

# Analysis of Medicaid and Medicare Reimbursement Variations for Common Orthopaedic Trauma Procedures

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**Objectives:** To quantify the variation in Medicaid (MCD) and Medicare (MCR) reimbursement for common orthopaedic trauma procedures.

**Design:** An economic analysis to evaluate the disparities between MCD and MCR reimbursement using state and federal physician fee schedules reimbursement rates, or relative value units (RVUs).

**Main Outcome Measurements:** MCD and MCR RVUs for each procedure were compared using dollar difference and coefficient of variation (CV).

**Results:** This analysis shows considerable variance in MCD reimbursement rates between states. Additionally, it found that the majority of RVUs for MCD were higher than MCR for the evaluated trauma procedures.

**Conclusions:** The variance in MCD reimbursement values may be driven by differences in the underlying characteristics of each system's patient population. This variance, particularly in bordering states, could represent a barrier to healthcare access for some populations.

**Level of Evidence:** Level IV; economic analysis

**Key Words:** Medicaid, Medicare, insurance, orthopaedic trauma, reimbursement, economic analysis, relative value unit (RVU)

## INTRODUCTION

Access to healthcare in the United States presents a complex and multifaceted challenge, which becomes particularly evident when considering Medicaid (MCD) and Medicare (MCR), two major public health insurance programs characterized by widely varying structures. MCR reimbursement rates are federally directed and relatively consistent nationwide; conversely, MCD rates are determined by individual state

governments.<sup>1</sup> The result is marked variability in reimbursement rates between these programs with far-reaching implications for patients, healthcare providers, and healthcare systems.<sup>2</sup> Indeed, discrepancy in reimbursement rates has been identified as a contributing factor leading to disparities in access to healthcare, particularly within the field of orthopaedics.<sup>2</sup>

National health expenditure (NHE) statistics published by the Centers for Medicare & Medicaid Services (CMS) show that MCD spending grew 9.2% to \$734.0 billion in 2021 or 17% percent of the total NHE; additionally, MCR spending grew 8.4% to \$900.8 billion in 2021, or 21% of the total NHE.<sup>3</sup> This clearly illustrates the vast scale of these programs, their influence on the healthcare system, and the importance for providers to understand MCD and MCR reimbursement policies. Navigating these policies effectively not only ensures the financial sustainability of medical practices but also plays an integral role in maintaining and enhancing the

accessibility and quality of healthcare services for patients across the United States.

Physician compensation for fee-for-service reimbursement models relies heavily on MCR's Resource-Based Relative Value Scale (RBRVS), a schema used to determine compensation amounts for medical providers.<sup>4-6</sup> The RBRVS is based on three components: practice expense, professional liability, and physician work, with physician work being the most significant.<sup>4-6</sup> Each component of the RBRVS is assigned a relative value unit (RVU), which sum to a total RVU used to define the relative value of a service or procedure in relation to others.<sup>4-6</sup> CMS annually updates the Medicare Physician Fee Schedule (MPFS), which lists all Current Procedural Terminology (CPT) codes and their assigned RVUs.<sup>4-7</sup> Public and private payers commonly use these published RVUs to determine physician compensation.<sup>5,6</sup>

Currently, the CMS is the only governing body providing any oversight to MCD reimbursement rates being determined at the state level; the result is relatively loose guidelines, creating the potential for discrepancies in reimbursement rates for orthopaedic procedures from state to state.<sup>4-7</sup> For example, one well-

documented illustration of these discrepancies is in regard to work RVUs (wRVUs), which specifically assess the technical skill, time, and overall requirements for a given service or procedure.<sup>4,6</sup> While higher wRVUs might suggest increased procedural complexity, numerous prior studies have evaluated the accuracy of wRVUs in reflecting surgical procedure demands and report a disparity between reimbursement rates and case complexity.<sup>8-17</sup> For example, relatively straightforward cases, such as intramedullary nailing of femoral shaft fractures, primary knee/hip arthroplasty, and fixation of distal radius fractures, are being reimbursed at higher rates than the more challenging femur fracture malunions, revision of knee and hip arthroplasty, and complex carpal trauma cases despite having shorter operative times and lower overall complexity.<sup>13-17</sup>

Although previous studies have described substantial irregularities in wRVUs or overall reimbursement rates for orthopaedic procedures, very little has been done to specifically evaluate MCD versus MCR reimbursement rates. There is one recent study in the field of general surgery, which reported substantial differences in compensation rates when comparing MCD to MCR for the same procedures.<sup>18</sup> Another study further described these

disparities for common procedures within general orthopaedics.<sup>19</sup> However, there is a gap in the literature regarding reimbursement of orthopaedic trauma-specific procedures. We set out to address this gap by quantifying the extent of variation in MCD and MCR reimbursement for common orthopaedic trauma procedures and discussing the potential implications this variability may have on healthcare access and equity in the field of orthopaedic trauma care.

## METHODS

Billing data from a Level I trauma center in 2021 were retrospectively reviewed to determine the ten most commonly billed orthopaedic trauma CPT codes. The 2018-2021 MPFS and publicly available 2018-2021 MCD physician fee schedules for each state were obtained. States were excluded if they did not use fee-for-service reimbursement models or if they had unavailable or unpublished fee schedules; the excluded states were Delaware, Pennsylvania, Tennessee, and Vermont. Once the fee schedules were collected, the reimbursement rates for the pertinent CPT codes were extracted.

The mean dollar difference per RVU was calculated for each procedure. This was done by taking the difference in absolute reimbursement in

dollars and dividing that number by the corresponding RVU for the procedure. Additionally, the coefficient of variation (CV), which is the ratio of the standard deviation divided by the mean of a set of values, was calculated for each procedure to assess the degree of variability among MCD rates between states. This measure has been used by other similar studies in the past as a surrogate for MCD reimbursement variability when compared to MCR reimbursement rates. The CV for MCR was also calculated for comparison. A higher CV indicates greater variability in reimbursement rates for a given procedure relative to the mean; conversely, a lower CV indicates lower variability, representing more consistent reimbursement rates.

Statistical significance was determined by using a t-test to evaluate the dollar differences between MCD and MCR reimbursement rates for each CPT code. Significance was set at  $\alpha = 0.05$ .

## RESULTS

The ten most commonly used orthopaedic trauma CPT codes included the following: intramedullary hip screw (27245), femoral shaft intramedullary nail (27506), hip hemiarthroplasty (27236), multiplanar external fixator placement (20692), debridement from skin to bone (11012),

tibial shaft intramedullary nail (27759), uniplanar external fixator placement (20690), nerve repair with synthetic conduit (64910), distal radius open reduction and internal fixation (25607), and posterior pelvic ring percutaneous fixation (27216) (Table 1).

**Table 1:** Ten common orthopaedic trauma CPT codes used at a Level I trauma center.

Procedure	CPT code
Intramedullary hip screw	27245
Femoral shaft intramedullary nail	27506
Hip hemiarthroplasty	27236
Multiplanar external fixator placement	20692
Debridement from skin to bone	11012
Tibial shaft intramedullary nail	27759
Uniplanar external fixator placement	20690
Nerve repair with synthetic conduit	64910
Distal radius open reduction and internal fixation	25607
Posterior pelvic ring percutaneous fixation	27216

MCD, Medicaid; MCR, Medicare; CPT, Current Procedural Terminology; RVU, relative value unit.

MCD procedures reimbursement averaged  $\$731 \pm \$58$  compared to an average of  $\$662 \pm \$12$  for MCR (Table 2). The range of average MCD reimbursement was from  $\$374 \pm \$49$  to  $\$1,052 \pm \$86$  for uniplanar external fixator placement and femoral shaft intramedullary nail, respectively. The range of average MCR reimbursement was from  $\$309 \pm \$6$  to  $\$1,135 \pm \$21$  for tibial shaft intramedullary nail and multiplanar external fixator placement, respectively. The average MCD CV for all ten CPT codes was 0.27 (range, 0.23 to 0.47), meaning the standard

deviation is 27% of the mean; the MCR CV for each CPT code was 0.06.

The average mean dollar difference between MCD and MC was  $\$69.40$  ( $\$1.96$  per RVU) in favor of MCD (Table 3); when billing frequency is considered, the weighted average mean dollar difference is  $\$264.03$  ( $\$7.17$  per RVU) also in favor of MCD. In other words, MCD was reimbursed 10.5% higher than MCR and 39.9% higher when weighted for procedure frequency. The range for mean dollar difference was from  $\$493.81$  for nerve repair with synthetic conduit in favor of MCR to  $\$645.02$  for intramedullary hip screw in favor of MCD. The range for weighted dollar difference was from  $\$407.09$  for multiplanar external fixator placement in favor of MCR to  $\$1,198.12$  for intramedullary hip screw in favor of MCD. The mean dollar difference between MCD and MCR reimbursement was statistically significant for all procedures ( $< 0.001$ ) except for femoral shaft intramedullary nail ( $p = 0.065$ ) and debridement down to the level of bone ( $p = 0.314$ ).

Finally, we analyzed the geographic distribution of the MCD-to-MCR reimbursement ratio percent differences, with Alaska MCD

Table 2. Medicaid and Medicare relative value units for common orthopaedic trauma procedures.

Procedure	MCD		MCR	
	Value (\$) ± 95% CI	CV	Value (\$) ± 95% CI	CV
Intramedullary hip screw	1,035 ± 70	0.23	390 ± 7	0.06
Femoral shaft intramedullary nail	1,052 ± 86	0.28	986 ± 18	0.06
Hip hemiarthroplasty	966 ± 74	0.26	469 ± 9	0.06
Multiplanar external fixator placement	704 ± 95	0.47	1,135 ± 21	0.06
Debridement from skin to bone	436 ± 43	0.34	425 ± 8	0.06
Tibial shaft intramedullary nail	813 ± 58	0.25	309 ± 6	0.06
Uniplanar external fixator placement	374 ± 49	0.46	605 ± 11	0.06
Nerve repair with synthetic conduit	544 ± 67	0.43	1,037 ± 19	0.06
Distal radius open reduction and internal fixation	621 ± 55	0.31	834 ± 15	0.06
Posterior pelvic ring percutaneous fixation	770 ± 90	0.41	429 ± 8	0.06
Average	731 ± 58	0.27	662 ± 12	0.06

Values are expressed as means. MCD, Medicaid; MCR, Medicare; CI, confidence interval; CV, coefficient of variability.

Table 3: Dollar difference per relative value unit of Medicaid versus Medicare reimbursement rates for common orthopaedic trauma procedures.

Procedure	Value (\$)	[per RVU]	P value	*Weighted		
				Value (\$)	[per RVU]	p-value
Intramedullary hip screw	645.02	[18.17]	< 0.001	1,198.12	[33.75]	< 0.001
Femoral shaft intramedullary nail	66.68	[1.73]	0.065	65.38	[1.70]	0.065
Hip hemiarthroplasty	496.81	[14.39]	< 0.001	520.41	[15.07]	< 0.001
Multiplanar external fixator placement	-431.25	[-13.36]	< 0.001	-407.09	[-12.61]	< 0.001
Debridement from skin to bone	10.49	[0.87]	0.314	21.91	[1.82]	0.314
Tibial shaft intramedullary nail	504.65	[17.49]	< 0.001	491.74	[17.04]	< 0.001
Uniplanar external fixator placement	-231.41	[-13.44]	< 0.001	-188.85	[-10.97]	< 0.001
Nerve repair with synthetic conduit	-493.81	[-21.72]	< 0.001	-288.71	[-12.70]	< 0.001
Distal radius open reduction and internal fixation	-213.94	[-9.00]	< 0.001	-91.20	[-3.84]	< 0.001
Posterior pelvic ring percutaneous fixation	340.77	[13.18]	< 0.001	95.47	[3.69]	< 0.001
Average	69.40	[1.96]	0.011	264.03	[7.17]	0.003

Values are expressed as means. RVU relative value unit.

\* In the right columns, procedure value is weighted by the relative frequency at which it is billed.

reimbursing at an average rate 65% higher than MCR and Rhode Island reimbursing an average of nearly 50% lower (Figure 1).

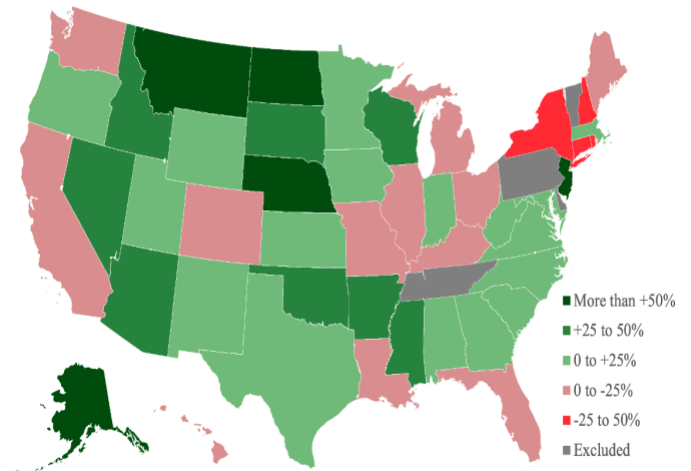
## DISCUSSION

The findings of this economic analysis reveal significant variability in MCD reimbursement rates for common orthopaedic trauma procedures across the United States. Our analysis aligns with previous research that has highlighted substantial disparities

in MCD reimbursement within the field of orthopaedics.<sup>8-17</sup> In 2019, a previous study by Casper et al. found that MCD reimbursement rates are significantly lower than MCR rates for common general orthopaedic procedures, and concluded that MCD reimbursement was 81.9% of the average MCR reimbursement.<sup>19</sup> In our analysis of common trauma procedures, we found the converse relationship with MCD reimbursing at 10.5% higher rates than MCR, 39.9% higher when weighted for procedure frequency. This observation suggests that the differences in reimbursement may be influenced by factors related to the patient populations served by each program. The implications of these findings are multifaceted, with the potential to impact healthcare access and equity, particularly in regions where the disparities are most pronounced.

Our analysis found considerable variance in MCD reimbursement rates between states, mirroring patterns seen in prior studies. This geographic discrepancy can be attributed to the decentralized nature of MCD, which allows individual states to set their individual reimbursement rates. Consequently, a patient's access to orthopaedic trauma care can vary dramatically depending on their location.

Figure 1. Geographic distribution of the Medicaid-to-Medicare reimbursement ratio percent differences.



In our study, we observed considerable geographical variation, with Alaska MCD reimbursing at a rate approximately 65% higher than MCR while Rhode Island reimbursed at nearly 50% lower. These findings highlight the importance of considering the regional context when addressing healthcare access and reimbursement policies.

One interesting aspect of our results was that MCD was more frequently reimbursed at higher rates than MCR for common orthopaedic trauma procedures. Specifically, our study revealed that MCD provided higher reimbursements than MCR for 60% of the procedures we included in our analysis. This is in stark contrast to the study by Casper et al. where MCR was reported as the superior reimbursement model in 100% of cases analyzed.<sup>19</sup> While this finding might seem

counterintuitive given the widespread perception of MCD as a program with lower reimbursement,<sup>20</sup> it accentuates the complexity of reimbursement mechanisms. The higher MCD reimbursement rates might be influenced by various factors, including differences in the case profile and patient demographics served by these programs. MCD typically covers individuals with lower socioeconomic status, who may have a higher prevalence of traumatic injuries. Additionally, MCD patients may present with more complex medical and social needs, which can necessitate more extensive orthopaedic trauma care. These factors could lead to higher reimbursement rates to ensure that healthcare providers are adequately compensated for the additional resources and expertise required to care for this population. Further research is needed to further explore the reasons behind these disparities and to assess their impact on patient outcomes.

This study has several limitations. First, our analysis is based on publicly available reimbursement data, and we were unable to account for privately managed MCD plans, which may have different reimbursement structures. Additionally, the use of billing data from a single Level I trauma center located in a border state (El Paso, Texas) may not be

a generalizable representation of the national landscape of orthopaedic trauma care. Furthermore, we lacked data on the frequency of procedures billed to MCD versus MCR, which would provide further insights into utilization patterns. Finally, the study raises questions about whether any reimbursement values, MCD or MCR, accurately represent the complexity, or work, required for a given procedure, which warrants further investigation. Ultimately, the goal should be to establish a reimbursement system that is not only equitable but also reflective of the true value of care provided, ensuring that patients receive the best possible care while providers are fairly compensated for their services.

## CONCLUSION

This study highlights the substantial variance in MCD reimbursement rates for common orthopaedic trauma procedures across the United States. These disparities, particularly in states that share borders, could pose a significant barrier to healthcare access for certain populations. While our analysis reveals that MCD more often offers higher reimbursement rates for these procedures compared to MCR, it is imperative to investigate the underlying factors contributing to these differences. These two

factors highlight the need for reform and policy adjustments to ensure that all individuals, regardless of their insurance type or geographic location, can receive quality orthopaedic trauma care. Finally, future research should focus on exploring the relationships between reimbursement, case complexity, and patient outcomes to ensure that reimbursement accurately reflects the value of orthopaedic trauma care. Addressing these disparities is crucial to advancing healthcare access and equity in the field of orthopaedic trauma.

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