Trends in Inpatient Costs and Drivers of High-Cost Hospitalizations Among Individuals with Opioid Use Disorder

Godwin Okoye, MS[1], Curtis Bone, MD[2,3], Jimmy Arnold, MBA[4], Chanhyun Park, PhD[1], Anton L.V. Avanceña, PhD[1,5]

[1]Health Outcomes Division, College of Pharmacy, The University of Texas at Austin, [2] Department of Family Medicine, The University of Texas at San Antonio, [3]Be Well Institute on Substance Use and Related Disorders at The University of Texas at San Antonio, [4]Long School of Medicine, The University of Texas at San Antonio [5]Department of Internal Medicine, Dell Medical School, The University of Texas at Austin, Austin, TX, USA

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Introduction

- Opioid use disorder (OUD) continues to impose a substantial clinical and economic burden on the U.S. healthcare system.
- Contemporary national estimates of hospitalization, utilization costs, and drivers of high-cost hospitalizations are limited.
- The objective of this study was to characterize national trends in inpatient utilization and hospitalization costs and to determine predictors of total and high-cost hospitalizations among individuals with OUD

Methods

Data source/ study design	Repeated cross-sectional analysis of hospitalization encounters using the National Inpatient Sample (NIS) dataset (1/1/2019-12/31/2022)
Study population	Adults hospitalized due to opioid poisoning/toxicity or OUD
Covariates	(1) Sociodemographic: age, sex, race, ethnicity, rural–urban residence, primary payer, and ZIP-code–level income quartile (2) Clinical: number of diagnoses and procedures, length of stay, elective admissions, severity indicator, indicators for amputation and debridement procedures. (3)Hospital: hospital's census division
Outcomes	(1) Annual rates of OUD-related hospitalizations per 100,000 hospitalizations (2) Average Total cost of hospitalization (3) Predictors of high-cost hospitalization (≥75th and 90th percentile of total cost)
Statistical analysis	We incorporated discharge weights, clusters, and stratification. Rates were modelled as a poisson distribution to estimate average effect. hospital-specific cost-to-charge ratios were applied to cost, adjusted to 2022 US dollars using the Consumer Price Index. We determined that cost follows a gamma distribution. Logistic regression were used to model high cost. All models included the full set of prespecified covariates. Multicollinearity was assessed.

Results

- Among 712,172 (weighted N=3,560,859) hospitalizations,
- Mean age at admission was 50.6 years (standard deviation [SD] = 17.1). Females accounted for 49.2% of hospitalizations
- There was a 6.45% **decline** in hospitalization rates from 2019 to 2022, with a 95% confidence interval (CI) ranging from 6.16% to 6.73% decline. While a 14% **increase** in mean hospitalization costs for OUD-related hospitalizations was observed. (Figure 1A and 1B respectively)
- Strong positive predictors of high-cost include additional diagnosis/procedure, length of stay, illness severity, age, Black/Hispanic/Asian vs White individuals, high income, Pacific vs New England, Private vs Medicare, Elective admissions (Figure 2)
- Strong negative predictors of high cost include being female and all regions vs New England except Pacific region (Figure 2)
- Amputation and debridement-sensitive to high-cost cut-offs (Figure 2)

Results

Figure 2: Predictors of High-Cost Hospitalization (Total Cost > 90th percentile and > 75th percentile)

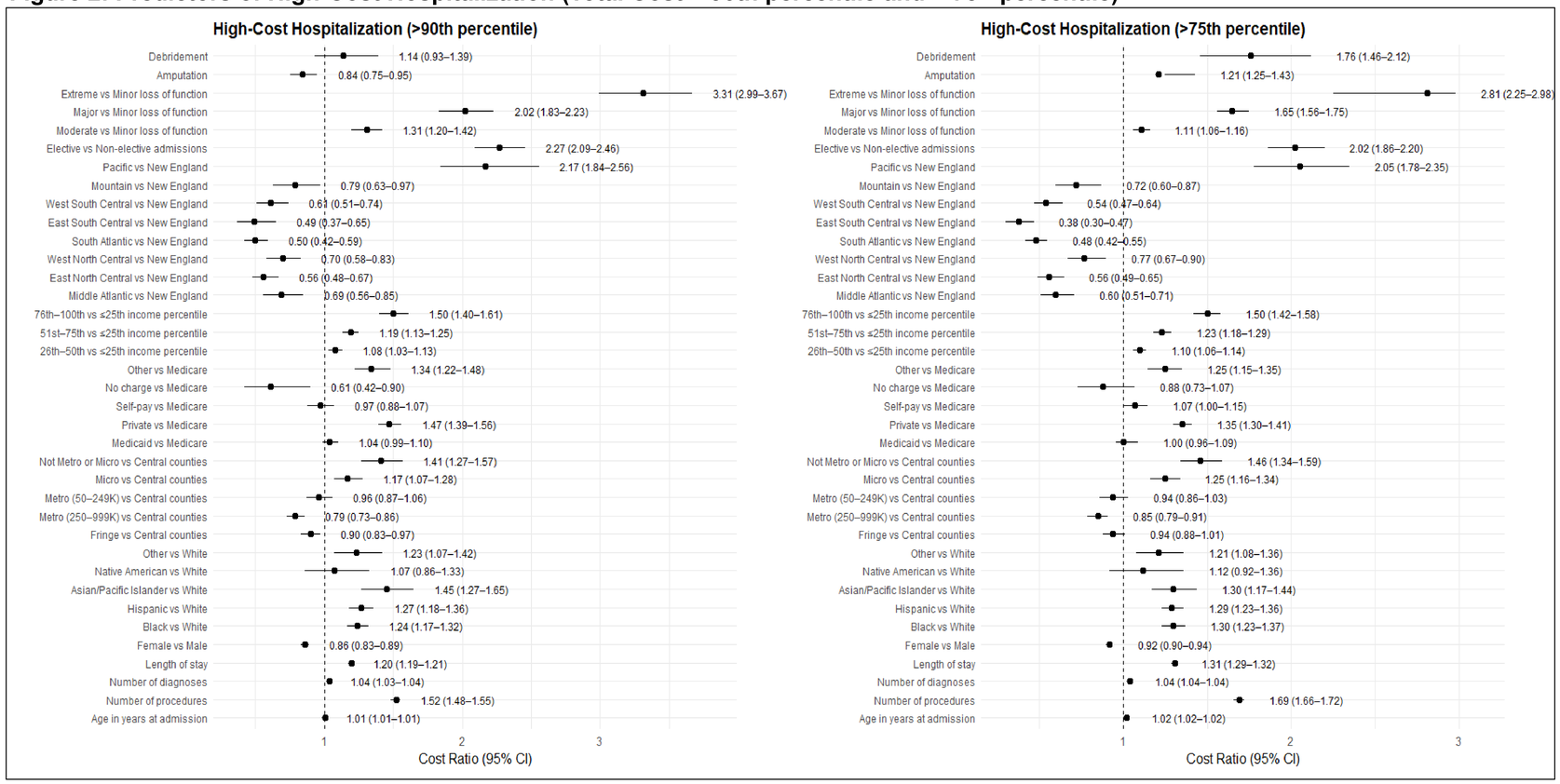
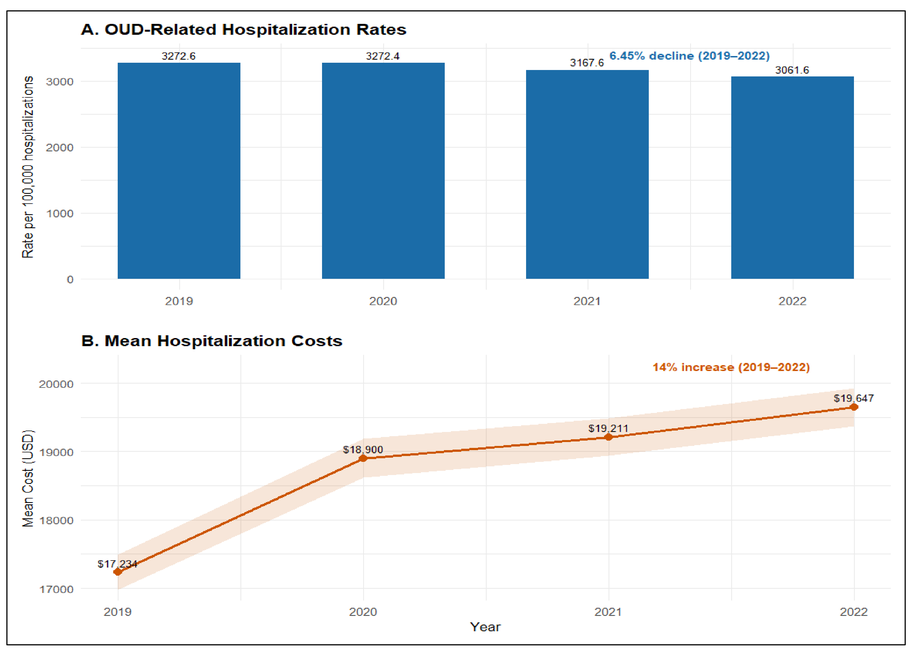


Figure 1: Temporal Trends in Annual Rates of OUD-related Hospitalizations per 100,000 Hospitalizations and Average Total Cost of Hospitalization



OUD-related hospitalizations declined even as the cost and complexity of care increased, and the threshold-dependent reversal for amputation and effect-strengthening for debridement shows how these procedures mark fundamentally different cost trajectories at the extreme versus moderate upper tail of the cost distribution.

Conclusion

- Overall, there has been a decrease in hospitalization rates and an increase in average cost of OUD-related hospitalization in the U.S. from 2019 - 2022
- Clinical factors were the strongest predictors of high-cost hospitalization
- Future research should examine how these cost-driving factors interact with care delivery, access to treatment
- This work can guide policymakers and health systems toward strategies that reduce financial burden while improving care for individuals with OUD.