



Title: The Impact of Social Determinants of Health on Trauma Outcomes across the Greater Houston Area

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Introduction: Social Determinants of Health (SDOH) are conditions that affect a wide range of health and quality-of life outcomes. Traditionally, trauma services are believed to be nondiscriminatory, providing equal access to care regardless of race, gender, age, insurance status, or socioeconomic status. Few studies have investigated how SDOH might impact traumatic and acute care patient outcomes. Our analysis examines disparities in the greater Houston trauma system by investigating differences in patient demographics and outcomes at Level I and Level II centers from 2013-2021 across social determinants of health.

Methods: This study is a historical cohort analysis of 2013-2021 trauma registry data from all Level I and II trauma centers. Only adult patients ages 16 and older were included. Data were obtained from the SouthEast Texas Regional Advisory Council (SETRAC), an administrative organization responsible for trauma system coordination in a 9 county region surrounding Houston. For calculation of transport time (scene to ED) only, transfer patients were excluded. Proportions and continuous variables were compared with Chi Square tests and Wilcoxon Rank Sum tests, respectively.

Results: Total annual patient volume at Level I and II trauma centers nearly doubled over the time period. Comparisons reported are significant at $p < 0.01$, unless noted. There were significant differences in patient characteristics at Level I compared to Level II trauma centers, with lower median age (42, Interquartile Range:27-59 vs. 57, IQR:34-76) and higher percentages of males (70.9% vs 56.2%), penetrating trauma (9.3% vs. 4.7%), non-white race (61.5% vs. 34.7%), Hispanic ethnicity (30.0% vs. 16.8%), higher median ISS (9, IQR:4-14 vs. 5, IQR:4-10), and more self-pay patients (29.5% vs. 21.2%). Level II centers saw more fall injury (29.6% vs, 49.3%), and discharged more patients to a skilled nursing or rehabilitation facility (11.7% vs. 22.3%). Unadjusted mortality rates decreased slightly during the study period from 4.8% to 4.3%, but differed between Level I and II trauma centers (4.6% vs. 3.4%). However, mortality was not significantly different between centers after adjustment for ISS and other confounders in a logistic regression model.

Conclusions: Overall mortality as well as transport times among patients receiving care at a Level I or II center decreased during the time period, suggesting improved care. The geographic distribution of Level I and II trauma centers within SETRAC likely impacted the social determinants of the populations served by each. Most Level II trauma centers are in suburban areas and see an older population more likely to be injured due to a fall. Level I trauma centers are located within a 1 square mile radius within the urban center of Houston and treat a younger, predominantly male population that is more likely to be Black or Hispanic, with a higher percentage of penetrating trauma and a higher ISS.