The Association of Neighborhood Disadvantage with Pediatric Trauma Outcomes among the Most Severely Injured Pediatric Trauma Patients

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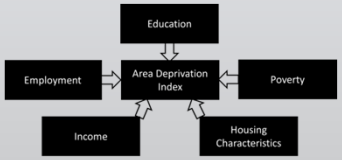
Introduction

- Leading cause of death in children aged 1-14 is unintentional injury, and the third leading cause of death in children aged 1-9 is assault or homicide[1]
- Socioeconomic disparities are associated with poor health outcomes across the spectrum of pediatric healthcare[2]
- Some studies have found differences in outcomes across racial/ethnic groups in multiple areas of trauma outcomes and interventions[3]
- There are differences in outcomes amongst racial/ethnic groups in subtypes of pediatric trauma like non-accidental trauma and traumatic brain injury[4,5]
- There are also differences in trauma outcomes according to insurance status - the uninsured are more likely to have mortality[5,6]
- Little research has focused on the association between socioeconomic disparities and pediatric trauma interventions and outcomes at the neighborhood level
- Understanding the factors that influence outcomes in pediatric trauma patients is key to advancing care

Objectives

- Interrogate the association of pediatric trauma outcomes and interventions with the Area Deprivation Index (ADI) (a validated, multifaceted marker of neighborhood-level disparity) in the most severely injured pediatric trauma patients (injury severity score (ISS) ≥ 15)[7]



Materials and Methods

Retrospective analysis of severely injured pediatric trauma patients (age 0-18, injury severity score ≥ 15) presenting to our level I trauma center from 2016-2021

Stratified into ADI quintiles (1-5, 5 = highest level of disparity)

Analyze the relationship between ADI and pediatric trauma interventions and outcomes

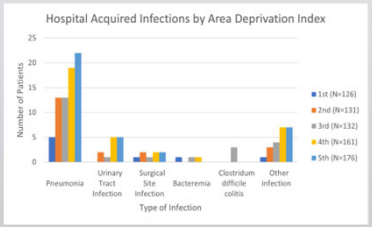
- Descriptive statistics for continuous variables summarized with medians and interquartile ranges
- Group differences analyzed via Chi-Squared tests or Fischer exact tests for categorical variables
- Descriptive statistics for categorical variables summarized with frequencies and proportions
- Group differences analyzed via t-test or Kruskal-Wallis test for continuous variables

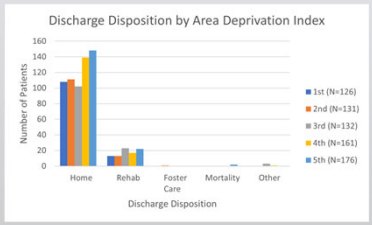
Results

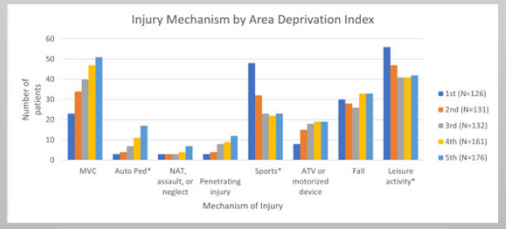
Table 1. Demographics of Analytic Cohort by quintile of national ADI

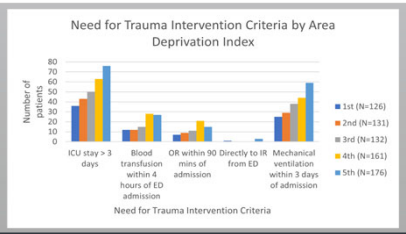
	1st (N=126)	2nd (N=131)	3rd (N=132)	4th (N=161)	5th (N=176)	Total (N=726)	P-value
State ADI (mean, SD)	1.5 (0.7)	3.3 (1.1)	5.3 (1.5)	6.6 (1.8)	8.6 (1.8)	5.4 (2.9)	< 0.001
National ADI (mean, SD)	8.7 (3.8)	19.5 (2.9)	30.3 (3.0)	42.0 (3.9)	68.7 (15.0)	36.5 (22.7)	< 0.001
Age (mean, SD)	10.0 (4.9)	9.7 (5.1)	10.2 (5.1)	9.5 (5.4)	9.6 (5.4)	9.8 (5.2)	0.748
Gender							0.637
Female	39 (31.0%)	42 (32.1%)	51 (38.6%)	60 (37.3%)	61 (34.7%)	253 (34.8%)	
Male	87 (69.0%)	89 (67.9%)	81 (61.4%)	101 (62.7%)	115 (65.3%)	473 (65.2%)	
Government or Medicaid Insurance (N, %)	22 (17.5%)	35 (26.9%)	64 (48.5%)	89 (55.3%)	113 (64.2%)	323 (44.6%)	< 0.001
Black Race (N, %)	0 (0.0%)	7 (5.4%)	10 (7.7%)	8 (5.0%)	4 (2.4%)	29 (4.1%)	< 0.001
Hispanic or Latinx (N, %)	9 (7.3%)	19 (14.5%)	35 (26.7%)	60 (37.3%)	51 (29.3%)	174 (24.1%)	< 0.001

ADI - area deprivation index; SD – standard deviation; N – number of patients









Conclusions

- Injury mechanism varies with ADI:
  - Patients with a lower ADI were more likely to be injured via a leisure activity mechanism
  - Patients in higher ADI quintiles are more likely to experience an auto vs pedestrian mechanism, and those with lower ADI quintiles are more likely to experience a sports related mechanism of injury
- Trauma interventions and outcomes did not vary significantly amongst ADI quintiles
- Though injury mechanism varies amongst the ADI quintiles, outcomes and interventions on hospital arrival do not vary, suggesting equitable care

Future Research

- Examine the association of ADI with pediatric trauma outcomes and injury patterns on a multi-institutional basis
- Interrogate factors predisposing to different injury patterns amongst the ADI quintiles
  - Long-form interviews with parents of patients on the pediatric trauma service to understand neighborhood-level factors that contribute to injuries

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