CITY OF MADISON
HIGH INJURY NETWORK
2017-2019

Wisconsin Traffic Operations and Safety Laboratory
Department of Civil and Environmental Engineering
University of Wisconsin – Madison

Overview

Vision Zero

- Strategy aimed at eliminating traffic fatalities and severe injuries while increasing safe, healthy, and equitable mobility for all road users
- Originated in Sweden in the 1990s
- Proven successful across Europe and gaining acceptance in the US
- The City of Madison is in the process of adopting Vision Zero

Overview

Vision Zero Commitment

- Build and sustain leadership, collaboration, and accountability
  - Transportation professionals
  - Public health officials
  - Police
  - Policymakers and community members
- Collecting, analyzing, and using **DATA**
  - Understand trends
  - Potential disproportionate impacts on certain populations
- Prioritizing equity and community engagement
- Managing speed to safe levels
- Setting timeline to achieve zero traffic deaths and serious injuries

Overview

Vision Zero: High Injury Network (HIN)

- Recommends the implementation of High Injury Networks
- **Data driven approach** to safety analysis and decision making
- Mapping of roadways in the network where high number and severe crashes concentrate
- Contribute to:
  - Determine geographic areas where crashes are concentrated
  - Focus efforts on the most challenging areas and crash factors
  - Strengthen collaboration for road improvements and education campaigns
- Prioritize investments

Methodology

City of Madison Staff

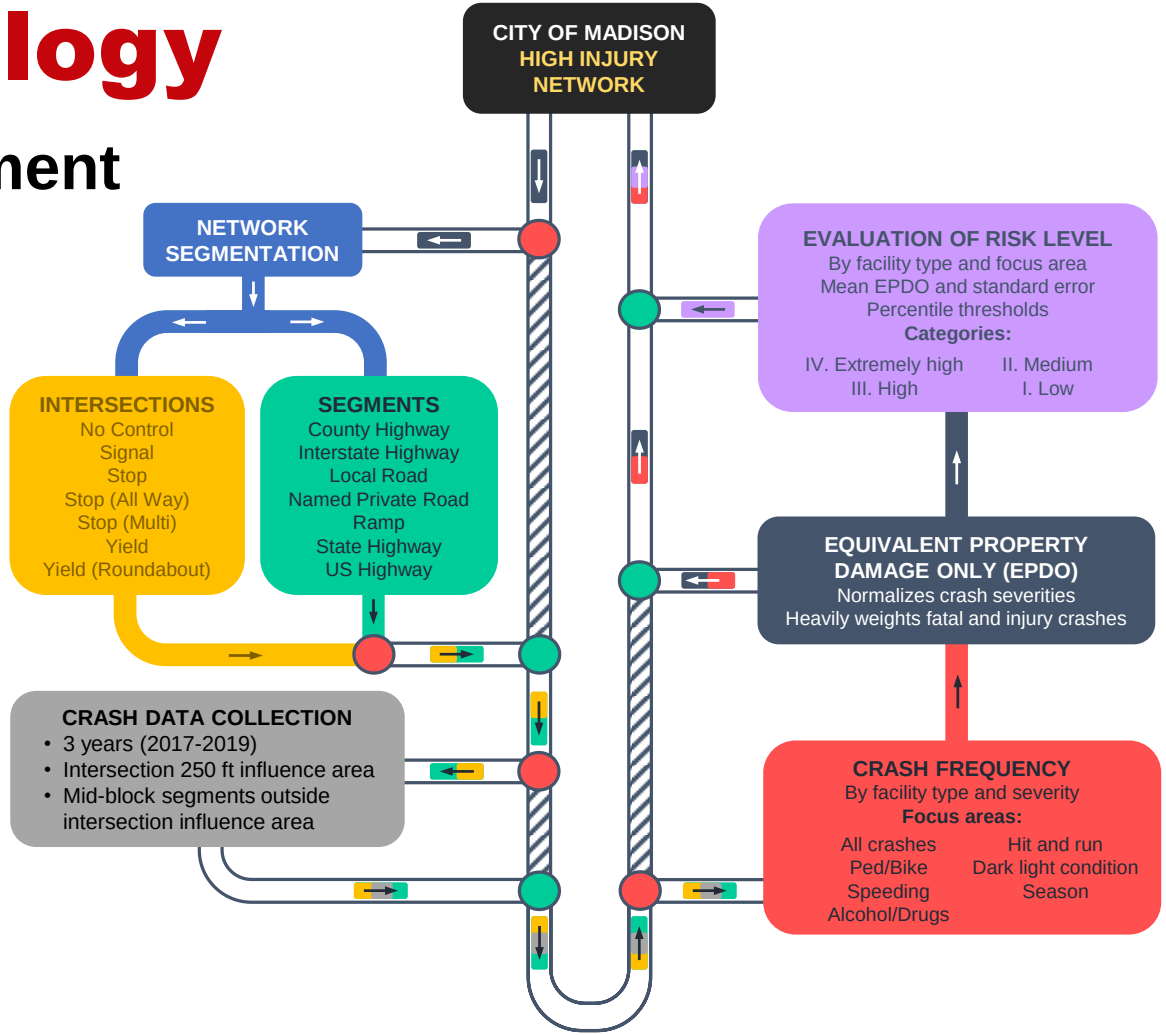
- Network segmentation
  - 4,590 intersections
  - 8,855 segments
- Crash data collection
  - Three years (2017-2019)
  - Intersections: 250 ft buffer
  - Segments: continuous mid-block roadway sections outside the 250 ft buffer

TOPS Lab

- Developed practical and repeatable analytical process to obtain HIN
- Statistical analysis
  - Crash Frequency
  - Equivalent Property Damage Only (EPDO)

Methodology

- HIN Development



Methodology

- **Crash Frequency**
  - Number of crashes over a period of analysis at a roadway facility
  - Without yearly averaging (i.e., 11 crashes over three years)
  - Roadway segments normalized to crashes per mile
- **Equivalent Property Damage Only (EPDO)**
  - Safety measure that allows fatal and injury crashes (KABC) to be normalized to property damage crashes (O).
  - Using crash costs, weights were estimated to determine the equivalency of KABC crashes to O crashes
  - Crash costs and EPDO weights available from Madison MPO 2012-2016 research project

Methodology

Equivalent Property Damage Only (EPDO)

- By crash type
  - Motor vehicle-pedestrian crash (Ped)
  - Motor vehicle-bicycle crash (Bike)
  - Motor vehicle crash (Veh)

Severity		Crash Cost			EPDO Weight		
		Ped	Bike	Veh	Ped	Bike	Veh
K	Fatal	$3,305,922	$3,147,627	$3,782,512	135.9	129.4	155.5
A	Incapacitating	$433,383	$362,759	$389,169	17.8	14.9	16.0
B	Non-Incapacitating	$113,100	$90,303	$107,674	4.7	3.7	4.4
C	Possible Injury	$73,539	$60,060	$56,365	3.0	2.5	2.3
O	Property Damage	$35,692	$49,042	$24,322	1.5	2.0	1.0

Methodology

EPDO Examples

Severity		Crash Cost			EPDO Weight		
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EXAMPLE 1
Vehicle Crashes

1

Vehicle crash (Veh) with incapacitating injury (A)

=

16

Vehicle crash (Veh) with property damage only (O)

Methodology

EPDO Examples

Severity		Crash Cost			EPDO Weight		
		Ped	Bike	Veh	Ped	Bike	Veh
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C	Possible Injury	$73,539	$60,060	$56,365	3.0	2.5	2.3
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EXAMPLE 2
Pedestrian Crashes

1

Vehicle-Pedestrian crash (Ped) with fatal injury (K)

=

136

Vehicle crash (Veh) with property damage only (O)

Methodology

EPDO Examples

Severity		Crash Cost			EPDO Weight		
		Ped	Bike	Veh	Ped	Bike	Veh
K	Fatal	$3,305,922	$3,147,627	$3,782,512	135.9	129.4	155.5
A	Incapacitating	$433,383	$362,759	$389,169	17.8	14.9	16.0
B	Non-Incapacitating	$113,100	$90,303	$107,674	4.7	3.7	4.4
C	Possible Injury	$73,539	$60,060	$56,365	3.0	2.5	2.3
O	Property Damage	$35,692	$49,042	$24,322	1.5	2.0	1.0

EXAMPLE 3
Bicycle Crashes

1

Vehicle-Bike crash (Ped) with incapacitating injury (A)

=

15

Vehicle crash (Veh) with property damage only (O)

Methodology

- **High Injury Network (HIN)**
  - Safety analysis of intersections and segments based on EPDO
  - Locations with EPDO higher than threshold
  - 65th percentile threshold
  - Mapping of high injury intersections and segments
  - Combination of influence area of high injury facilities