SPR 778 – Safety Effectiveness of Pedestrian Crossing Enhancements

UTC Spotlight – Pedestrian and Bicycle Safety

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Research Objectives

- To estimate the effectiveness of pedestrian crossing enhancements (PCE)s on multimodal safety in Oregon design contexts to derive CMFs calibrated to Oregon

- To provide decision-makers with a valuable tool to guide future PCE deployments and set the foundation for future cost/ benefit analysis of PCEs

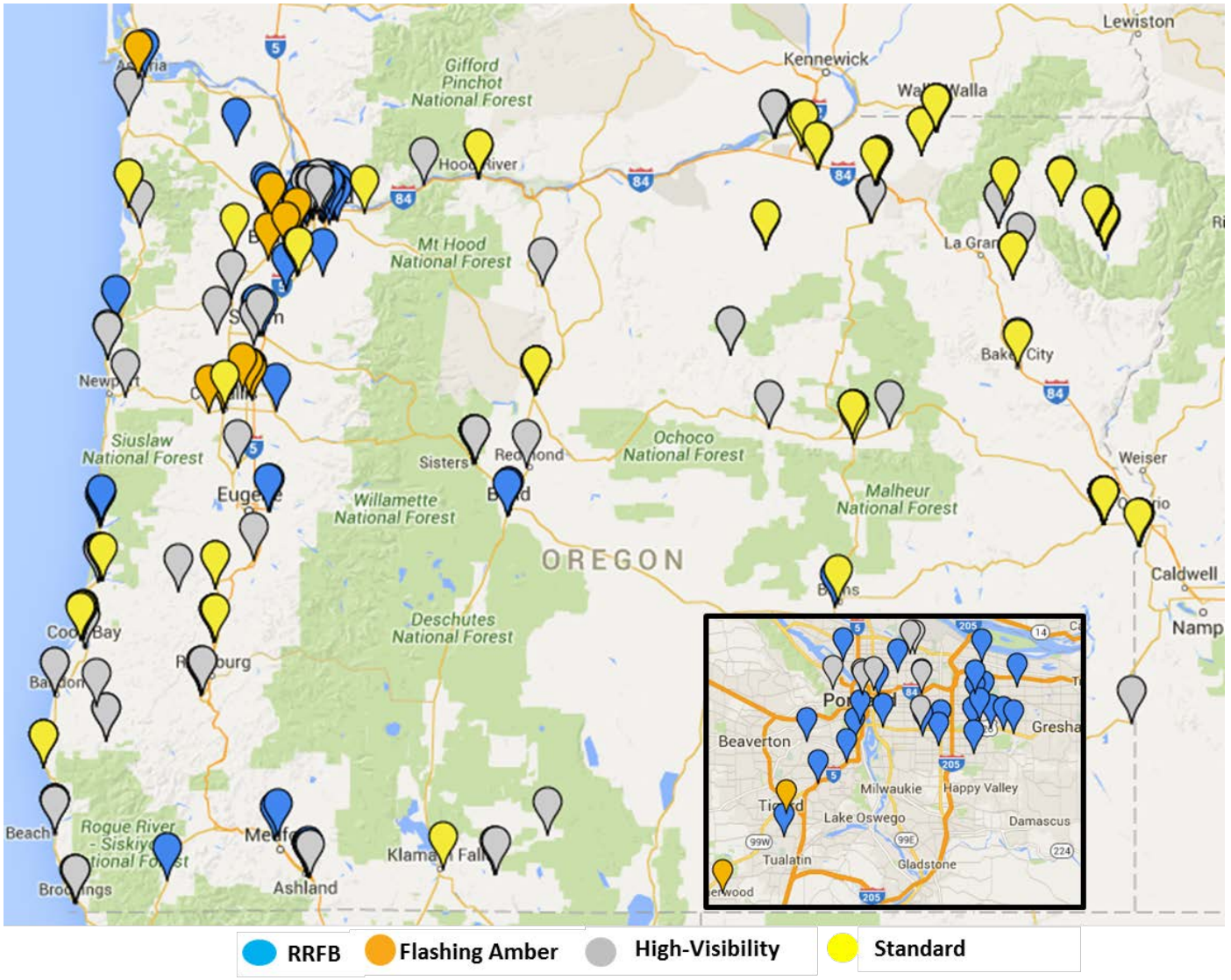
Research/ Data Collection Summary

- Collect detailed data on 3 types of crossings (n=191)

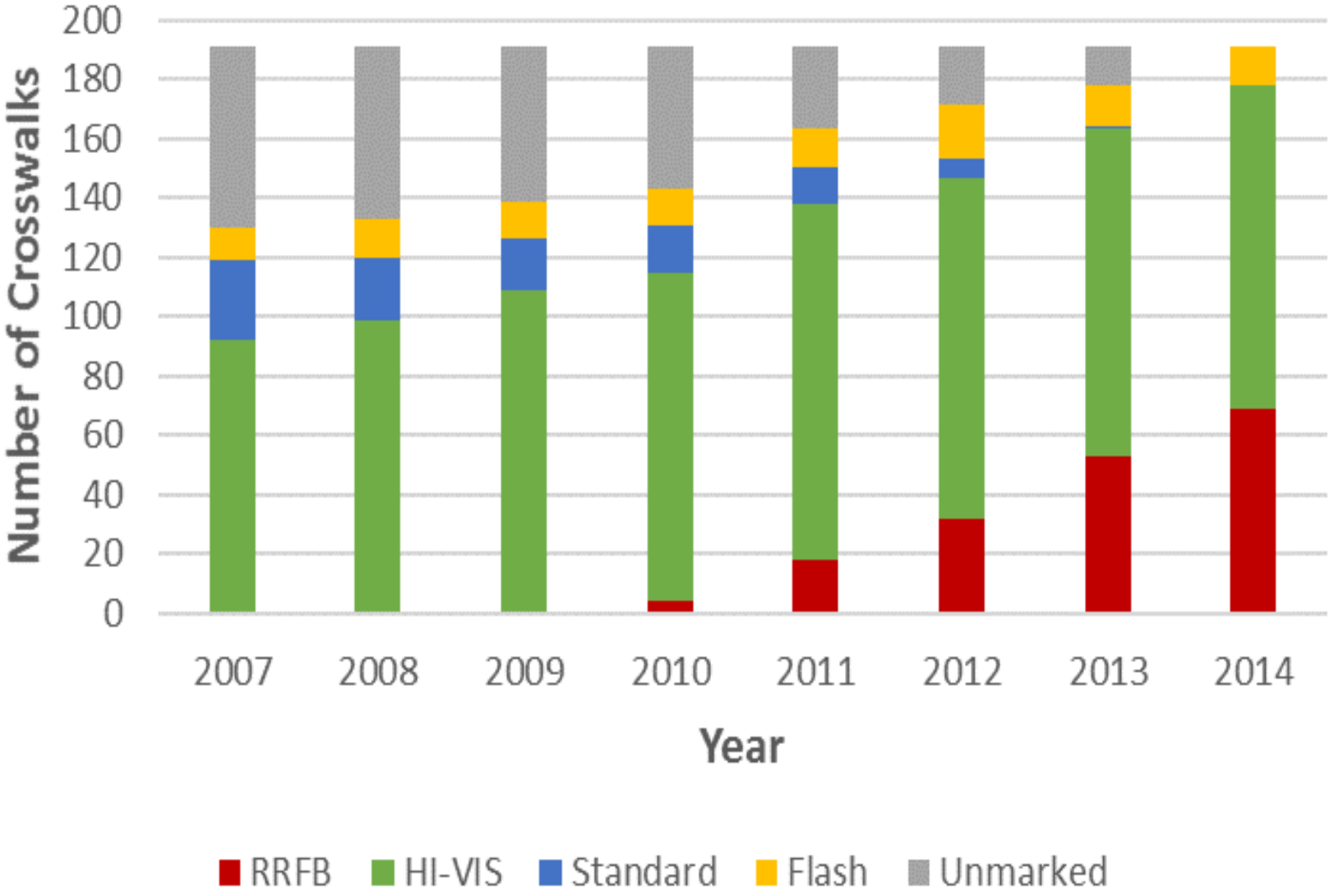
High-visibility	Flashing Amber	RRFB
		

- Note:
  - Crossing only included if installation date could be determined.

Crossings Mapped (n=191)



Crossing Type By Install Year



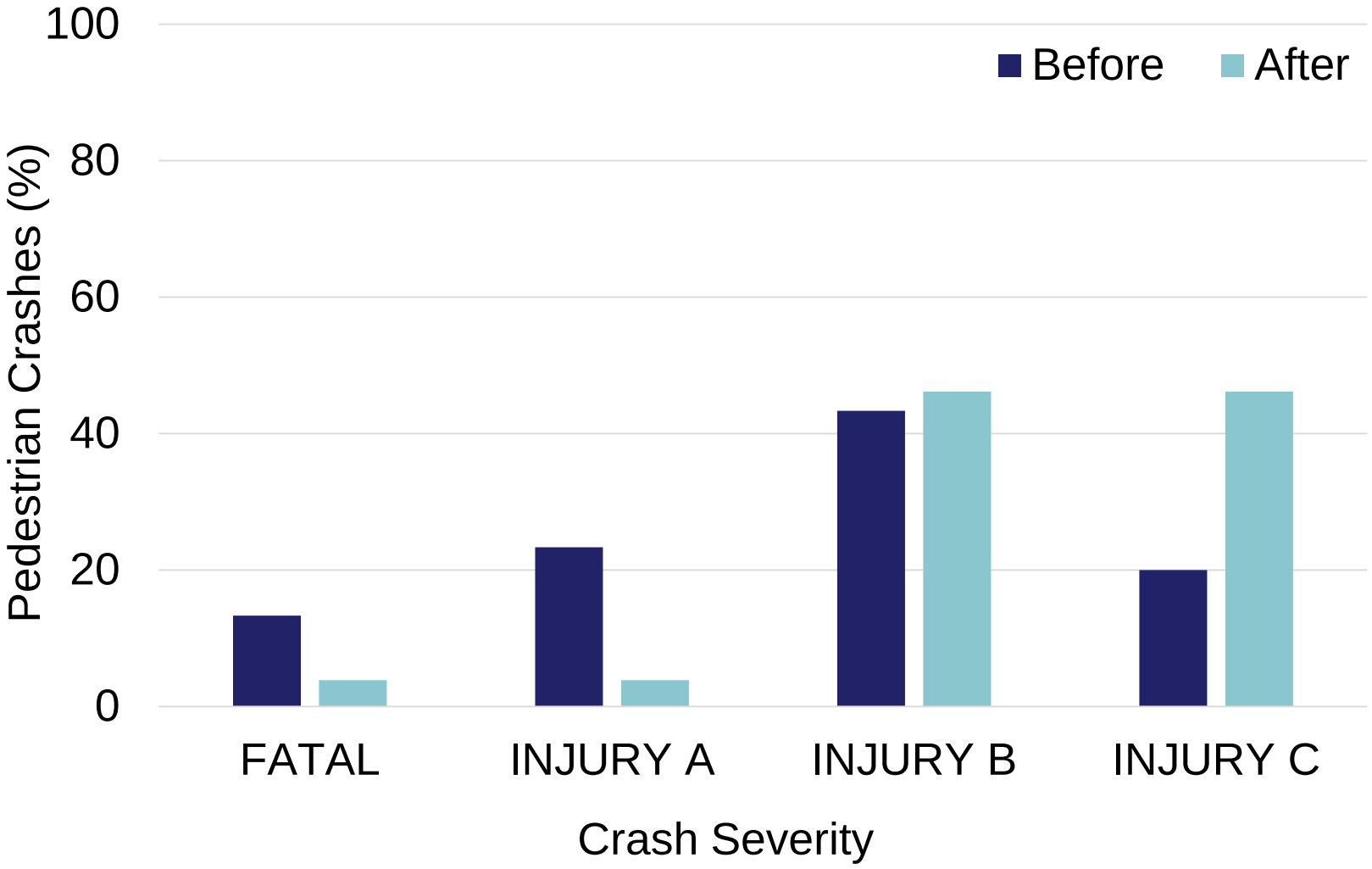
Exposure

- Motor vehicle
  - AADT per year (factored based on nearby count stations)
- Pedestrian
  - No systematic counts
  - Explored pedestrian estimation models
  - Explored land-use characterization
    - Neighborhood Concept (C-F)
    - Walk Score
  - Indicator data
    - Presence and distance to bus stop, major shopping center, school, hospital, signal

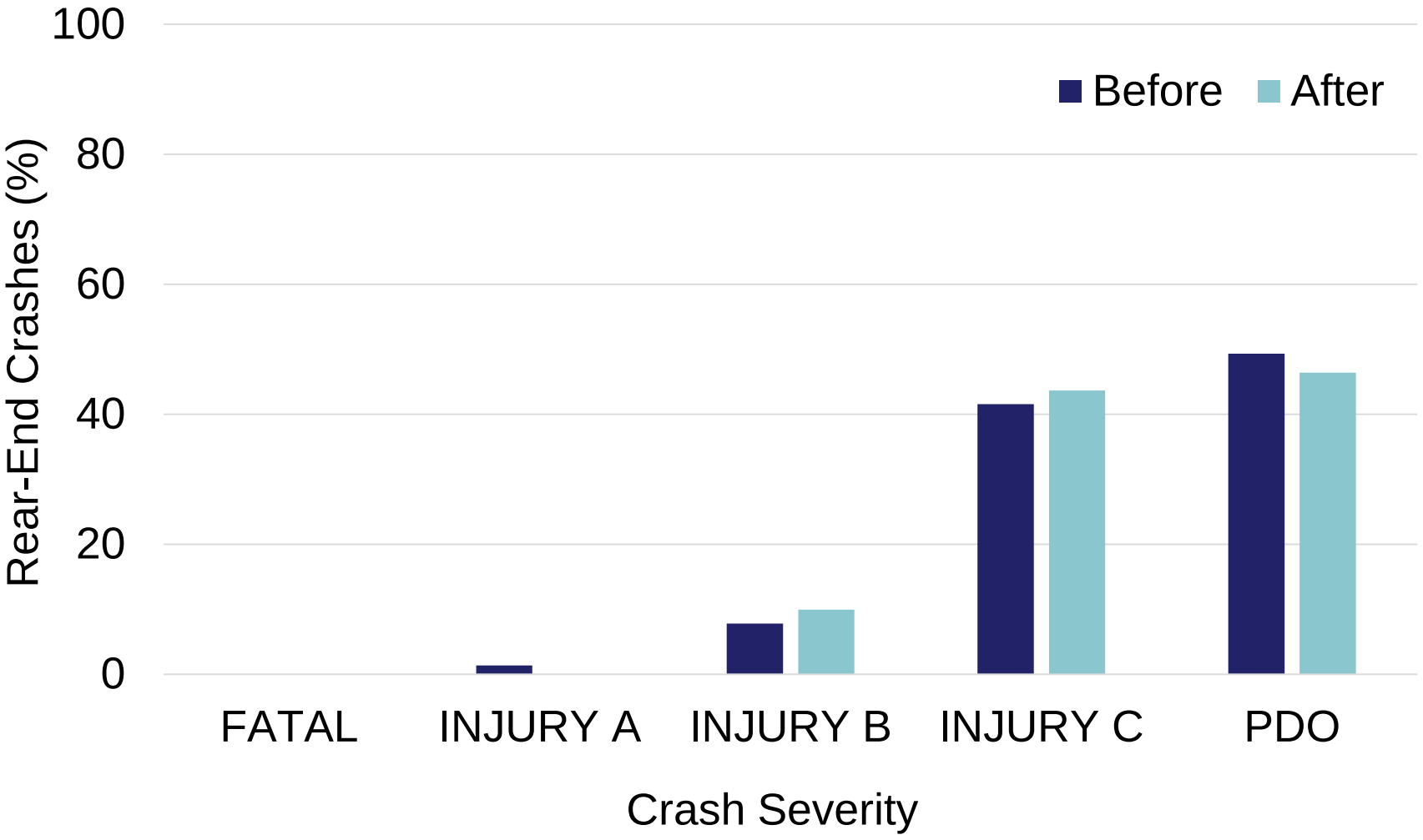
Methods

	Simple Before-After	Comparison Group	Cross-sectional Analysis	Empirical Bayes Analysis
Pedestrian	X	X	no	no
Rear-End	X	X	X	X

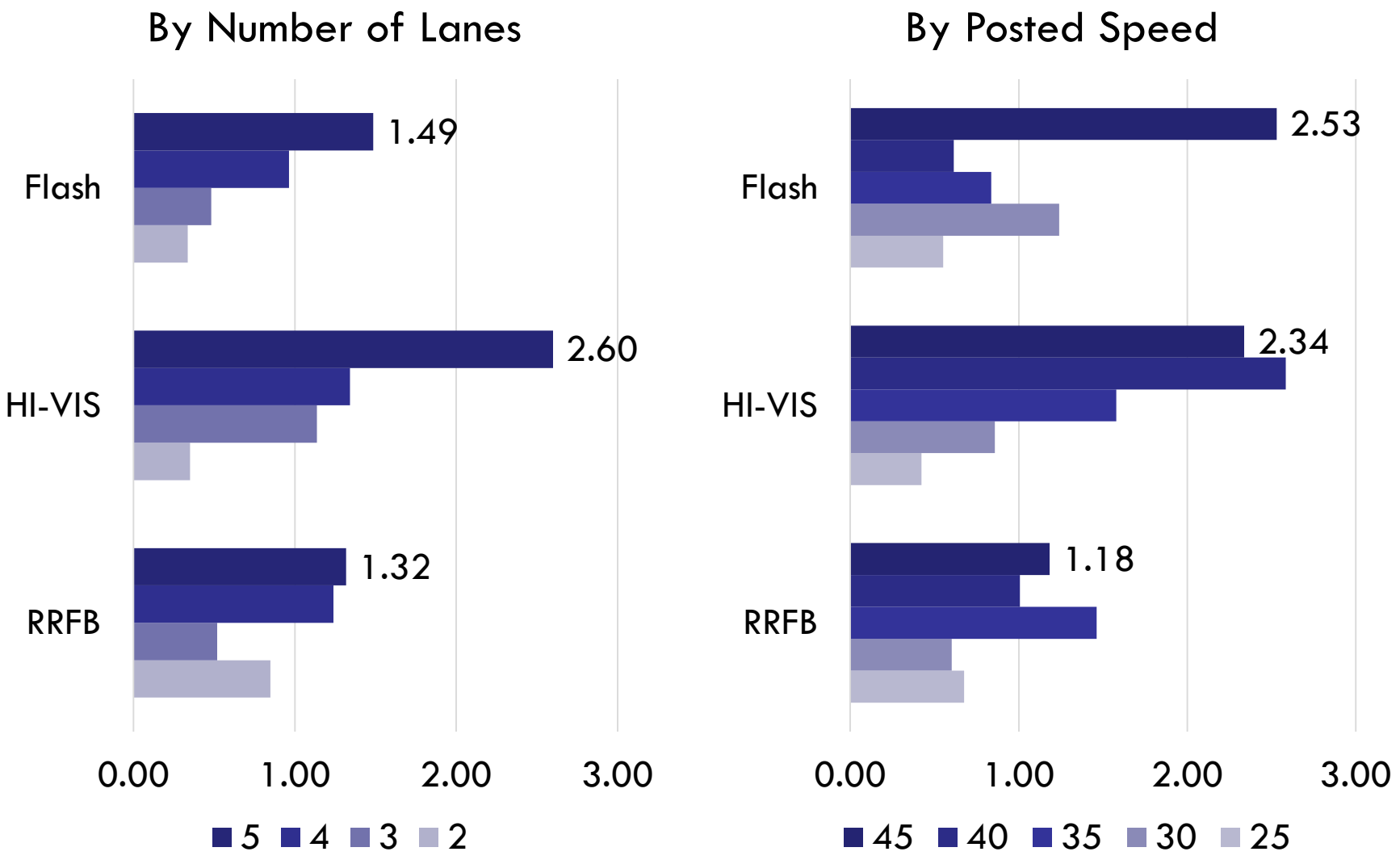
Pedestrian Crash Distribution, By Severity



Rear-End Crash Distribution, By Severity



Risk Ratio = Percent of Crashes / Percent of Observation-Years



Summary: CMFs for RRFB

Pedestrian

Parameter	Simple Before-After	Comparison Group	Cross-sectional Analysis	Empirical Bayes Analysis
CMF	0.78	0.09	-	-
Standard Error	0.35	0.06	-	-

Rear-end

Parameter	Simple Before-After	Comparison Group	Cross-sectional Analysis	Empirical Bayes Analysis
CMF	1.30	1.00	1.75	0.93
Standard Error	0.19	0.34	0.33	0.22

Challenges

- Not able to estimate SPF for pedestrian crashes
- No reliable way to estimate pedestrian activity
- Small number of crashes
- Short after duration of RRFB installs
- No consistent logging of installation dates and minor modifications

Countermeasure Name and Description	Install enhanced RRFB pedestrian crossing at mid-block crossing location.	
Crash Type	Pedestrian	Rear-end
Crash Severity	All (KABCO)	
Time of Day	All hours	
Crash Modification Factor	0.78	0.93
Measures of Precision for the CMF (standard error/deviation)	0.35	0.22
Prior Conditions	Previously unmarked or at a location with prior high-visibility markings. The data set pooled these locations in the estimation of CMFs.	
Roadway Class	Other principal arterial, minor arterial, major collector, minor collector, local	
Road Division Type	Undivided	
State	Oregon	
Area Type	Rural; Urban; Suburban	
Number of Through Lanes	2 to 5 lanes (includes TWLTL)	
Speed Limit	20 mph to 45 mph	
Traffic Volume Range	Average = 13,000	
Traffic Control	No control	
Intersection Type	Roadway to pedestrian crossing (i.e., mid-block crossing).	
Years of Data	8	4
Type of Methodology	Simple Before-After	EB Before-After
Site Selection Criteria	Sites for inclusion in the study were identified from a list of enhanced crossing locations from state and local inventories. Sites were excluded primarily due to undetermined installation date of treatment.	
Sample Size Used (Crashes)	26 before, 6 after	18 before, 26 after
Sample Size Used (Sites)	19	15
Biases Documentation	Sites likely selected for pedestrian crash experience. Regression to the mean bias present and not accounted for in simple before-after analysis. Changes in pedestrian volume also not accounted for in method.	Sites not likely selected based on rear-end crash history. EB analysis approach includes adjustment for traffic volumes. Changes in pedestrian volume also not accounted for in method.