SAFETY INVESTIGATION MANUAL
CHAPTER 4: DIAGNOSING CRASH PATTERNS
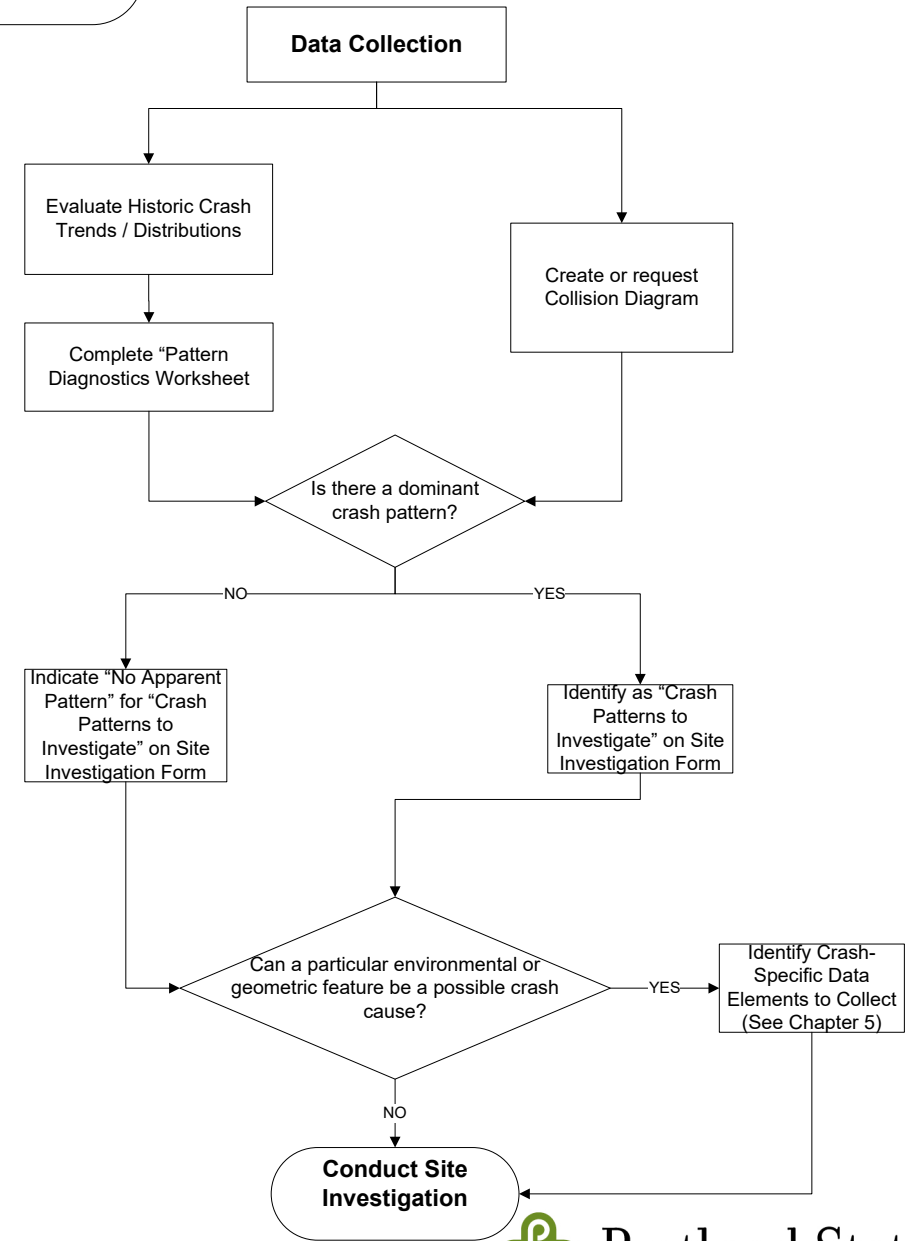
Online Training

Presented by:

Dr. Chris Monsere, Professor

Portland State University
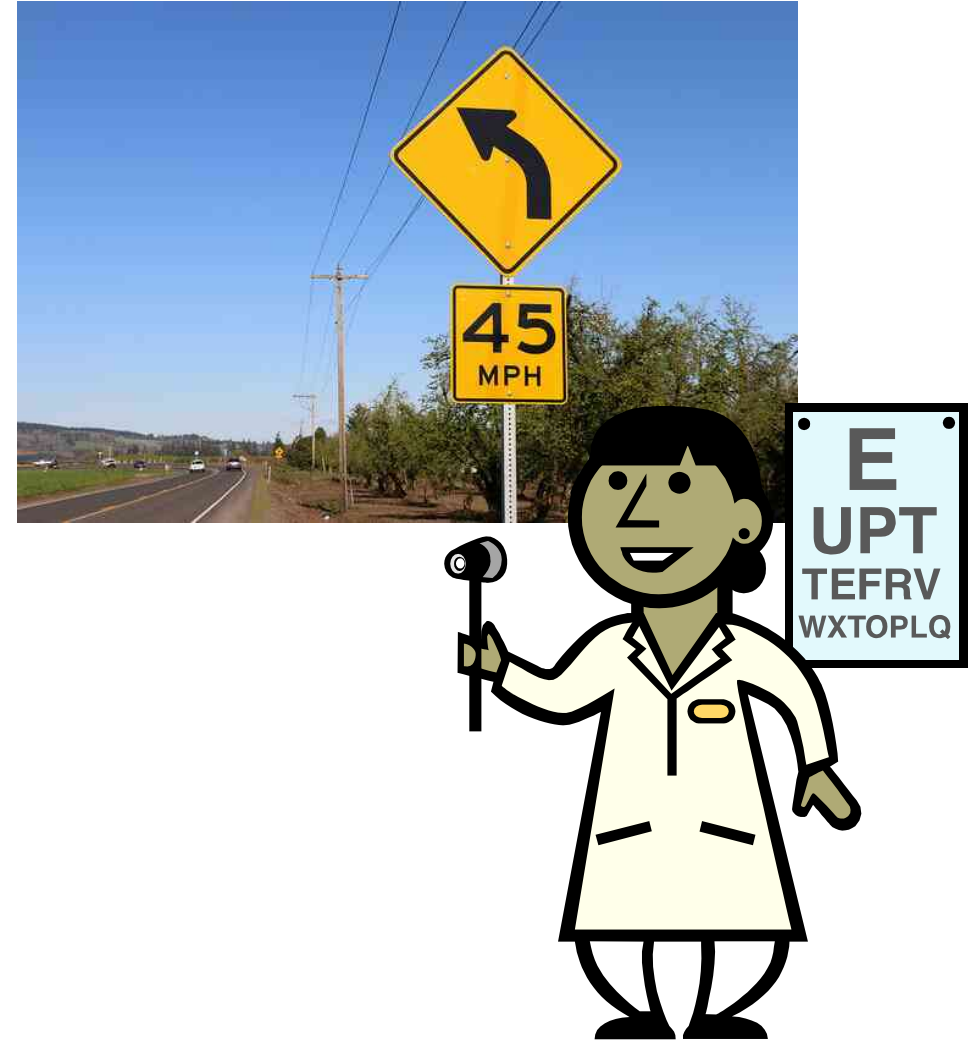
Diagnosing Crash Patterns

- Primary goal: diagnose safety issues and propose solutions
  - Based on office data and field reviews
- Crash data is the starting point
- Searching for patterns and trends in crashes
  - Crash type
  - Vehicle type involved
  - Time of day
  - Spatial groupings
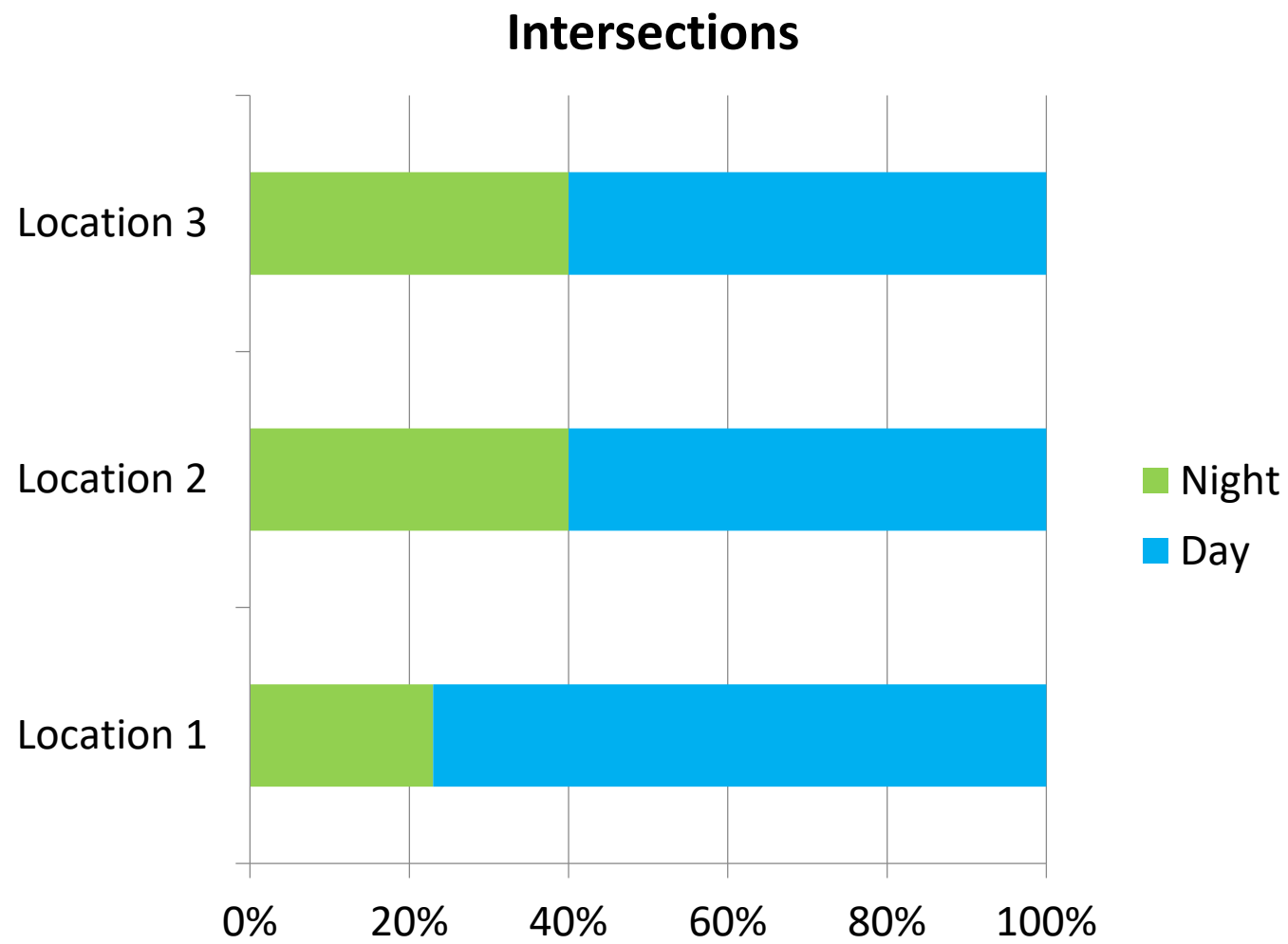- Several tools available to assist with this process
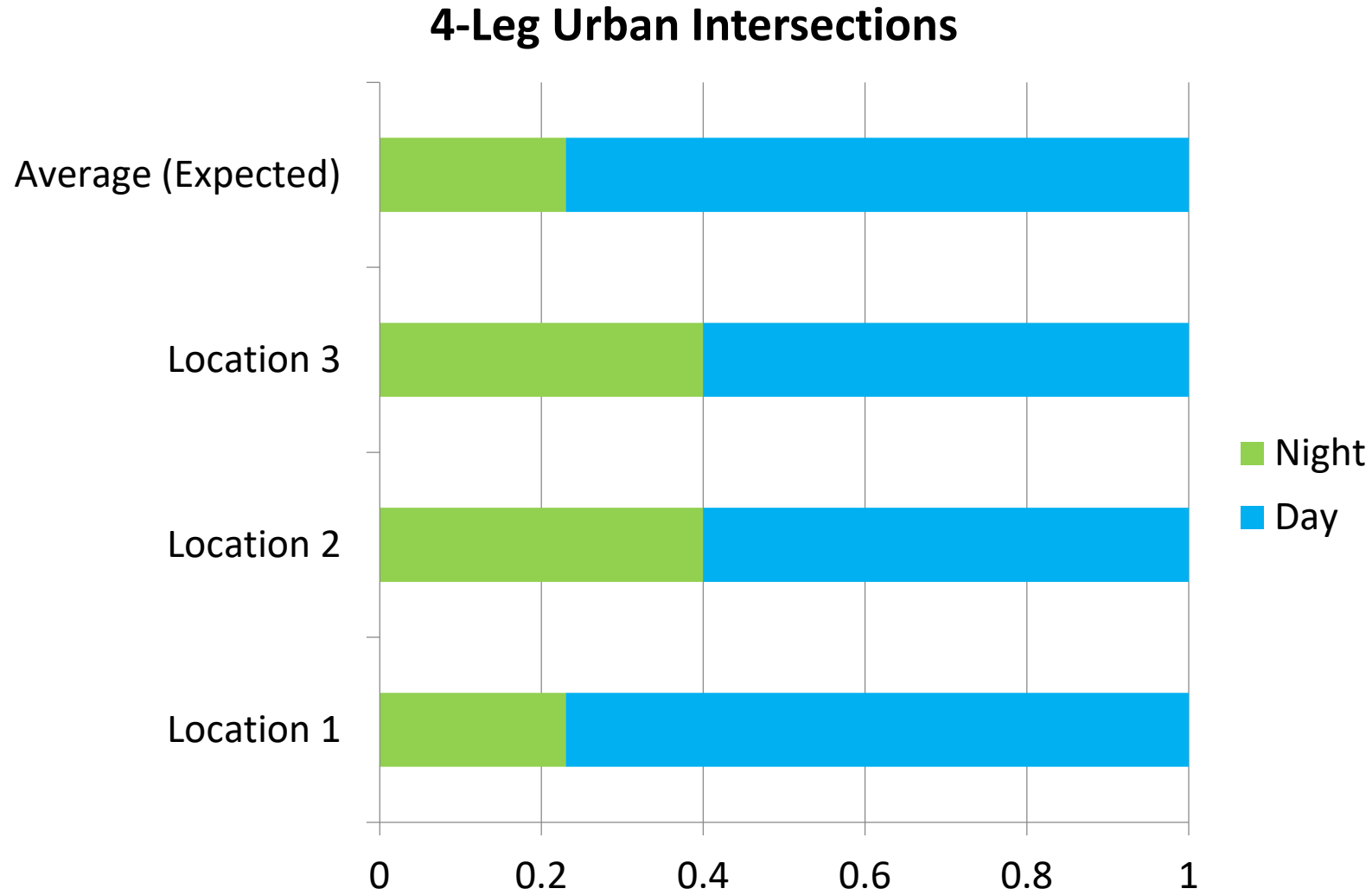
Crash Pattern Worksheet

- Additional training videos and case studies available.

- Overrepresentation of crash type best for identifying improvements

- Unusual is a clue -- trying to detect a pattern of crashes that are "out of the ordinary"

- Over-represented crash types provide a reliable guide to the remedial action since they are likely to be indicative of some problem

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Which of these are unusual?

Intersections

Now, which of these are unusual?

4-Leg Urban Intersections
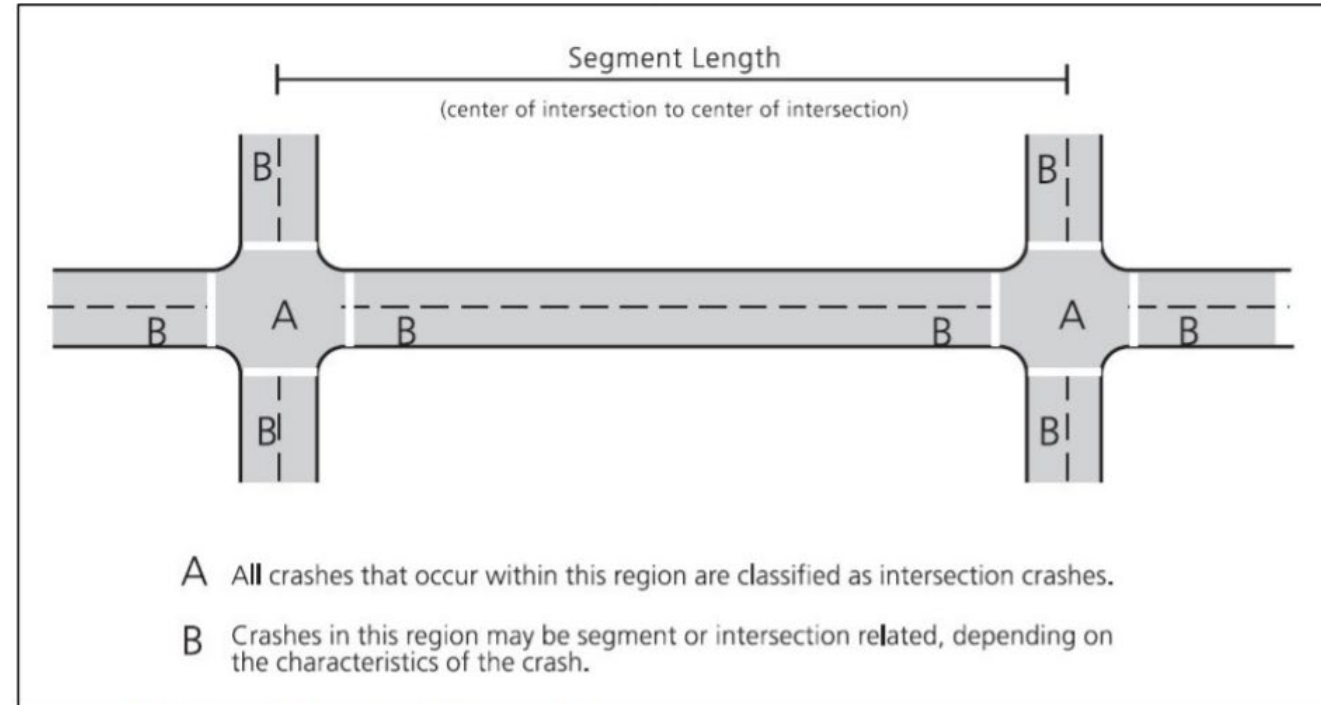
Crash Pattern Worksheet

- Tabulations of typical distributions developed for various crash classifications
  - Segments (by functional class)
  - Intersections (by urban/rural, configuration, and traffic control)
- Calculates probability that an observed percentage of a crash classification exceeds the average of similar locations
  - i.e., is the probability that the observed proportion is "normal"? *P(Norm)*

Collision Type (All)	Crash	Obs %	Ex %	P(Norm)
Angle	1	5.9%	0.1%	**1.3%**
Head-on	0	0.0%	0.3%	
Rear	3	17.6%	24.4%	82.2%
Sideswipe-Meet	0	0.0%	0.2%	
Sideswipe-Over	1	5.9%	14.4%	92.9%
Turn	11	64.7%	0.1%	**0.0%**
Parked	0	0.0%	0.1%	
NonCollision	0	0.0%	8.3%	
Backing	0	0.0%	0.2%	
Pedestrian	1	5.9%	0.2%	**4.0%**
Fixed Object	0	0.0%	44.6%	
Other	0	0.0%	7.1%	
	17	100%	100%	

Crash Pattern Worksheet probability calculations

Crash Rate Calculations

- Pattern Worksheet
  - Crash rate for total crashes
  - Critical crash rate using peer rate
- Crash Rate Calculator Tabs: Segment & Intersection
  - Segment- Overall crash rate, severity-based crash rate, crash density
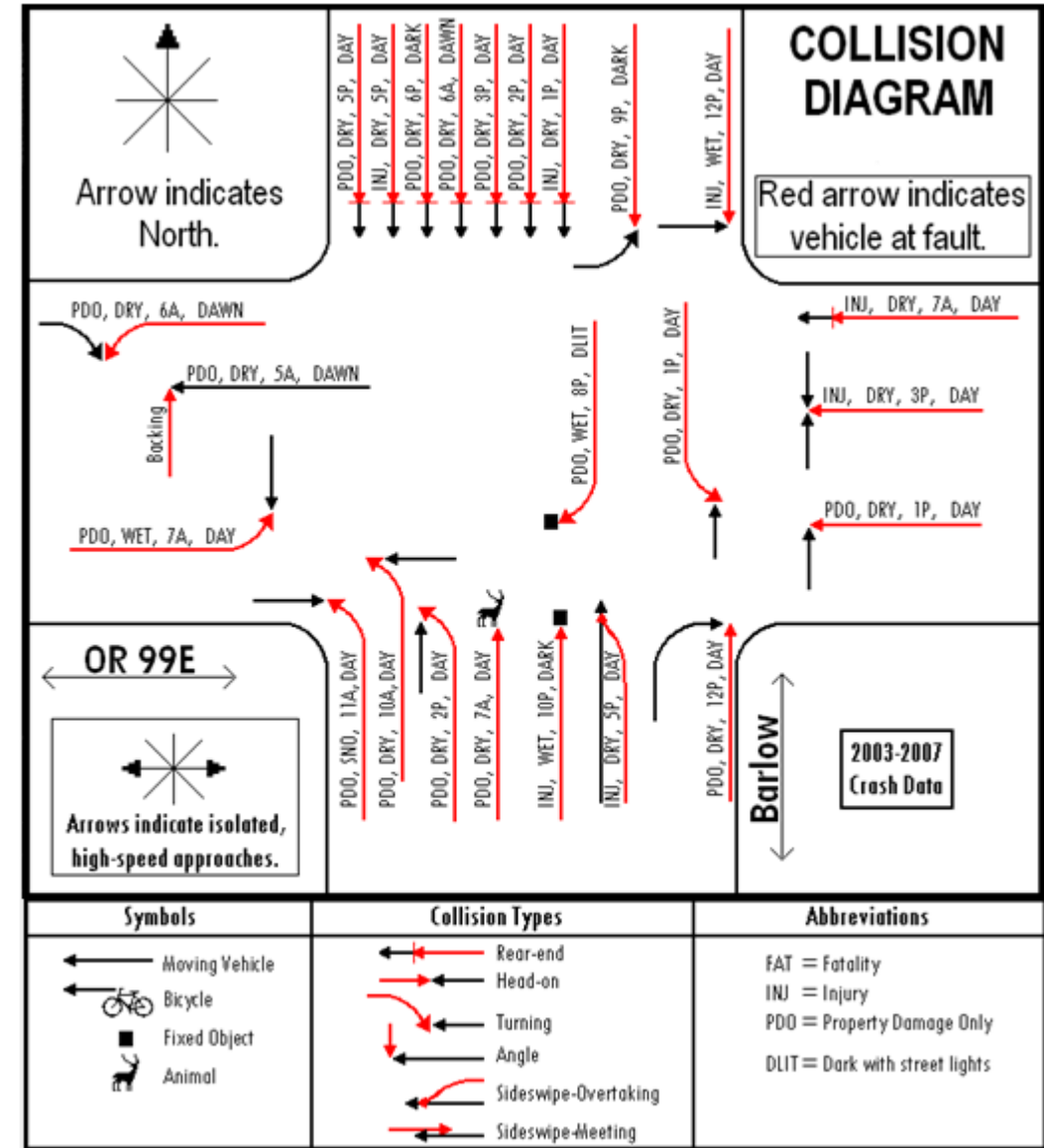 - Intersection- Overall crash rate, severity-based crash rate, crash density, crash cost

Segment Length
(center of intersection to center of intersection)

A All crashes that occur within this region are classified as intersection crashes.

B Crashes in this region may be segment or intersection related, depending on the characteristics of the crash.

Source: HSM Part C, Appendix A, Figure A-1

Differentiating between segment and intersections

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Collision Diagrams

- Use CrashMagic!
- Spatial patterns of crashes
- Visual representation of crash locations and incidents
- Not drawn to scale with general details
  - Vehicle direction
  - Severity
  - Crash type
- At least 3 years of crash data