting room of orthopedic sports medicine clinic
Fowler et al	<i>Orthopedics</i> , 2013	IV	CTR ORIF of distal radius fracture	132	44	Mean 49.7 Range 18–87	Patients scheduled for an outpatient hand and upper-extremity clinic visit
Badlani et al	<i>Spine</i> , 2013	IV	Lumbar discectomy Single-level lumbar DIF Single-level ACD Multilevel scoliotic deformity correction and instrumented fusion	200	Not reported	Mean 53 Range 20–85	Patients in waiting room of outpatient orthopedic clinic
Nagda et al	<i>Journal of Shoulder and Elbow Surgery</i> , 2015	IV	TSA RCR	250	83	Mean 52.3 Range 20–86	Patients with complaints of shoulder pain at 3 orthopedic practices in different states
Tucker et al	<i>Journal of Arthroplasty</i> , 2013	IV	THA/TKA	1200	Not reported	Mean 64 Range 19–95	Patients in outpatient orthopedic clinic waiting room, single institution
Memon et al	<i>Journal of Experimental Orthopedics</i> , 2017	IV	ACLR	250	79.9	Mean 38.8 Range 18–92	Patients in waiting rooms of 3 orthopedic centers
Maratt et al	<i>American Journal of Orthopedics</i> , 2015	IV	THA TKA	284	71	Mean 62.6 Range not reported	Patients who underwent THA or TKA at an academic center; surveys administered 2 wk postoperative
Courtney et al	<i>Journal of Arthroplasty</i> , 2016	IV	THA TKA	557	83	Mean 60.7 Range 18–96	Patients in waiting room of 4 orthopedic clinics (2 academic, 2 private practice)
Foran et al	<i>Journal of Arthroplasty</i> , 2012	IV	THA TKA	812	72.5	Mean 63.2 Range 22–93	Pre- and postoperative patients in outpatient clinic
Welton et al	<i>Spine Journal</i> , 2015	IV	Cervical fusion Lumbar fusion Laminectomy with fusion Kyphoplasty Discectomy Laminectomy without fusion	103	26.8	Mean not reported Range 31–60	Surveys mailed to orthopedic postoperative patients who underwent a spine procedure
Kokko et al	<i>Hand</i> , 2015	IV	CTR	225	100% convenience sample	Mean 43.4 Range 18–80	Patients at hand specialist's office
Schwartz et al	<i>Journal of Arthroplasty</i> , 2016	IV	THA TKA	45	Not reported	N/A	Preoperative patients undergoing arthroplasty by single surgeon

ACD, anterior cervical discectomy; ACLR, anterior cruciate ligament reconstruction; CTR, carpal tunnel release; DIF, decompression instrumented fusion; LOE, level of evidence; N/A, not applicable; ORIF, open reduction and internal fixation; RCR, rotator cuff repair; THA, total hip arthroplasty; TKA, total knee arthroplasty; TSA, total shoulder arthroplasty.

group unless otherwise specified. The overall discrepancy estimate is reported as an unweighted average of all of the included studies.

### Arthroplasty

Six of the 12 survey studies assessed patients' perceptions of reimbursement for arthroplasty procedures. Only one study

investigated patients' perceptions in the setting of TSA.<sup>7</sup> In this study, after the survey participants were told the surgeon's actual Medicare reimbursement (\$1633), 64% stated that TSA reimbursement was "much lower" than they thought it should be. THA compensation perceptions were assessed in four different studies.<sup>6,8–10</sup> The study conducted by Schwartz et al is unique

in that it was a preoperative WTP survey. Excluding the Schwartz et al study, on average, participants reported that a reasonable surgeon’s fee for THA should be \$17,886, which is approximately 12 times more than the actual Medicare reimbursement. Similar discrepancies also were seen in the setting of TKA. The studies that assessed TKA payment perceptions found that, on average, patients believed that a reasonable fee would be \$15,141, which was approximately 10 times more than the actual Medicare reimbursement.<sup>8–10</sup> Tucker et al<sup>11</sup> combined THA and TKA compensation perceptions in their survey and found that patients valued both procedures at \$6029, which is approximately 3.5 times more than the actual Medicare reimbursement. When asked about Medicare reimbursement estimations, on average, patients overestimated Medicare reimbursement for arthroplasty to be 5.4 times higher than current Medicare reimbursement rates. The largest discrepancy was seen in THA (9.6 times). These findings are outlined in Table 2.

Certain factors were associated with participants reporting a higher reasonable surgeon’s fee. Foran et al<sup>10</sup> reported that patients who had previously undergone an arthroplasty procedure tended to estimate a higher reasonable surgeon’s fee compared with those who had not had the surgery ( $P = 0.03$ ). There was no statistically significant correlation between patient satisfaction with a procedure and estimated surgeon’s fees.<sup>6,8–10</sup>

**Spine**

Two of the 12 survey studies assessed patients’ perceptions of surgeon reimbursement for multiple spine procedures<sup>12,13</sup> (Table 3). Badlani et al surveyed patients to determine their estimation for orthopedic surgeon reimbursement for lumbar discectomy, single-level decompression instrumented fusion, single-level anterior cervical discectomy, and multilevel scoliotic deformity correction and instrumented fusion.<sup>12</sup> Although patients who

had previous spine surgeries tended to report higher surgeon compensation, only the lumbar discectomy cohort reached statistical significance. The age of the patient was not found to be a significant variable. Ninety-two percent of patients reported that Medicare reimbursement for lumbar discectomy was “much lower” or “somewhat lower” than what a surgeon should earn. These findings were similar in the other reported spine procedures. Overall, patients reported a reasonable surgeon’s fee to be 14.6 times higher than the actual Medicare reimbursement rates. On average, patients overestimated Medicare reimbursement rates for these spine procedures by 9.1 times.

Welton et al took a similar approach in their study.<sup>13</sup> This study assessed patient-reported reasonable surgeon’s fees for “major” and “minor” spine procedures. Major procedures included cervical fusion, lumbar fusion, or laminectomy with fusion; minor procedures included kyphoplasty, discectomy, or laminectomy without fusion. Seventy-six percent of respondents previously underwent a major procedure, whereas 24% of patients had previously undergone a minor procedure. Of the patients who underwent a minor spine procedure, 62% believed that surgeon compensation was between \$5000 and \$10,000; however, the average Medicare reimbursement for all of the listed minor procedures was <\$2500. The reasonable surgeon’s fee for the major procedure group also was overestimated. Eighty-four percent believed that the reimbursement was >\$5000, whereas 28% of this group reported reimbursement to be >\$15,000; however, the mean Medicare reimbursement for each listed major procedure was <\$5000.

**Sports Medicine**

Three studies measured patient perceptions of physician reimbursement for common sports medicine procedures. Okoroha et al assessed arthroscopic meniscectomy and ACLR,<sup>14</sup> Memon

**Table 2. Arthroplasty: reasonable fee vs actual reimbursement**

Procedure	Authors	“Reasonable surgeon’s fee” or patient value, \$, mean	Perceived Medicare reimbursement, \$, mean	Actual Medicare reimbursement, \$, mean	Difference between reasonable surgeon’s fee and actual Medicare reimbursement	Difference between perceived Medicare reimbursement and actual Medicare reimbursement
TSA	Nagda et al	13,178	7177	1633	8×	4.4×
THA	Maratt et al	11,872	N/A	1467	8×	N/A
	Courtney et al	27,430	13,216	1375	20×	9.6×
	Foran et al	14,358	8212	1375	10×	6×
	Schwartz et al (WTP survey)	39,479	N/A	1480	26×	N/A
TKA	Maratt et al	12,263	N/A	1530	8×	N/A
	Courtney et al	19,830	8300	1450	13×	5.7×
	Foran et al	13,332	7196	1450	9×	5×
	Schwartz et al (WTP survey)	28,438	N/A	1480	19×	N/A
THA/TKA	Tucker et al	6029	2939	1700	3.5×	1.7×

N/A, not applicable; THA, total hip arthroplasty; TKA, total knee arthroplasty; TSA, total shoulder arthroplasty; WTP, willingness to pay.

**Table 3. Spine procedures: reasonable fee vs actual reimbursement**

Procedure	Authors	“Reasonable surgeon’s fee” or patient value, \$, mean	Perceived Medicare reimbursement, \$, mean	Actual Medicare reimbursement, \$, mean	Difference between reasonable surgeon’s fee and Medicare reimbursement	Difference between perceived and actual Medicare reimbursement
Lumbar discectomy	Badlani et al	21,229	12,336	971	21×	12.7×
Single-level lumbar DIF	Badlani et al	29,457	17,308	2413	12×	7.2×
Single-level ACD	Badlani et al	25,226	15,971	2158	11×	7.4×
Multilevel scoliotic deformity correction and instrumented fusion	Badlani et al	42,706	25,394	“Variable”	N/A	N/A
Major procedures	Welton et al	84% report >5000, 28% report >15,000	N/A	<5000	N/A	N/A
Minor procedures	Welton et al	5,000–10,000	N/A	<2500	N/A	N/A

ACD, anterior cervical discectomy; DIF, decompression instrumented fusion; N/A, not applicable.

et al investigated ACLR,<sup>15</sup> and Nagda et al looked at RCR.<sup>7</sup> The results of these studies are outlined in Table 4. Memon et al conducted their study in Ontario and compared patient estimations of orthopedic surgeon compensation with the Ontario Health Insurance Plan. The results from their study show that patients perceive a reasonable surgeon’s fee for ACLR to be \$1000, whereas the national Ontario Health Insurance Plan reimburses surgeons \$615 for the procedure. This study found a positive correlation between that patients that were “happy” with or “neutral” about their surgical outcomes and higher reasonable surgeon’s fees. This correlation also was noted in patients who had a “positive orthopedic surgery experience” ( $P < 0.05$ ). Okoroha et al also investigated perceptions of arthroscopic meniscectomy physician reimbursement. They noted that a history of knee operations did not show any correlation with patients’ perceptions of adequate surgeon reimbursement. In all three of these studies, between 54.4% and 65% of patients reported that Medicare reimbursement to surgeons was “too low” or “much lower” than what they thought was adequate compensation for these

sports medicine procedures. Overall, patients reported a reasonable surgeon’s fee to be 8.4 times higher than the actual Medicare reimbursement rates. Furthermore, on average, patients perceived Medicare reimbursement for sports medicine procedures to be 5.3 times higher than the present Medicare reimbursement rates.

### Hand

Two other studies examined perceptions of orthopedic surgeon compensation for other common hand procedures, including CTR<sup>16,17</sup> and ORIF of distal radius fracture.<sup>16</sup> These findings are outlined in Table 5. Kokko et al found that patients who previously had hand surgery estimated a reasonable surgeon’s fee to be \$3000 more compared with participants who had not had hand surgery ( $P < 0.001$ ).<sup>17</sup> This study found that 84% of patients reported that surgeon reimbursement for CTR was “lower” or “much lower” than what they considered to be adequate. Overall, patients reported a reasonable hand surgeon’s fee to be 7.6 times

**Table 4. Sports medicine procedures: reasonable fee vs actual reimbursement**

Procedure	Authors	“Reasonable surgeon’s fee” or patient value, \$, mean	Perceived Medicare reimbursement, \$, mean	Actual Medicare reimbursement, \$, mean	Difference between reasonable surgeon’s fee and Medicare reimbursement “value”	Difference between perceived and actual Medicare reimbursement
Arthroscopic meniscectomy	Okoroha et al	8096	5442	576	14×	9.4×
ACLR	Memon et al	Median 1000	OHIP: median 700	OHIP: 615	1.6×	1.1×
	Okoroha et al	11,794	6667	1013	11×	6.6×
RCR	Nagda et al	8459	4692	1175	7×	4×

ACLR, anterior cruciate ligament reconstruction; OHIP, Ontario Health Insurance Plan; RCR, rotator cuff repair.

**Table 5. Hand procedures: reasonable fee vs actual reimbursement**

Procedure	Authors	“Reasonable surgeon’s fee” or patient value, \$, mean	Perceived Medicare reimbursement, \$, mean	Actual Medicare reimbursement, \$, mean	Difference between reasonable surgeon’s fee and Medicare reimbursement “value”	Difference between perceived and actual Medicare reimbursement
CTR	Fowler et al	2630 SD ± 3058	1892 SD ± 4180	436	6×	4.3×
	Kokko et al	5030	2685	412	12×	6.5×
ORIF of distal radial fractures	Fowler et al	3874 SD ± 4275	2672 SD ± 5386	743	5×	3.6×

CTR, carpal tunnel release; ORIF, open reduction and internal fixation; SD, standard deviation.

higher than the actual Medicare reimbursement rates. Furthermore, on average, patients estimated Medicare physician reimbursement for hand procedures to be 4.8 times higher than the present Medicare reimbursement rates.

### Socioeconomic Variables

The type of insurance was investigated in all of the included studies, except for two.<sup>7–14,16,17</sup> Badlani et al found that patients with health management organization insurance tended to report higher reasonable surgeon’s fees compared with patients who were covered by Medicare or preferred provider organization insurance. This difference was statistically significant only for lumbar discectomy ( $P < 0.05$ ), however.

Education level was assessed in all but one study.<sup>7–17</sup> Memon et al found that participants who did not graduate from high school were more likely to estimate higher reasonable surgeon’s fees for an ACLR ( $P = 0.002$ ).<sup>15</sup> Kokko et al noted the same finding in their study in regard to CTR ( $P = 0.025$ ).<sup>17</sup>

Household income was another variable that was measured in all of the included studies, except for one.<sup>7–12,14–17</sup> Nagda et al<sup>7</sup> showed that compared with participants with higher incomes, participants with a household income between \$20,000 and \$75,000 were more likely to report higher reasonable surgeon’s fees for both TSA and RCR ( $P < 0.01$ ). Memon et al<sup>15</sup> also had a similar finding in that participants with an income  $< \$41,000$  also were more likely to report higher estimations ( $P < 0.001$ ).

### Discussion

This is the first systematic review to our knowledge to evaluate patients’ perceptions of orthopedic surgeon reimbursement in relation to actual Medicare reimbursement. On average, there is a 5.9 times discrepancy between patients’ perceptions of orthopedic surgeon reimbursement and actual Medicare reimbursement. Furthermore, on average, patients reported a reasonable surgeon’s fee that was 11.2 times higher than the actual Medicare reimbursement.

Significant attention has been directed at healthcare expenditures, which account for 18% of gross domestic product in the United States.<sup>5</sup> The public may believe that physician reimbursement accounts for a large share of these costs, but studies have shown that actual reimbursement from Medicare is significantly

lower than what the public assumes. Furthermore, Medicare reimbursement rates have declined since 2000. Specifically, mean annual decreases in reimbursement for various orthopedic procedures (during the last 20 years) are as follows: shoulder arthroscopy ( $-\$58.79$ ), TKA ( $-\$47.51$ ), THA ( $-\$40.92$ ), and RCR ( $-\$39.57$ ). This, combined with the increasing cost of living, has resulted in many orthopedic surgeons considering not accepting Medicare. This would have significant financial implications for the US healthcare system and may decrease access to care.<sup>5,18</sup> One of the studies included in this systematic review was from Ontario, Canada, and a similar discrepancy was noted; however, this discrepancy (1.6 times difference) was not as substantial as the results from the other studies conducted in the United States. It is important to note that in Canada, healthcare expenditures account for 10.6% of the gross domestic product,<sup>19</sup> which is significantly less when compared with the United States. As such, Canadian patients may perceive that a lower proportion is being spent on surgeon reimbursement.

Our systematic review yielded reimbursement articles from multiple subspecialties within orthopedic surgery, revealing that these patient perception discrepancies are widespread throughout the specialty. For patient-reported reasonable surgeon’s fees versus Medicare reimbursement, the largest difference was seen in spine procedures (11–21 times) and THA (8–26 times). The smallest differences were seen in ACLR (1.6 times, Canada study) and ORIF of distal radial fracture (5 times). For patient estimations of Medicare reimbursement versus actual Medicare reimbursement, the largest difference also was seen in spine procedures (7.2–12.7 times) and THA (4.4–9.6 times), whereas the smallest differences were seen in ACLR (1.1 times, Canada study) and ORIF of distal radial fracture (3.6 times). The results of each of these studies show that there is a lack of transparency for patients in relation to surgeon reimbursement. Furthermore, these numbers are not specific to orthopedics. Patients overestimate plastic surgeon compensation anywhere from 4.7 to 9.2 times, depending on the procedure.<sup>20</sup> In a study similar to those assessed in this systematic review, patients’ perceptions of cardiac ablation, pacemaker implant, single stent placement, laparoscopic cholecystectomy, inguinal hernia repair, and colonoscopy reimbursement were found to be 4.9 times higher than the actual Medicare reimbursement.<sup>2</sup>

It is important to note that each study did not have identical surveys. Most of the studies asked for a “reasonable surgeon’s fee” or “how much an orthopedic surgeon should get paid” for a particular procedure.<sup>7–12,14,16,17</sup> This wording allows researchers to extrapolate the value that patients place on particular procedures; however, some studies worded the question “how much you think an orthopedic surgeon is paid.”<sup>13,15</sup> These differences are subtle, but they do alter the implication of the question. Furthermore, not all of the studies asked about perceptions of Medicare reimbursement,<sup>6,8,13,15</sup> and one study conducted surveys with ranges of patient perceptions.<sup>13</sup> Lastly, the survey from Schwartz et al was a WTP survey that assessed patient distribution of bundled payments. As such, these survey studies are slightly heterogeneous, which may limit the generalizability among the studies included in this systematic review.

With such discrepancies in orthopedic surgery, policymakers need to evaluate whether patients value these procedures more than what Medicare is presently reimbursing. The results of our systematic review suggest that patients do place a higher monetary value on surgeon reimbursement than what is actually reimbursed. Further studies are needed on the value that patients place on orthopedic services and how this relates to reimbursement. Furthermore, such data will help educate the public, direct policy, and help decrease the lack of transparency for patients.

This study is not without limitations. Because this systematic review comprises survey studies, there may be selection bias. Furthermore, because these patients were recruited from orthopedic offices, the findings may not be representative of the general population. In addition, the included studies were performed in particular geographical locations and may not extrapolate to other geographical areas. Nonetheless, there does appear to be consensus among the studies regarding the discrepancy between patients’ perceptions of reimbursement and actual reimbursement.

## Conclusions

A significant discrepancy exists between patients’ perceptions of orthopedic surgeon reimbursement and what is actually reimbursed across multiple subspecialties. The unweighted mean discrepancy was 5.9 times, with a range of 1.1 to 12.7 times. Furthermore, patients report reasonable surgeon’s fees that are much higher than what Medicare reimburses. The unweighted mean discrepancy was 11.2 times, with a range of 1.6 to 26 times. Such information may be useful to policy makers when allocating limited resources within the present US healthcare system.

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