

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Final Reports & Technical Briefs from Mid-  
America Transportation Center

Mid-America Transportation Center

---

1-2023

## A Heterogeneity-Based Temporal Stability Assessment of Pedestrian Crash Injury Severity Using an Aggregated Crash and Hospital Data Set

M. Umer Farooq

Aemal Khattak

Follow this and additional works at: <https://digitalcommons.unl.edu/matcreports>



Part of the [Civil Engineering Commons](#), and the [Transportation Engineering Commons](#)

---

This Conference Proceeding is brought to you for free and open access by the Mid-America Transportation Center at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Final Reports & Technical Briefs from Mid-America Transportation Center by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

## Conference Presentation

Farooq, M.U., and Khattak, A.J. A Heterogeneity-Based Temporal Stability Assessment of Pedestrian Crash Injury Severity Using an Aggregated Crash and Hospital Data Set (No. TRBAM-23-01089). *Transportation Research Board (TRB) 102nd Annual Meeting*, January 8-12, 2023, Washington DC, 2023.

URL Link: <https://trid.trb.org/view/2117765>

### **ABSTRACT:**

This study utilized a unique approach to crash data analysis by examining the temporal stability of pedestrian crash injury severity and its contributory factors. Police-reported crash data and EMS-related injury data from Nebraska were obtained from 2014 to 2018, and random parameter ordered probit models for injury severity were estimated for each year to account for unobserved heterogeneity. Four discrete levels of injury severity were considered for model estimation: fatality, disabling injury/suspected serious injury, visible injury/possible injury, and no injury. Data were filtered based on several important variables of interest, such as pedestrian characteristics, crash characteristics, environmental and weather characteristics, road surface characteristics, pedestrian location of crash, pre-crash pedestrian conditions, contributory circumstances of a crash, presence of work zones, and time gap between actual crash-time and police-reported time. A series of likelihood ratio tests were used to determine the temporal stability of factors over the course of two consecutive years and then over all individual time periods. The likelihood ratio tests showed temporal instability among explanatory variables for different time periods as well as for consecutive years. The random-parameters ordered probit models estimated a random distribution for the following indicators: old pedestrian indicator, pedestrian not visible due to dark clothing indicator, marked crosswalk at intersection indicator, time gap of 10-30 minutes between actual crash-time and police-reported time, chest area injury, work zone indicator, and ice on road indicator. This exploratory research suggests significant policy implications to help improve pedestrian safety.