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RESILIENCE FINDINGS

Assessing Transportation Insecurity after Disaster: Evidence from Transit Riders Following the 2025 Los Angeles Wildfires

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Findings

Transportation disruptions can persist after a disaster, yet little is known about who experiences transport challenges during the immediate post-disaster period. Using survey data collected from transit riders one month after the 2025 Los Angeles wildfires, this paper measures these challenges by using the Transportation Security Index. Findings indicate that 41% of respondents were transport insecure post-wildfire, and the odds of being transport insecure were four times higher for evacuees than for people who did not evacuate. Evacuation status was more strongly associated with insecurity than car ownership, a typical proxy for identifying people with additional transportation needs.

1. Questions

Disasters and their related evacuations cause massive disruptions to people's mobility. Yet these post-disaster transportation challenges are understudied because these data are hard to gather, and transportation research offers few methods for measuring people's cumulative transportation needs (Gould-Werth et al. 2018). In the limited literature on disaster-related transportation experiences, prior studies have traditionally used socioeconomic characteristics and/or car ownership as proxies to identify individuals with unmet transportation needs (Grajdura et al. 2026). Identifying need through these characteristics alone, or even in combination, may overlook lived experience, which adds nuance and distinctions in who is affected and how it affects their lives in material and relational ways. The Transportation Security Index (TSI), a new composite metric, centers the lived experience of transportation insecurity by defining levels of insecurity based on responses to a series of questions about forgoing travel and activities. The TSI aims to capture being "unable to regularly move from place to place in a safe or timely manner" (Gould-Werth et al. 2018, 1), and how limited mobility affects personal relationships and material opportunities.

Transit riders are more vulnerable to transportation system disruptions during disasters (Renne et al. 2009; Renne and Mayorga 2022). Thus, we surveyed transit riders in Los Angeles after the 2025 wildfires and combined their responses into the three-question TSI (Murphy, Griffin, et al. 2025).

Using this case study of transit riders after the 2025 Los Angeles wildfires, we ask:

1. To what extent did transit riders experience transportation insecurity in the month following the 2025 Los Angeles wildfires?
2. What evacuation, transportation, housing, and sociodemographic factors were associated with post-wildfire transportation insecurity?

2. Methods

2.1. Study area

Our work is set in Los Angeles County, where multiple fast-moving fires struck densely populated areas in early January 2025, triggering evacuations and devastating communities (Palm et al. 2026). Public transit services, especially buses, were severely disrupted after the fires, while smoke, debris, and particulate matter created hazardous street-level conditions (Withers et al. 2025). The disruption affected Los Angeles for weeks after the initial ignition with dangerous wind conditions continuing through January 22, and the Los Angeles County Metropolitan Transportation Authority pausing fare collection through January 27, 2025.

2.2. The Transportation Security Index

Modeled after the food security index, the transportation security index is derived from a series of questions about how often a person has experienced material and relational transportation problems in the past 30 days. Research has most commonly applied the TSI to measure individual-level change from a particular transportation intervention (Palm et al. 2025; Rodier et al. 2025), and to measure overall transportation insecurity prevalence across populations (Lee et al. 2026; Murphy, Griffin, et al. 2025).

We used the TSI-3 version, based on three questions:

- How often did you skip going somewhere because of a problem with transportation?
- How often were you not able to leave the house when you wanted to because of a problem with transportation?
- How often did problems with transportation affect your relationships with others?

Response options include 'never,' 'sometimes', or 'often'. Each response is coded from 0-2, summed, and categorized: above 1 is "insecure," and 1 or below is "secure" (Murphy et al. 2025). This index provides a quantitative measure of transportation insecurity that can be consistently replicated across applications. (see supplemental material).

We lacked data about respondents' pre-disaster transportation insecurity, so we cannot measure how the wildfire changed someone's insecurity status. However, understanding who is transport insecure and analyzing how insecurity status is associated with disaster-specific factors such as evacuation provides valuable insight on people's post-disaster experience and can inform the prioritization of post-disaster resources.

2.3. Survey Data and Model Specification

We rapidly deployed a survey advertised through Transit App to users in LA County in February 2025 (deployment details in supplemental information). The survey asked about people's evacuation decision-making, pre-fire travel behavior, pre- and post-fire housing status, the TSI questions, and socio-demographics. Respondents completed the survey approximately 30 days after the fires began, allowing them to answer the TSI questions for the post-disaster period. We estimated a logistic regression model predicting the likelihood of transportation insecurity as a binary outcome, where an odds ratio greater than 1 indicates higher odds of transportation insecurity.

3. Findings

Who experienced transportation insecurity?

Forty-one percent of respondents experienced transportation insecurity in the post-disaster period (Table 1). Evacuees were approximately twice as likely to be insecure as non-evacuees, even though the majority of evacuees in our sample (75%) had returned home in the post-disaster period. People living in some form of temporary housing (homelessness, shelter, or moving around) in the pre-disaster period were nearly twice as likely to be transportation insecure as homeowners or renters. Extremely low-income respondents had more insecurity than higher-income groups. Insecurity prevalence increases with age.

Respondents who used ridehail more frequently before the wildfire, as well as those who got rides from others, showed notably higher rates of insecurity than frequent transit users. Car owners experienced lower transportation insecurity than carless survey respondents. Although car ownership was weakly correlated with frequently getting rides from others, variance inflation factors remained low, suggesting that multicollinearity was not a major concern when these measures were included as separate predictors.

Table 1. Percent transportation insecure by group

		N	Insecurity Rate (%)
Full sample		610	41%
Evacuation and Pre-fire housing			
	Non-evacuees	454	34.1%
	Evacuees	156	62.4%
	Homeowners	160	37.3%
	Renters	344	39.2%
	Temporary housing[1]	40	66.7%
	Housing - other	51	42.0%
	Living with dependents[2]	285	56.1%
Transportation			
	Frequent transit	125	42.9%
	Frequent rides from others	49	51.0%
	Frequent ridehail	25	70.8%
	Car owners	332	34.1%
	Carless	239	50.0%
Socio-Economic			
	Full-time employment	225	34.7%
	Part-time employment	159	46.2%
	Unemployed	218	44.7%
	Above median income (>100% AMI[3])	110	33.6%
	Low income (30-100% AMI)	241	36.9%
	Extremely low income (<30% AMI)	229	51.1%
Demographic			
	Male	287	37.6%
	Female	280	43.5%
	Non-binary/self-described	42	50.0%
	Has disability	156	50.6%
	Age 18-34	295	42.0%
	Age 35-49	155	54.1%
	Age 45-64	105	62.8%
	Age 65+	48	70.9%
	Asian	88	64.7%
	Black	37	59.4%
	Hispanic/Latino	252	58.3%
	White	132	39.4%
	Mixed race & other	85	48.2%

[1]Temporary housing is a combined variable for people who answered their pre-disaster housing arrangement as "I was experiencing homelessness", "I was living in a shelter", or "I was moving around a lot".

[2]People under 18 or over 65

[3]Area median income is for a single-person household in Los Angeles County

What factors were associated with transportation insecurity?

Controlling for transportation, housing, evacuation, and other socio-demographic factors, we find that evacuation status was strongly and most clearly associated with post-disaster transportation insecurity (Figure 1).

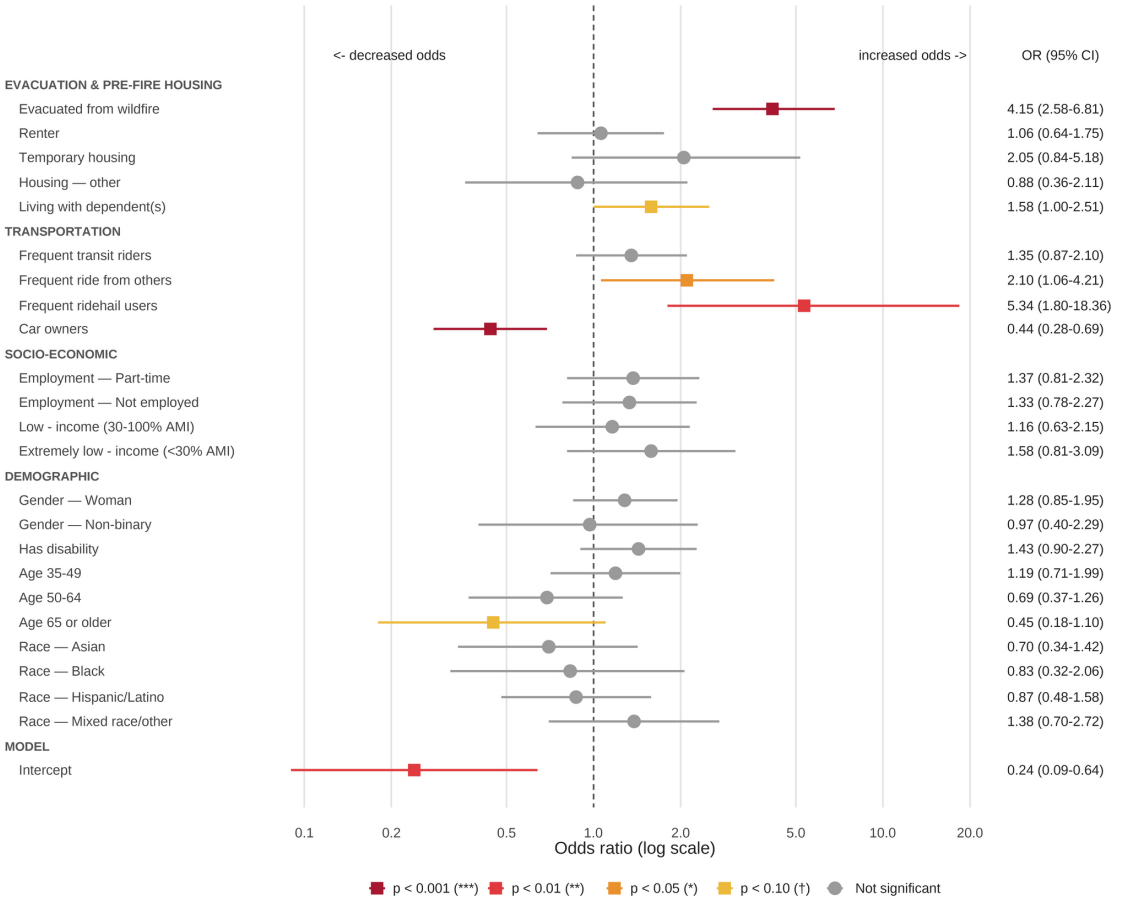


Figure 1. Logistic Regression Results

Evacuees had nearly four times the odds of reporting transportation insecurity compared to non-evacuees. Frequently getting rides from others and using ridehail were similarly associated with higher odds of insecurity, but with wider confidence intervals than evacuation status. In comparison, owning a car and being over age 65 were associated with lower odds of insecurity.

Income did not significantly predict insecurity, which contrasts with previous TSI studies (Bader et al. 2025; Murphy, Pilkauskas, et al. 2025; Wileden and Murphy 2025). We conducted a sensitivity analysis and found that, after removing car ownership, income became a significant predictor. This suggests a close relationship between car ownership and income, as would be expected, even as multicollinearity was not identified as a previous model concern.

We find that evacuation status was much more strongly associated with transportation insecurity than car ownership. This evidence suggests that evacuation disrupts people's movement in the post-disaster period, and that identifying insecurity based on car ownership or other proxies may not fully capture needs. Disaster planning should prioritize ways to provide additional mobility in this acute period as it can lessen the negative effects that insecurity may have on people's lives.

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REFERENCES

Bader, M., M. McComas, A. Williams, et al. 2025. *A Portrait of Baltimore 2024*. Nos. 2025–6. Johns Hopkins 21th Century Cities Initiative. https://21cc.jhu.edu/wp-content/uploads/sites/64/bas25-initial-report.pdf.

Gould-Werth, A., J. Griffin, and A. K. Murphy. 2018. "Developing a New Measure of Transportation Insecurity: An Exploratory Factor Analysis." *Survey Practice* 11 (2). https://doi.org/10.29115/SP-2018-0024.

Grajdura, S., M. Palm, C. Yarbrough, et al. 2026. "Transportation Equity and Natural Hazard Resilience: A Scoping Review (Mxwtr_v1)." *SocArXiv*. https://doi.org/10.31235/osf.io/mxwtr_v1.

Lee, K., A. Zivarts, and I. Sener. 2026. "Unpacking Living without Driving: Travel Modes, Barriers, and Transportation Insecurity among Nondrivers in Washington State, USA." *Cities* 175 (107109). https://doi.org/10.1016/j.cities.2026.107109.

Murphy, A. K., J. Griffin, and A. Gould-Werth. 2025. "Development and Validation of a 3-Item Transportation Security Index for Social Risk Screening Assessments and Research into the Many Pathways through Which Transportation Impacts Health." *AJE Advances: Research in Epidemiology* 1 (3): uuaf020. https://doi.org/10.1093/ajeadv/uuaf020.

Murphy, A. K., N. V. Pilkauskas, N. Kovski, and A. Gould-Werth. 2025. "How Does Transportation Insecurity Compare and Relate to Other Indicators of Material Hardship in the U.S.?" *Social Indicators Research* 178 (1): 435–63. https://doi.org/10.1007/s11205-025-03585-y.

Palm, M., M. Bhagat-Conway, and M. L. Yao-Chen. 2025. *Evaluating the Effectiveness of E-Bicycle Incentives in North Carolina*. FHWA/NC/TA-2025-04. University of North Carolina - Chapel Hill. https://connect.ncdot.gov/projects/research/ResearchAnalysis/Final%20Report_TA2025-04.pdf.

Palm, M., S. Gradjura, S. Dennis-Bauer, et al. 2026. "Health and Evacuation Challenges for Transit Riders During the 2025 Los Angeles Wildfires." DesignSafe-CI. https://doi.org/10.17603/ds2-rc5f-a495.

Renne, J. L., and E. Mayorga. 2022. "What Has America Learned Since Hurricane Katrina? Evaluating Evacuation Plans for Carless and Vulnerable Populations in 50 Large Cities across the United States." *International Journal of Disaster Risk Reduction* 80: 103226. https://doi.org/10.1016/j.ijdrr.2022.103226.

Renne, J. L., T. W. Sanchez, P. Jenkins, and R. Peterson. 2009. "Challenge of Evacuating the Carless in Five Major U.S. Cities: Identifying the Key Issues." *Transportation Research Record* 2119 (1): 36–44. https://doi.org/10.3141/2119-05.

Rodier, C., Y. Zhang, B. S. Harold, and C. Drake. 2025. *Evaluation of a Large Scale Universal Basic Mobility Wallet in South Los Angeles (Phase 1)*. https://doi.org/10.7922/G2891472.

Wileden, L., and A. Murphy. 2025. *Transportation Insecurity in the Motor City*. University of Michigan. https://mcity.umich.edu/wp-content/uploads/2025/01/Mcity-TSI-White-Paper_FINAL.pdf.

Withers, A., D. Chmielewski, A. Hay, and H. Lang. 2025. "Los Angeles Wildfires Trigger Air Quality Warnings and Health Concerns." Reuters, January 10. https://www.reuters.com/world/us/los-angeles-wildfires-trigger-air-quality-warnings-health-concerns-2025-01-10/.

SUPPLEMENTARY MATERIALS

Supplemental figure

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