Regional Safety Planning

The Case for MPO Leadership

AMPO Conference

October 23, 2013

Portland, OR

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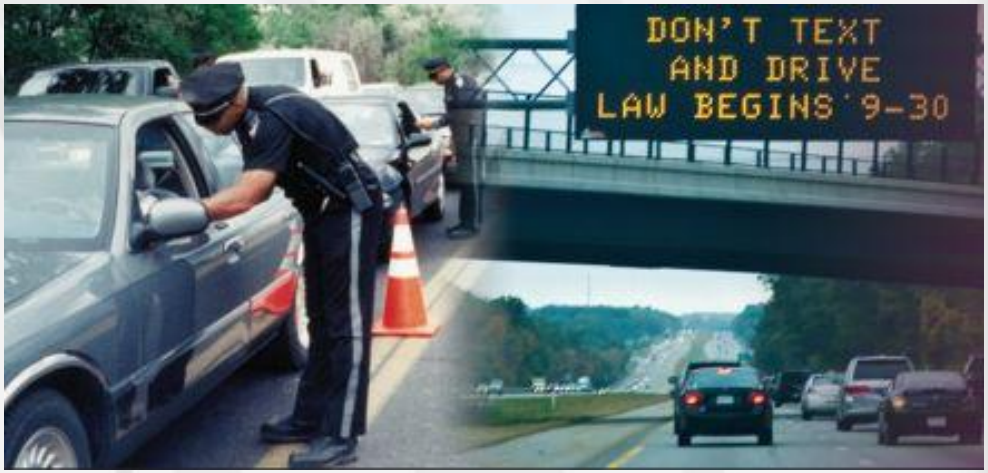
CAMBRIDGE SYSTEMATICS

Overview

- Why regional safety planning matters and MPOs should be taking the lead
- Quick summary of safety planning at the state and federal levels
- Crash data collection and analysis process
- Resources



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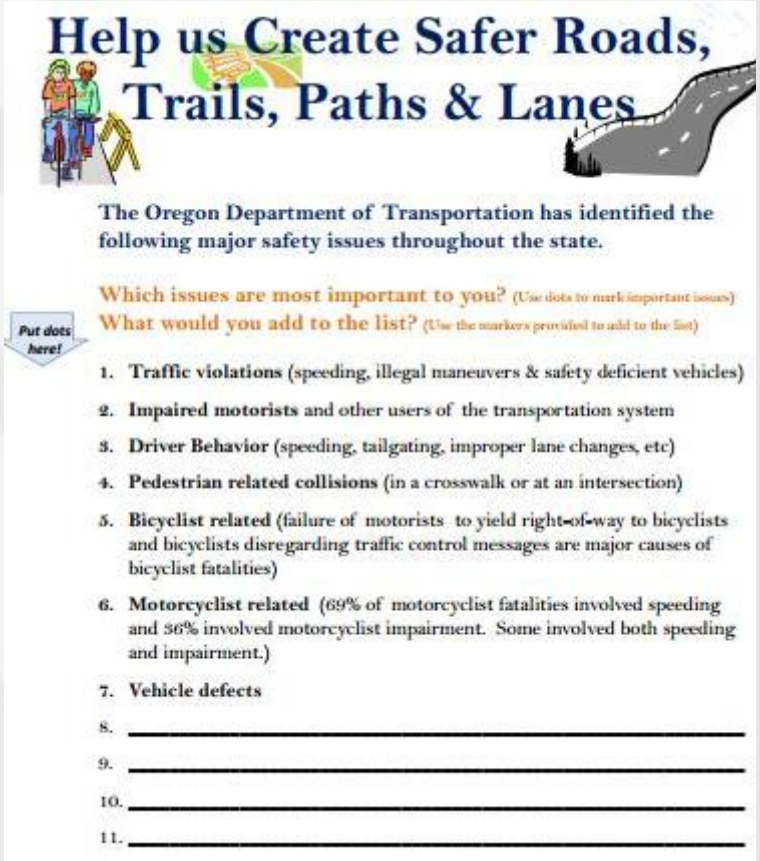
The Role of MPOs in Safety Planning

- Why it matters: local roads account for over 40% of fatalities in the U.S.
- Why MPOs should take the lead
  - » Integration with other plans
  - » Technical expertise & resources
  - » Service to member agencies
  - » Venue for collaboration
  - » Difficult for states to coordinate with many small jurisdictions
  - » Safety is multidisciplinary



Help us Create Safer Roads, Trails, Paths & Lanes

The Oregon Department of Transportation has identified the following major safety issues throughout the state.

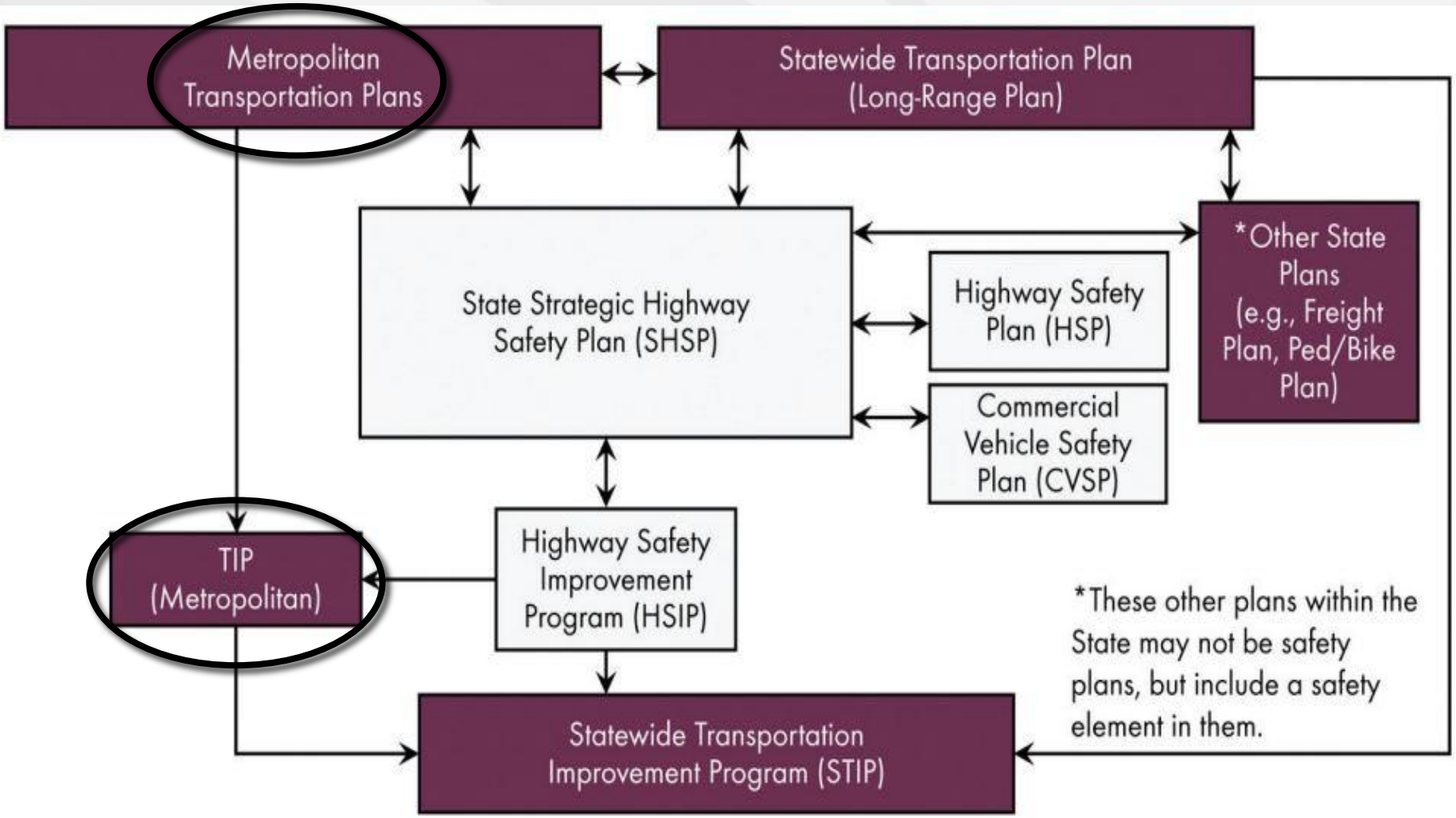
Which issues are most important to you? (Use dots to mark important issues)
What would you add to the list? (Use the markers provided to add to the list)

Put dots here!

1. **Traffic violations** (speeding, illegal maneuvers & safety deficient vehicles)
2. **Impaired motorists** and other users of the transportation system
3. **Driver Behavior** (speeding, tailgating, improper lane changes, etc)
4. **Pedestrian related collisions** (in a crosswalk or at an intersection)
5. **Bicyclist related** (failure of motorists to yield right-of-way to bicyclists and bicyclists disregarding traffic control messages are major causes of bicyclist fatalities)
6. **Motorcyclist related** (69% of motorcyclist fatalities involved speeding and 36% involved motorcyclist impairment. Some involved both speeding and impairment.)
7. **Vehicle defects**
8. _____
9. _____
10. _____
11. _____

Image: Corvallis Area MPO

Coordinated Safety Planning

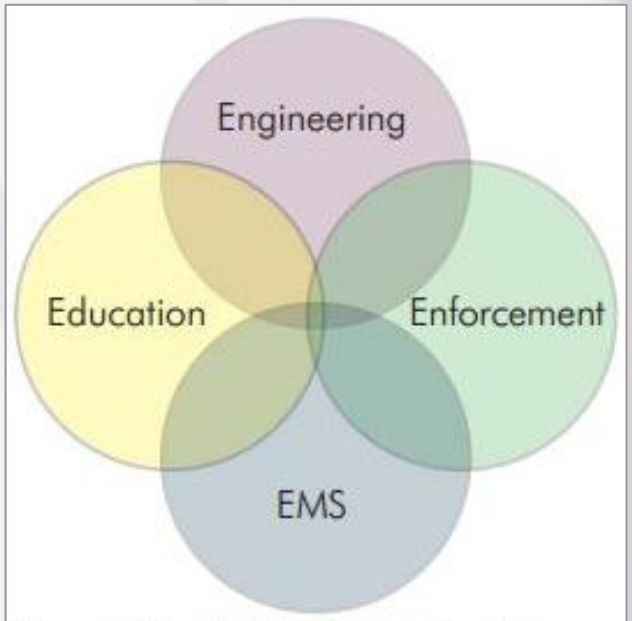


Source: Federal Highway Administration.

MAP-21 Safety Provisions

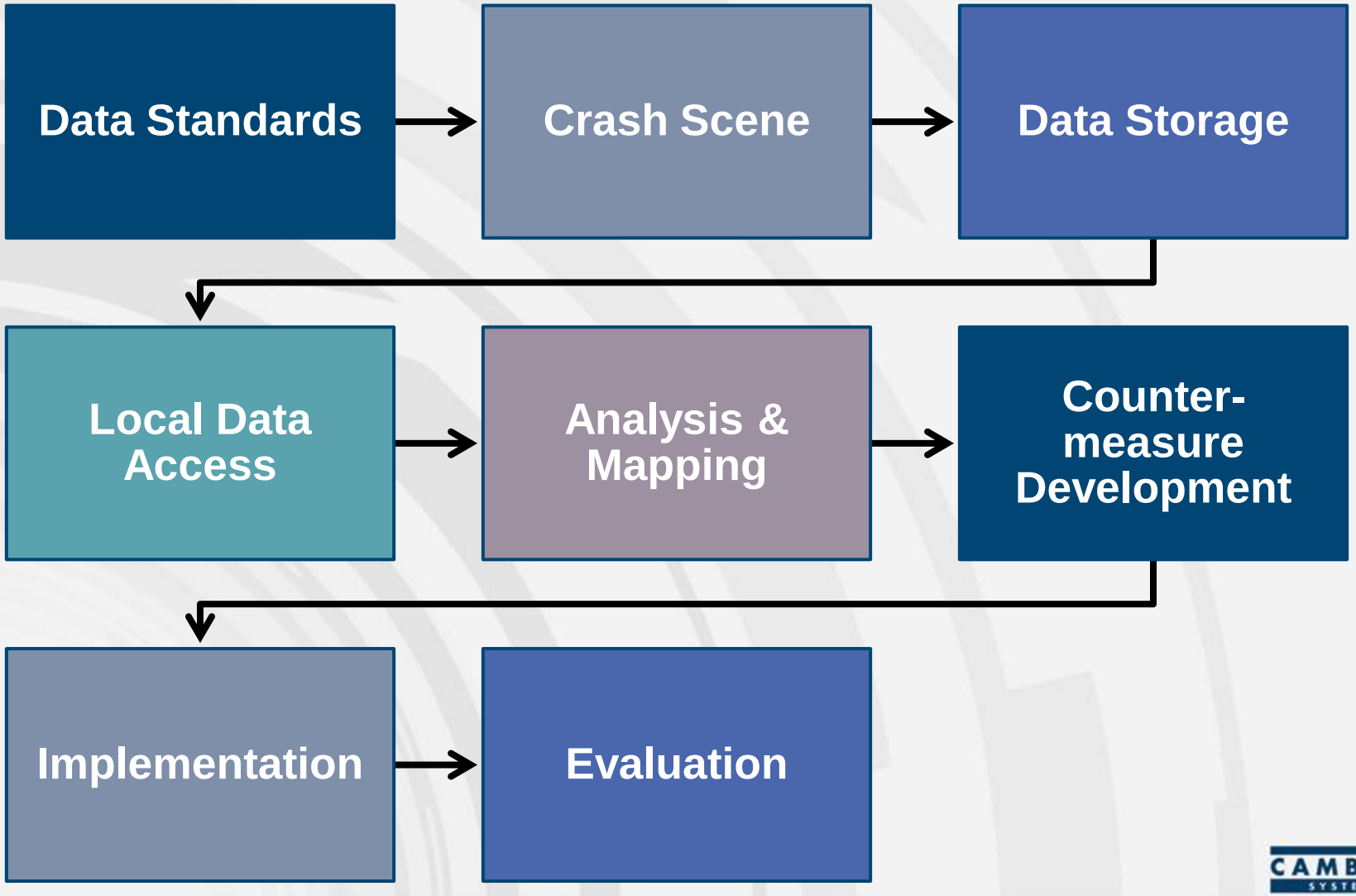
- HSIP program: $2.4B annually (nearly doubled) – third largest highway fund
- Regular updates to Strategic Highway Safety Plan
  - » Must be data-driven
  - » Emphasis on coordination with stakeholders (the 4Es)
- Performance Measures by 2014
  - » Focus on fatalities and serious injuries

Source: Federal Highway Administration.



Source: Cambridge Systematics, Inc.

Crash Data Collection and Analysis Process



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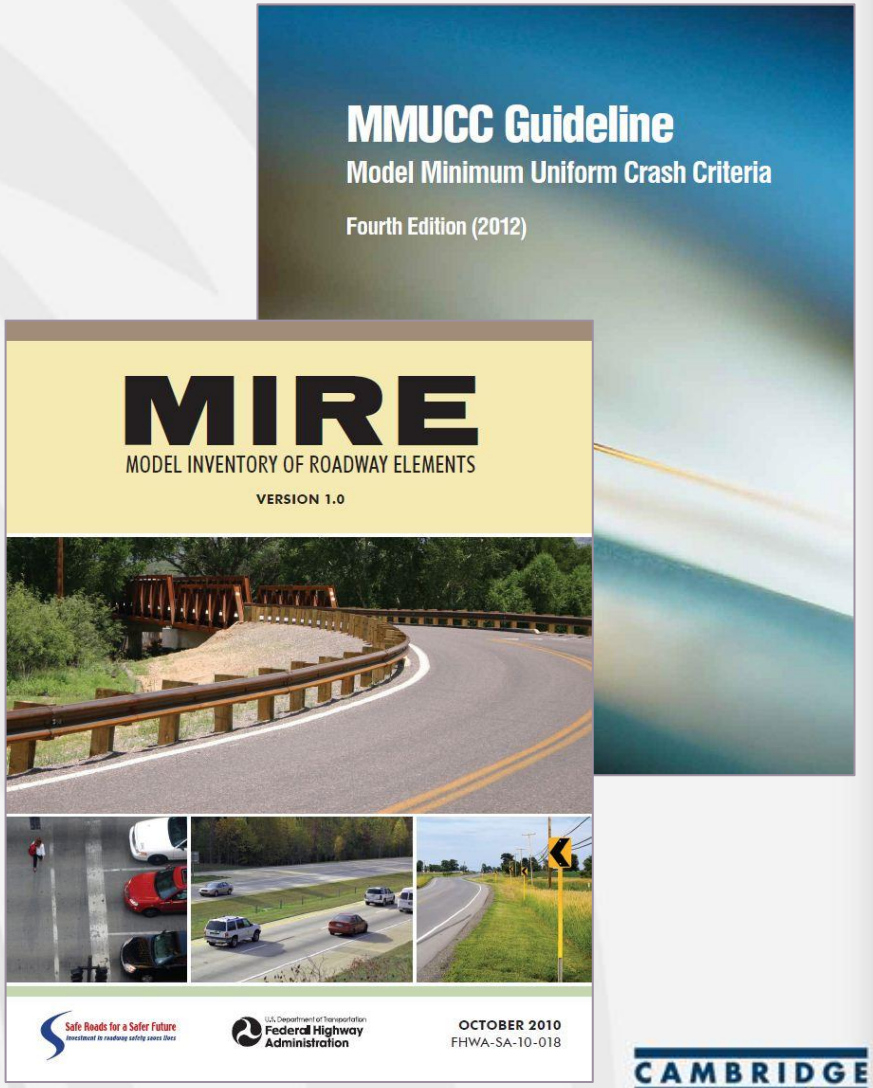
Crash Data Systems and Standards

- Model Minimum Uniform Crash Criteria (MMUCC)
- Model Inventory of Roadway Elements (MIRE)
- NHTSA National Priority Safety program
  - » Improve timeliness, accuracy, completeness, uniformity, integration, and accessibility of State data
  - » Incentives to incorporate best practices



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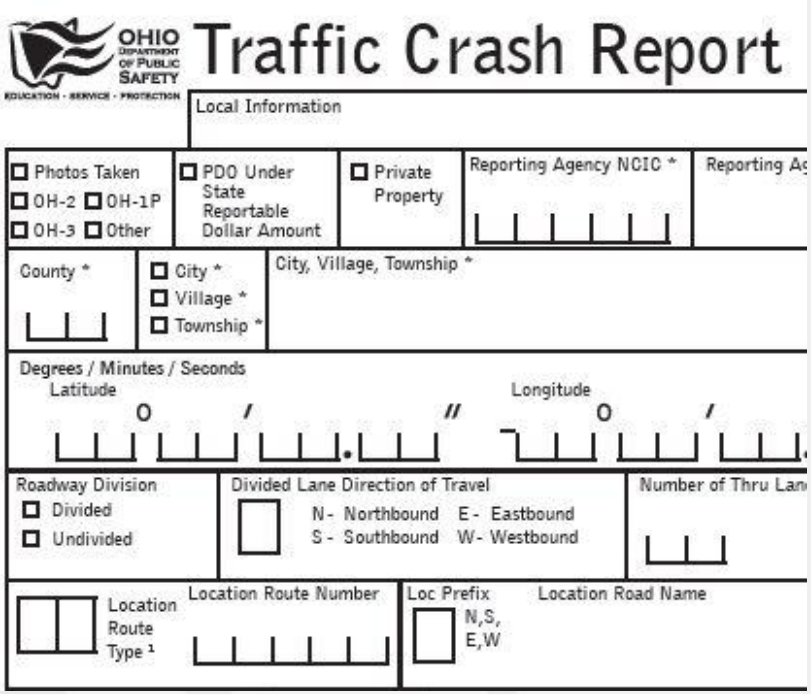
Crash Data Collection – Important Considerations

- Unreported crashes
- Hit-and-run
- GPS/location accuracy
- Potential bias of reporting officer
- Reluctance to make legalistic determinations regarding driver distractions, speeding, etc.
- Limited time and resources to figure out what happened
- Missing or conflicting data


OHIO DEPARTMENT OF PUBLIC SAFETY
EDUCATION · SERVICE · PROTECTION

Traffic Crash Report

Local Information

Photos Taken
OH-2 OH-1P
OH-3 Other

PDO Under State Reportable Dollar Amount

Private Property

Reporting Agency NCIC *

Reporting Ag

County *

City *
Village *
Township *

City, Village, Township *

Degrees / Minutes / Seconds
Latitude
0 / . //
Longitude
0 /

Roadway Division
Divided
Undivided

Divided Lane Direction of Travel
N - Northbound E - Eastbound
S - Southbound W - Westbound

Number of Thru Lan

Location Route Type 1

Location Route Number

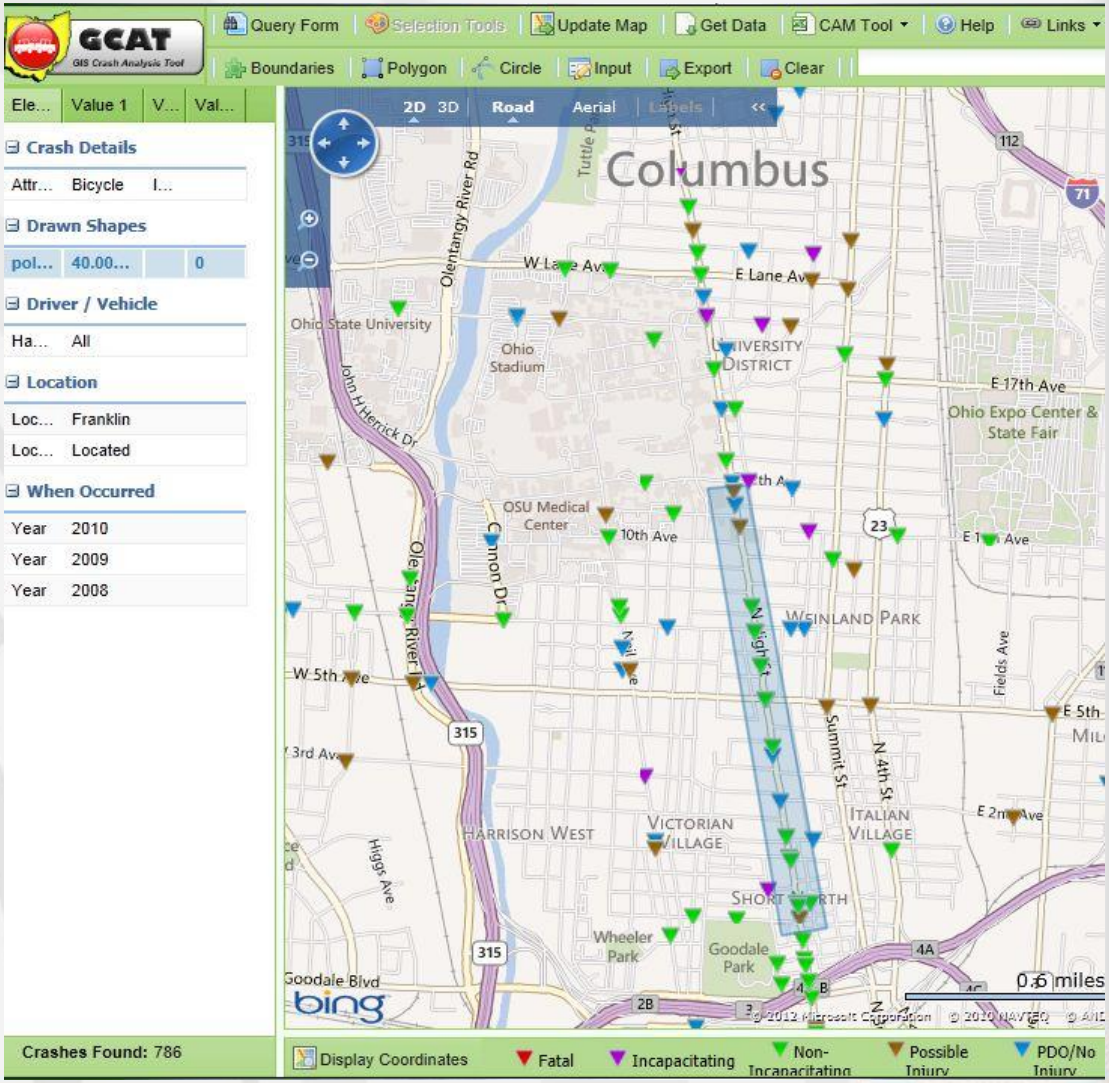
Loc Prefix
N,S,
E,W

Location Road Name

Source: Ohio Dept. of Public Safety

Data Storage and Access

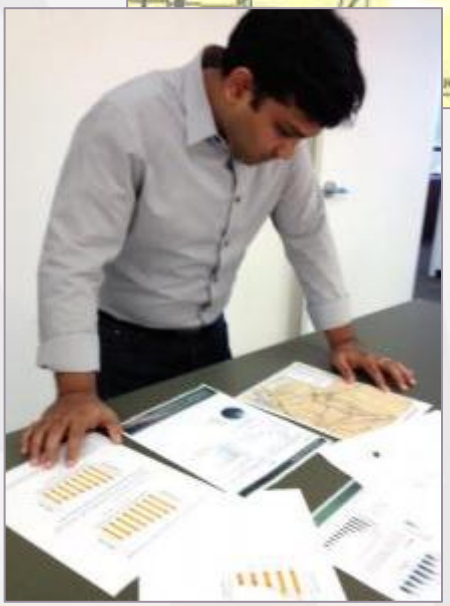
- Data submitted from local police agencies to state database
- State data made available to local agencies through web interfaces or another format



Source: Ohio Dept. of Transportation

Analysis & Mapping

- Location-Based Analysis
  - » Hotspots
    - May only tell you where volume is high
    - Can be difficult or expensive to address
  - » Corridors
    - May indicate systemic problem along a corridor
  - » Transit stops
  - » Curves



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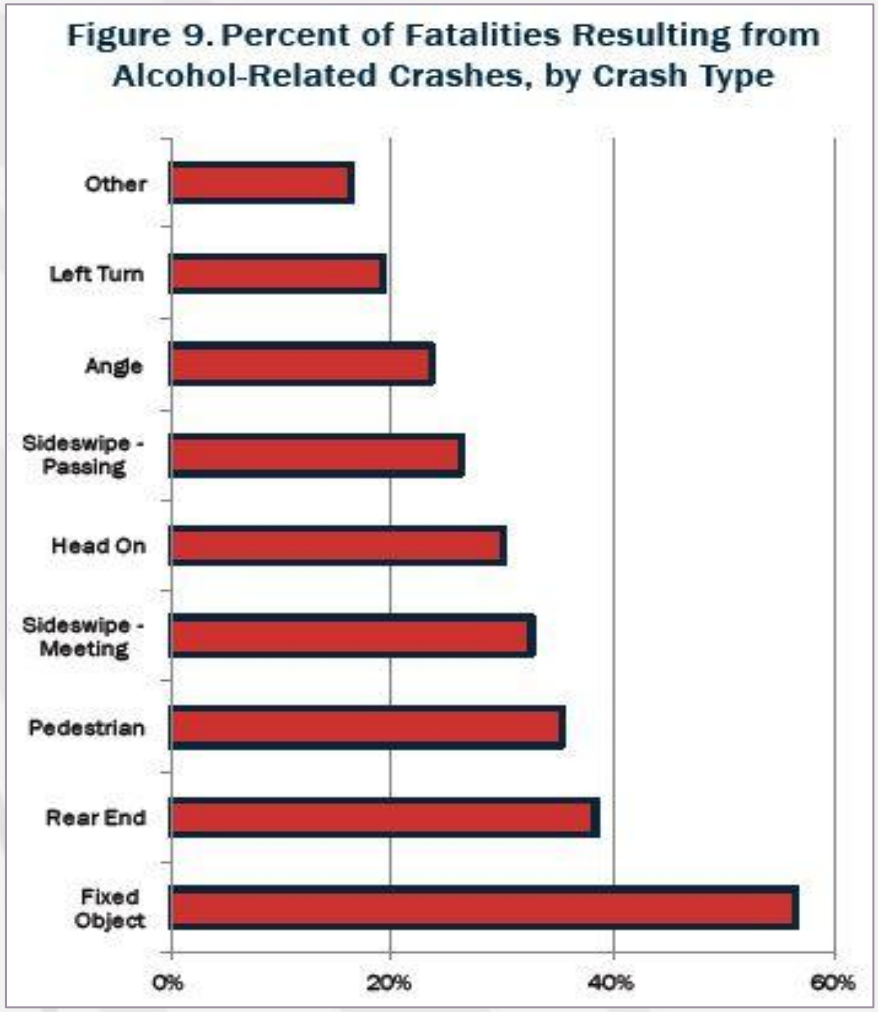
High-Crash Location Lists (Regional and by Jurisdiction)

RANK	LOCATION	JURISDICTION	TOTAL CRASHES (FREQ.)	CRASH SEVERITY			SEVERITY INDEX (SI)	AVERAGE DAILY TRAFFIC (ADT)	CRASH RATE (MEV RATE)
				Fatal	Injury	PDO			
1	Cleveland Ave @ Morse Rd	Columbus	233	0	69	164	1.59	57,100	3.73
2	W Broad St / US 40 @ N Wilson Rd	ODOT	115	0	46	69	1.80	40,300	2.61
3	Innis Rd @ Westerville Rd / SR 3	ODOT	110	0	38	72	1.69	28,100	3.57
4	Cleveland Ave @ Oakland Park	Columbus	101	0	41	60	1.81	28,400	3.25
5	E Dublin Granville Rd / SR 161 @ Maple Canyon Dr	Columbus	153	0	44	109	1.58	38,500	3.63

JURISDICTION	RANK	INTERSECTION	2009 TO 2011				CRASHES BY YEAR		
			Total Crashes	Fatal Crashes	Injury Crashes	Severity Index	2009	2010	2011
BEXLEY	1	E Broad St / SR 16 @ N Cassady Ave	33	0	10	1.61	11	8	14
	2	College Ave @ E Main St	25	0	6	1.48	6	7	12
	3	S Drexel Ave / US 40 @ E Main St / US 40	23	0	3	1.26	8	6	9
	4	E Broad St / SR 16 @ N Roosevelt Ave	17	0	7	1.82	7	7	3
	5	E Main St / US 40 @ S Roosevelt Ave	15	0	6	1.80	7	5	3

Non-location based analysis

- Crash Types & Risk Factors
  - » Tend to be more reliable predictor of fatal & serious injuries than location
- Demographics – age, gender
- Behavioral – alcohol, distracted driving



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Risk Factors (Pedestrian Crashes)

Crash Severity	Intersection		Posted Speed			Time of Day							
	Yes	No	<35	35-40	45+	12a-3a	3a-6a	6a-9a	9a-12p	12p-3p	3p-6p	6p-9p	9p-12a
Fatal	39%	**61%**	9%	41%	**50%**	**21%**	11%	14%	3%	2%	6%	24%	**20%**
Incapacitating	54%	46%	19%	59%	23%	7%	4%	9%	8%	12%	25%	23%	14%
Non-Incapacitating	56%	44%	19%	69%	12%	7%	2%	8%	8%	12%	27%	22%	13%
Possible Injury	62%	38%	17%	69%	14%	4%	1%	10%	10%	17%	24%	23%	11%
No Injury	60%	40%	20%	71%	10%	9%	2%	9%	11%	15%	22%	21%	11%
All Ped Crashes	57%	43%	18%	68%	14%	7%	2%	9%	9%	14%	24%	22%	13%

Crash Trends

CONTRIBUTING FACTORS & ROADWAY CONDITIONS

The factors leading up to a crash provide engineers and law enforcement officials with valuable information needed to reduce the severity and frequency of future crashes. In this regard, there are behavioral aspects, along with infrastructure and environmental conditions, that must be considered. The statistics shown here refer to the contributing factor for the at-fault vehicle (the 'Unit in Error' as noted on the crash report).

Key Facts

- Following too closely is the most common contributing factor, accounting for around 30% of all crashes.
- Failure to control accounts for only 15% of all crashes, but 26% of fatal & serious injury crashes.
- Around 3.4% of crashes occuring under dark, unlit conditions result in a fatality or serious injury, compared to 1.7% during daylight conditions.
- Surprisingly, crashes that occur during wet conditions (rain, snow, or ice) are less severe compared to those during normal, dry conditions.
- Speed-related crashes are more than twice as likely to result in a fatal or serious injury than other crashes.
- Almost 4% of single-car crashes result in a fatality or serious injury compared to 1.8% of crashes involving two vehicles.

Figure 6. Primary Contributing Factors (excluding pedestrian and bike crashes)

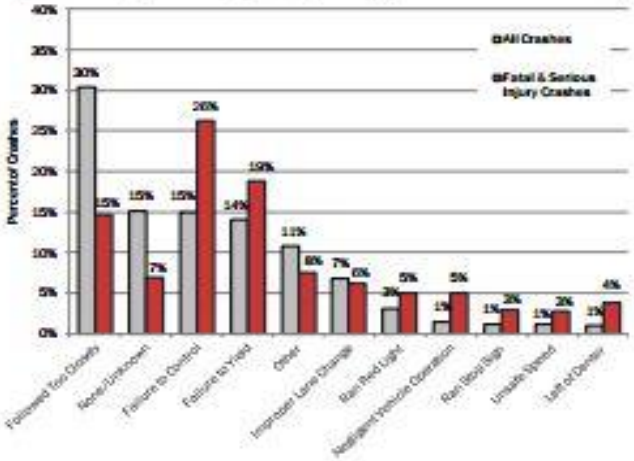


Figure 7. Risk Factors for Fatal and Serious Injuries

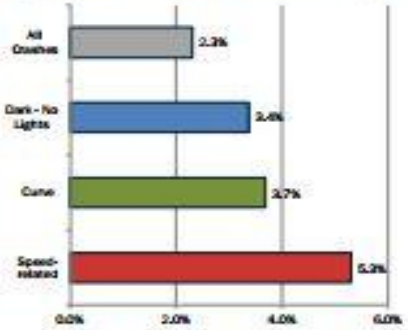


Table 4. Effect of Speeding and Number of Units on Severity

Number of Units Involved in Crash		1	2	3 or more	Total
Not Speed-Related	Total Crashes	25,911	134,696	15,070	175,677
	FSI Crashes	882	2,211	504	3,597
	FSI Rate	3.4%	1.6%	3.3%	2.0%
Speed-Related	Total Crashes	5,038	7,069	1,180	13,287
	FSI Crashes	337	284	83	704
	FSI Rate	6.7%	4.0%	7.0%	5.3%
All Crashes	Total Crashes	30,949	141,765	16,250	188,964
	FSI Crashes	1,219	2,495	587	4,301
	FSI Rate	3.9%	1.8%	3.6%	2.3%

Notes
- These data include only those crashes where a determination was made as to whether the crash was speed-related.
- The shaded yellow cells indicate the highest value for each row.
- FSI Crashes = the number of fatal and serious injury crashes.
- FSI Rate = the percent of crashes that resulted in a fatal or serious injury.

Source: ODPS/ODOT/MORPC

morpc

ALCOHOL-RELATED FATALITIES & SERIOUS INJURIES

Alcohol is a suspected factor in many of the fatal and serious injury crashes in central Ohio. Between 2007 and 2011, an average of 38 people died in alcohol-related crashes each year and close to 150 more sustained serious injuries. For the purposes here, a fatality or serious injury is classified as 'alcohol-related' if the driver, pedestrian, or bicyclist of the at-fault vehicle was suspected of being under the influence of alcohol by the reporting officer.

Figure 8. Alcohol-Related Fatalities & Serious Injuries by Year

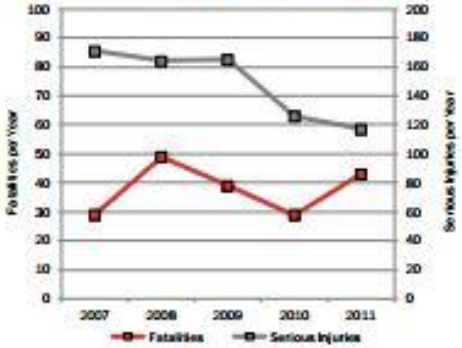
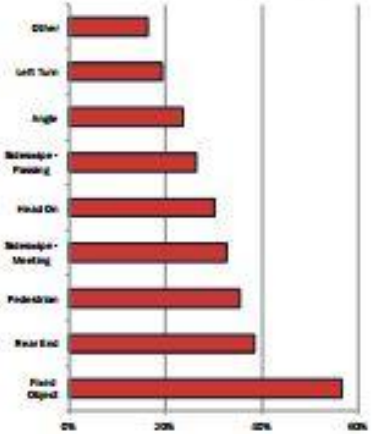


Figure 9. Percent of Fatalities Resulting from Alcohol-Related Crashes, by Crash Type



Key Facts

- From 2007 to 2011, alcohol was a suspected factor in 37% of all fatalities and 16% of serious injuries.
- Alcohol is suspected in over half of all fatalities resulting from fixed-object crashes.
- Alcohol-related serious injuries declined by 30% between 2007 and 2011.
- Although alcohol-related fatalities increased from 2007 to 2011, there is not a clear trend evident in the data.

Table 5. Alcohol-Related Fatalities & Serious Injuries by Crash Type

CRASH TYPE	FATALITIES				SERIOUS INJURIES			
	Total Fatalities	Alcohol-Related Fatalities	% Alcohol-Related	% All Fatalities (Alcohol-Related)	Total Serious Injuries	Alcohol-Related Serious Injuries	% Alcohol-Related	% All Serious Injuries (Alcohol-Related)
Angle	51	13	24%	2%	853	64	8%	1%
Fixed Object	159	90	57%	18%	1,071	325	30%	7%
Head On	30	9	30%	2%	200	49	24%	1%
Left Turn	31	6	19%	1%	417	30	7%	1%
Pedestrian	99	35	35%	7%	394	57	14%	1%
Rear End	26	10	38%	2%	696	69	10%	1%
Sideswipe - Meeting	43	14	33%	2%	241	55	23%	1%
Sideswipe - Passing	19	5	26%	1%	306	18	6%	0%
Other	49	8	16%	2%	523	77	15%	2%
Total	507	189	37%	37%	4,701	743	16%	16%

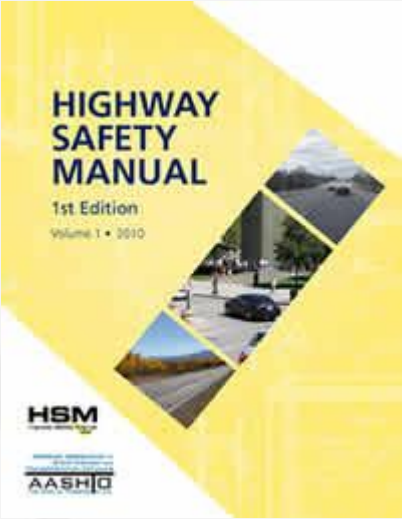
Notes
- The column titled "% All Fatalities/Serious Injuries (Alcohol-Related)" refers to the percent of all fatalities or serious injuries that are attributable to alcohol-related crashes of the particular crash type. For example, alcohol-related fixed-object crashes account for 18% of all fatal crashes and 7% of all serious injury crashes.
- Shaded yellow cells indicate the crash type with the highest value for each respective column. In this case, fixed-object crashes are the most problematic for alcohol-related crashes in all categories.

Source: ODPS/ODOT/MORPC

morpc

Countermeasure Development & Implementation

- Countermeasures can address behavioral or engineering problems
- Match countermeasure to specific problem identified through data analysis
- Highway Safety Manual
- Crash Modification Factors Clearinghouse website
  - » How many crashes will there be after implementing a treatment
- Evaluation



CMF
CRASH MODIFICATION FACTORS CLEARINGHOUSE

Resources

- A Champion's Guide to Saving Lives: http://safety.fhwa.dot.gov/safetealu/guides/guideshsp040506/
- MORPC's Safety Program: www.morpc.org/safety
- AASHTO Highway Safety Manual - http://www.highwaysafetymanual.org/
- Crash Modification Factors Clearinghouse – http://www.cmfclearinghouse.org/
- Fatality Analysis Reporting System (FARS) - http://www-fars.nhtsa.dot.gov/
- NHTSA Publications - http://www-nrd.nhtsa.dot.gov/cats/listpublications.aspx
- Model Minimum Uniform Crash Criteria (MMUCC) - http://www.mmucc.us/
- Model Inventory of Roadway Elements (MIRE) - http://www.mireinfo.org/
- City of Chicago 2011 Pedestrian Crash Analysis - http://www.cityofchicago.org/city/en/depts/cdot/supp_info/2011_pedestrian_crashanalysis.html

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Thanks!

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