

A Disproportionate Burden: Injury Severity, Outcomes, and Resource Use in Unhoused Pedestrians

Brandon C. Karcher, MD¹; Alexander Rowan, MD¹; Christopher Gonzalez, DO¹; Kavita Batra, PhD²; Vidhani Goel, BS²; Benjamin P. Nguyen, MD¹; Noel Antolin, PhD¹; Allison G. McNickle, MD¹; Deborah A. Kuhls, MD¹

Department of Surgery, Kirk Kerkorian School of Medicine at University of Nevada, Las Vegas
Office of Research, Department of Medical Education, Kirk Kerkorian School of Medicine at University of Nevada, Las Vegas



Introduction and Aim

- The incidence of pedestrian trauma and homelessness are both **increasing**, with unhoused individuals experiencing **higher mortality rates** than housed individuals.
- As homelessness reaches record highs in the U.S., this population represents a **growing high-risk group**.
- The primary aim of our study was that unhoused individuals experience greater injury severity and mortality than housed individuals.
- Secondary analyses assessed socioeconomic status of injury location, disposition, and hospital charges.

Methods

- Performed a retrospective analysis of adult pedestrian trauma at a Level I trauma center from 2016-2024.
- Community level socio-economic factors were assessed between housed and unhoused individuals using distressed community indices (DCI)¹. (Figure 1)
- Categorical outcomes (Demographic, injury characteristics, disposition, mortality) were analyzed using χ^2 or Fisher's exact tests, and continuous outcomes (length of stay, hospital charges) were analyzed using the Mann-Whitney U test.

Components of DCI Score:

- Share of adults without a high school diploma
- Housing vacancy rate
- Adults not working
- Poverty rate
- Median income ratio
- Percent change in number of jobs in past 5 years
- Business establishment change

DCI Score by Percentile: Prosperous (0-20th), Comfortable (20th-40th), Mid-tier (40th-60th), At Risk (60th-80th), Distressed (80th-100th)

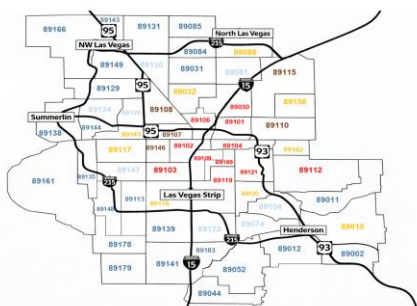


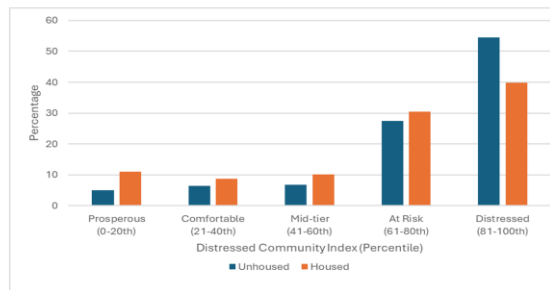
Figure 1: Las Vegas Metropolitan area with zip codes color coded to Distressed Community Index (DCI)

Results

- From 2016 to 2024, 2,652 adults with pedestrian injuries were treated of whom 20.1% (n=532) were unhoused. (**Table 1**)

Variable	Categories	Unhoused (%)	Housed (%)	P value
Patient Age (M±SD)		46.4±13.7	44.1±17.8	0.001
Race	White	290 (54.5)	1041 (49.1)	<0.001
	Black/African American	154 (28.9)	506 (23.9)	
	Asian	3 (0.6)	89 (4.2)	
	American Indian	4 (0.8)	9 (0.4)	
	Other	81 (15.2)	475 (22.4)	
Ethnicity	Hispanic	64 (12.4)	466 (22.4)	<0.001
	Non-Hispanic	452 (87.6)	1611 (77.6)	
Sex	Male	407 (76.5)	1403 (66.2)	<0.001
	Female	125 (23.5)	717 (33.8)	
Insurance	Medicaid	361 (67.9)	860 (40.6)	<0.001
	Medicare	53 (10.0)	244 (11.5)	
	Private Insurance	75 (14.1)	645 (30.4)	
	Uninsured/ Other	43 (8.1)	371 (17.5)	

- Unhoused patients were **significantly more likely** to be injured in highly distressed neighborhoods, with **over half** of injuries occurring in the most distressed DCI quintile with higher mean DCI scores at injury locations ($p<0.001$).



- Injury severity by housing status revealed that unhoused patients sustained a **higher proportion** of moderate to critical injuries (60.0% vs 50.5% $p<0.001$). (**Table 2**)
- Unhoused patients were more likely to be admitted to the hospital (84.0% vs. 67.4% $p=0.001$), have **longer median hospital stays** (20 vs 14 days $p<0.001$), and have **higher hospital charges** (\$640,598 vs \$434,661 $p<0.001$).
- In-hospital mortality (ED/Trauma Resuscitation + inpatient) was **lower in unhoused patients** (4.3% vs 9.3% $p<0.001$), as was inpatient mortality among admitted patients (2.9% vs 7.1% $p=0.004$).

Table 2: Difference between unhoused vs housed pedestrian traumas. Injury severity score (ISS) defined as: mild (0-8), moderate (9-15), severe (16-24), and critical (25+)

Variable	Categories	Unhoused (%)	Housed (%)	P value
Comorbidities	Yes	511 (99.4)	1923 (98.2)	0.048
	No	3 (0.6)	35 (1.8)	
Injury Severity Score (continuous)		13.0 ±11.8	12.0 ±12.5	0.082
Injury Severity Score (categorical)	Mild	213 (40.0)	1048 (49.4)	<0.001
	Moderate	154 (28.9)	486 (22.9)	
	Severe	91 (17.1)	266 (12.5)	
	Critical	74 (13.9)	320 (15.1)	
Injury Mechanism	Pedestrian on Foot	384 (72.2)	2026 (95.6)	<0.001
	Non-motorized device	79 (14.8)	34 (1.6)	
	Motorized device	69 (13.0)	60 (2.8)	
DCI Score (Injury)		74.7 ±23.1	66.4 ±27.4	<0.001
In-hospital Mortality	Alive	509 (95.7)	1922 (90.7)	<0.001
	Dead	23 (4.3)	198 (9.3)	
Inpatient Mortality	Alive	438 (97.1)	1362 (92.9)	0.004
	Dead	13 (2.9)	104 (7.1)	
Hospital length of stay, median (IQR), days		20±142	14±22	<0.001
Hospital charges, median (IQR), USD		\$640,598 ±779,843	\$434,661 ±326,424	<0.001

Conclusions

- Unhoused patients represent a **substantial proportion** of pedestrian trauma and **experience greater injury severity** in socioeconomically distressed communities.
- They require **longer hospital stays** and **incur higher costs** despite **lower in-hospital mortality**, underscoring housing instability as a **key social determinant** of trauma risk and healthcare utilization.

References

- Economic Innovation Group. *2025 Distressed Communities Index Methodology*. Washington, DC: EIG; 2025.

Correspondence to:
Brandon Karcher, MD brandon.karcher@unlv.edu
PI: Deborah A. Kuhls, MD deborah.kuhls@unlv.edu