Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments

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Objective

There is a need to better understand the safety effects of some of the more promising treatments on pedestrian crashes. The purpose of this study was to develop crash modification factors (CMFs) for selected types of pedestrian treatments at unsignalized pedestrian crossings. After considering numerous treatment options related to geometric design and traffic control devices, the four treatment types selected for evaluation in this study included:

- **Rectangular Rapid Flashing Beacons (RRFBs)**
- **Pedestrian Hybrid Beacons (PHBs)**
- **Pedestrian refuge islands, and**
- **Advance Yield or STOP markings and signs.**

Method

- Evaluation included approximately 1,000 treatment and comparison sites.
- Sites were selected from 14 cities in U.S.
  - Alexandria and Arlington, VA, Cambridge, MA, Chicago, IL, New York, NY, Miami and St. Petersburg, FL, Tucson, Scottsdale, and Phoenix AZ, Portland and Eugene, OR, Charlotte, NC and Milwaukee, WI.
- Sites were selected at intersections or midblock locations on urban (or suburban), multi-lane streets.
- Crash effects (i.e., CMFs) were determined using both cross-sectional models and before/after empirical Bayes analysis techniques.

Summary of Results and Recommendations

The data analysis revealed that all four of the treatment types were found to be associated with reductions in pedestrian crash risk, compared to the comparison (untreated) sites. A summary of recommended CMFs developed in this study are given in Table 1. As a general caution, in the application of the CMFs, users should consider the summary statistics in chapter 4 of the full report (NCHRP Project 17-56) to see how closely the site under consideration for one of these treatments is to the sites used to develop the CMF. Specifically, the CMFs developed in this study are most appropriate for urban, multi-lane intersection and midblock locations in urban (and suburban) areas.

Table 1. Reccomended Crash Modification Factors (CMFs)

Treatment	Crash Type	Recommended CMF	Standard error	Study basis
Refuge Islands	Pedesterian	0.685	0.183	Median from two studies
	Total	0.742	0.071	Cross-sections
	All Injury	0.714	0.082	Cross-sections
	Rear End/Side Swipe Total	0.741	0.093	Cross-sections
	Rear End/Side Swipe Injury	0.722	0.106	Cross-sections
Advance Stop (AS)	Pedestrian	0.750	0.230	Median from two studies
	Total	0.886	0.065	Before-after
	Rear End/Side Swipe Total	0.800	0.076	Before-after
PHB	Pedestrian	0.453	0.167	Median from two studies
PHB + AS	Pedestrian	0.432	0.134	Median from two studies
	Total	0.820	0.078	Before-after
	Rear End/Side Swipe Total	0.876	0.111	Before-after
RRFB	Pedestrian	0.526	0.377	Cross-section

References

1. Zegeer, C., C. Lyon, R. Srinivasan, B. Persaud, B. Lan, S. Smith, D. Carter, N. Thirsk, J. Zegeer, E. Ferguson, R. Van Houten, and C. Sundstrom. Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Final report, NCHRP Project 17-56. Transportation Research Board (March 2017). http://www.trb.org/Main/Blurbs/175381.aspx