Analyzing the Impact of Median Treatments on Bicyclist/Pedestrian Safety
Sepehr Ghader1, Arash Asadabadi2, Mark Franz3, Lei Zhang4,* (1. Research Assistant, University of Maryland; 2. Research Assistant, University of Maryland; 3. Faculty Specialist, Center for Advanced Transportation Technology (CATT) Laboratory; 4. Herbert Rabin Distinguished Professor and Director of the National Transportation Center, University of Maryland). * Corresponding Email: lei@umd.edu, Phone:301-405-2881 TRB Paper Number: 18-04583

Introduction
- Between 2005 and 2013, pedestrian fatalities constituted 19% of total traffic fatalities in Maryland. During these years, the pedestrian fatality rate per 10,000 walking commuters was on average 4% higher than the U.S. average.
- SHA has identified 24 high-frequency bicycle/pedestrian crash sites through the Pedestrian Safety Audit (PSRA) Program.
- Median treatments were implemented at selected locations over the past 10 years.
- This study had the following objectives:
  1. To conduct a comprehensive scan of the best practices in addressing illegal mid-block crossings and enhancing bicycle/pedestrian safety;
  2. To assemble pedestrian and bicycle safety datasets at locations with recently installed median treatments in Maryland;
  3. To apply statistical methods to quantify the effectiveness of installed median treatments;
  4. To investigate human and socio-demographic factors of illegal mid-block crossing behavior.

Data
- Treatment Sites: 18 locations in Maryland with median treatments.
- Control Sites: Immediately upstream or downstream of the corresponding treatment sites.
- Crash data including: Total Crashes, Severe Crashes, Pedestrian/Bicyclist Crashes, Pedestrian/Bicyclist Fatal Crashes.
- Annual average daily traffic (AADT), pedestrian/bicyclist counts, and design characteristics were among the datasets that were collected.

Trend Analysis
- The empirical Bayes (EB) method was found to be the most appropriate method for a before/after treatment effectiveness analysis. The EB method estimates the expected number of crashes at a treatment site had the treatment not been installed, and compares the number with the actual observed number of crashes.
- SPF development is a type of regression modeling to predict the number of crashes.
- Independent variables for SPF: AADT, pedestrian counts, pedestrian illegal crossings, bicycle counts, bicyclist illegal crossings, speed limit, number of lanes, lane width, and near-bans location.

Survey
- The research team designed three different surveys for pedestrians, bicyclists, and local business owners, and conducted the surveys at all treatment sites during September and October of 2016.
- A total of 63 responses from pedestrians/bicyclists were collected during the site visits.

Statistical Modeling Results
- The median treatments have reduced the number of total crashes by 122 (14%), the number of severe crashes by 33 (9%), and the number of fatal crashes by 24 (86%).

Acknowledgement
- This research was partially funded by Maryland Department of Transportation State Highway Administration and the National Transportation Center at the University of Maryland. Findings presented in this paper do not necessarily represent the official views of the sponsoring agencies.