

# Unequal Hands: The Impact of Insurance on Amputation Rates in Traumatic Hand Injuries

Ryan W. Dominguez, BSA<sup>1</sup>, Alexander K. Palma, BA<sup>1</sup>, Richard Samade, MD, PhD<sup>1</sup>

<sup>1</sup>University of Texas Southwestern Medical Center, Dallas, TX

[Ryan.dominguez@utsouthwestern.edu](mailto:Ryan.dominguez@utsouthwestern.edu)

**Disclosures:** Dominguez, Ryan (N) Palma, Alexander (N) Samade, Richard (N)

**Background:** Insurance status has been associated with disparities in surgical care, but its impact on treatment choice in mangled hand injuries remains unclear. This study evaluates whether insurance type influences the likelihood of amputation versus flap reconstruction and examines how these associations vary across different time intervals to operation. It is hypothesized that those with government-funded insurance, such as Medicaid and Medicare, will receive amputations at a higher rate than their privately insured counterparts. Conversely, flap reconstruction is expected to occur at a higher rate in the private insurance patient cohort.

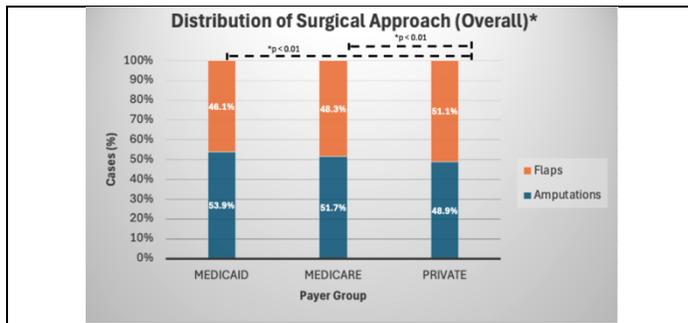
**Methods:** A retrospective cohort study was conducted using the PearlDiver Mariner database, which contains adjudicated claims data from over 165 million patients (January 2010 – October 2022). This study compared procedural approaches, including soft tissue reconstruction and amputation, among patients with mangled hand injuries with their respective insurance plan. The insurance type was stratified amongst three groups: Medicare, Medicaid, and private. Chi-square tests were used to analyze differences in procedural approaches between the three insurance types. The significance level was set at 0.05 to minimize the risk of Type I error.

**Results:** In the management of mangled hand injuries, treatment modality (amputation versus soft tissue reconstruction) differed significantly across insurance groups ( $p < 0.01$ ). Patients with Medicare had 30% higher odds of undergoing amputation compared with those with private insurance (OR 1.30, 95% CI 1.09–1.53,  $p = 0.0029$ ), while Medicaid patients demonstrated a non-significant trend toward higher amputation rates. When stratified by time to operation, soft tissue reconstruction remained the predominant treatment overall; however, amputations among Medicare patients clustered disproportionately at delayed intervals, particularly 5–7 days and 11–15 days post-injury. In contrast, privately insured patients consistently underwent reconstruction across nearly all operative timeframes.

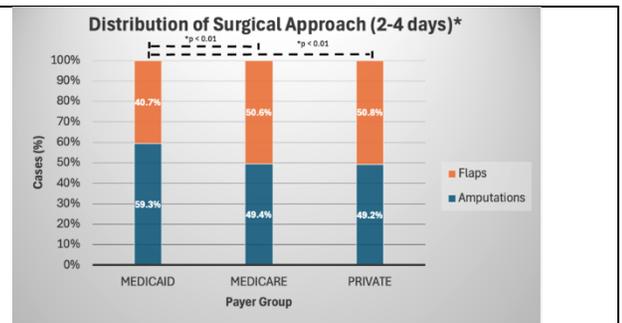
**Discussion:** This study demonstrates that insurance status is significantly associated with treatment modality following mangled hand injury, with patients covered by Medicare exhibiting notably higher odds of undergoing amputation compared to their privately insured counterparts. Stratification by time interval revealed that, while soft tissue reconstruction was the most common approach across payer groups, Medicare patients were disproportionately treated with amputation at specific delayed intervals. These findings highlight potential inequities in access to and delivery of limb-salvage care, underscoring the need for further investigation into systemic barriers and treatment decision-making processes within limb-salvage; though factors such as age, comorbidity burden, and injury severity likely also influence treatment decisions.

**Significance/Clinical Relevance:** This study highlights the influence of insurance status in the likelihood of amputation versus limb salvage in mangled hand injuries, with Medicare patients experiencing a disproportionately higher odds of amputation. The findings that these disparities are pronounced in delayed operative intervals suggests that barriers to timely surgical care may be driving inequities in approach/outcomes.

## Images and Tables:



**Figure 1:** Distribution of surgical approach (amputations vs. flaps) by insurance type among all patients collected.



**Figure 2:** Distribution of surgical approach (amputations vs. flaps) by insurance type among patients operated within 2-4 days of injury. P-values reflect post hoc pairwise comparisons between Medicaid and Medicare as well as Medicaid and Private.