AIsafe

Safety Planning Tools for Alabama MPOs

presented by

Cambridge Systematics, Inc.

Elizabeth Wemple, P.E.

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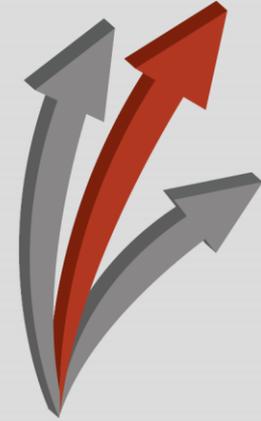**SYSTEMATICS**

Research Overview

Project Objectives

Project Outcomes

Next Steps

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Project Team

Alabama DOT

Tim Barnett

University of Alabama, Huntsville

Mike Anderson

Cambridge Systematics, Inc.

Beth Wemple *(Portland, OR)*

Joe Fish *(Denver, CO)*
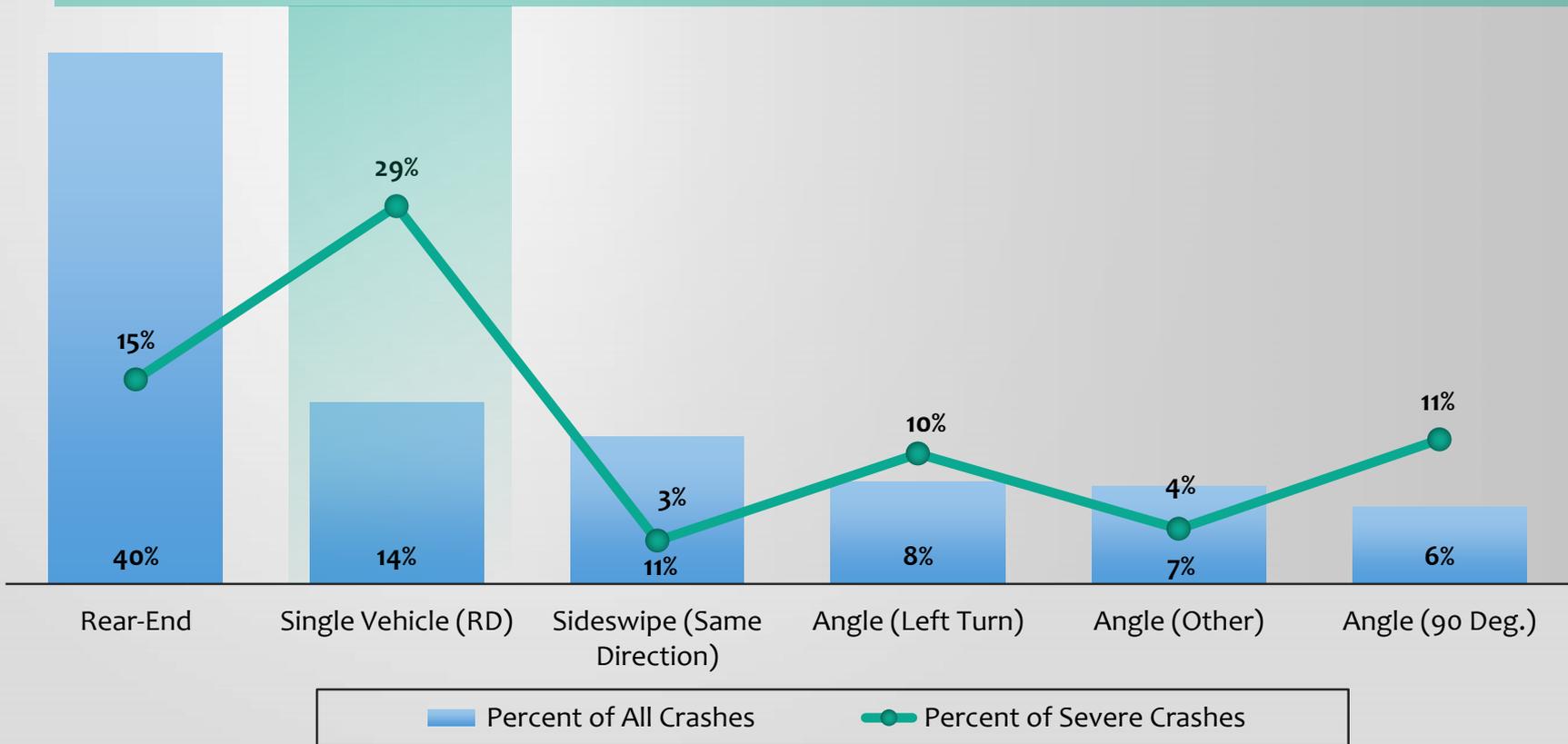
Srinath Ravulaparthy *(Oakland, CA)*

Brent Selby *(Oakland, CA)*

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Short-Term Safety Planning Tool Overview

Short-Range Safety Planning

1. Develop Benchmarks

2. Evaluate Crash Trends and Characteristics

3. Identify and Evaluate Focus Crash Types

First St.

Legend
- Fatal
- Injury
- C Dry Clear
- W Wet
- D Daylight
- L Dark with Streetlight
- N Dark without Light

4. Identify and Implement Countermeasures

Focus Crash Types

Frequency and Severity

A scatter plot with axes labeled "Crash Severity" (vertical) and "Crash Frequency" (horizontal), plotting the following crash types:

- Motorcycles
- Unrestrained Occupants
- Pedestrians
- Alcohol and/or Other Drugs
- Alcohol (No Drugs)
- Unlicensed Drivers
- Roadway Departure
- Bicycles
- Speed-Related
- Commercial Vehicles
- Older Drivers (65+)
- Inattentive Drivers
- Young Drivers (15-25)
- Aggressive Driving
- Intersections

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Focus Crash Types (continued)

Route Type (Single-Vehicle Roadway Departure Crashes)

Legend:
- % of Total Crashes
- % of Severe Crashes

Route Type	% of Total Crashes	% of Severe Crashes
Municipal	37%	23%
County	35%	47%
Federal	11%	15%
State	8%	8%
Interstate	7%	6%
Private Property	1%	2%

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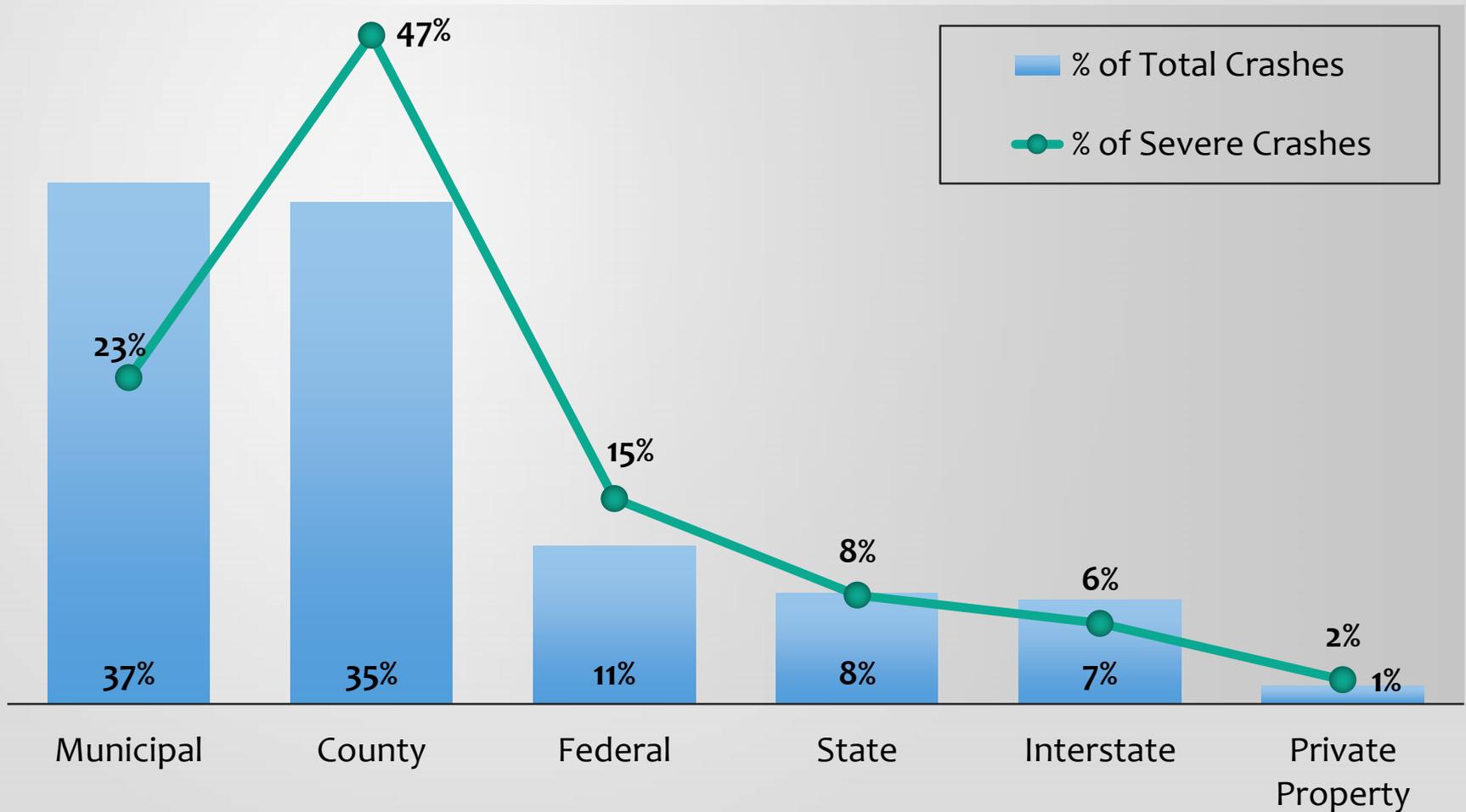
Short-Term Safety Planning Tool

Short-Range Safety Planning

- **Develop Benchmarks**
  - MAP-21
  - How are we doing?

- **Evaluate Characteristics**
  - 5-Ws

- **Identify and Evaluate Focus Crash Types**
  - Geographic distribution
  - Risk Factors
  - Type

- **Identify and Implement Countermeasures**

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Long-Range Safety Planning Tool Overview

Long-Range Safety Planning

1. Identify Long-Range Planning Scenarios

2. Use Formulas to Predict Crash Impacts of Alternatives

3. Evaluate Alternatives

4. Prioritize and Implement Projects

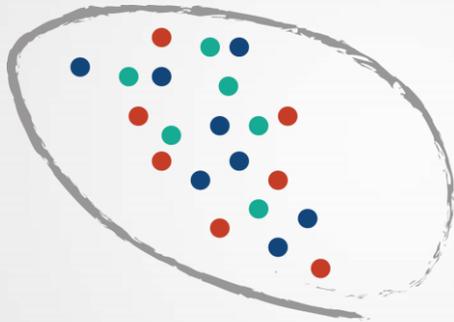CAMBRIDGE SYSTEMATICS

Model Development

Long-Range Safety Planning

- Literature Review

- Collected/organized variables for Huntsville MPO area

- Variables tested

  - ✓ Roadway mileage (by type)
  - ✓ VMT (by roadway type)
  - ✓ V/C ratio (by roadway type)
  - ✓ Speed
  - ✓ Number of lanes

  - ✓ Intersection and signal density
  - ✓ Percent of population male
  - ✓ Retail and nonretail employment density
  - ✓ Median household income
  - ✓ Student enrollment

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Technical Process Overview

Collect

Organize

Predict

Evaluate

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Model Development (continued)

$$\mu = e^{\wedge}(\alpha + \beta 1 X1 + \beta 2 X2 + \cdots)$$

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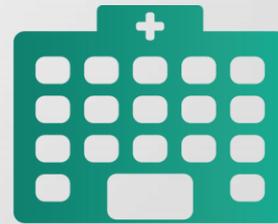
Sensitivity of Fatal and Serious Injury Crashes to Changes in Input Variables

Long-Range Safety Planning

Fatal and Serious Injury Crashes (Base Prediction = 1,138)		Primary Road VMT	Posted Speed	Secondary Road Miles	Local Road Miles	Average Number of Lanes	Inters. Den.	Number of Signals	Male Pop. Percent	Non-Retail Emp. Density
Average		4,119	34	0.41	10	3	110	0.79	50	901
Percent Change in Input Variable and Crash Outcome	-25%	-3%	-30%	-6%	-12%	10%	-3%	-4%	-12%	0%
	-10%	-1%	-12%	-3%	-5%	4%	-1%	-2%	-5%	0%
	10%	1%	13%	3%	6%	-4%	1%	2%	5%	0%
	25%	3%	32%	7%	16%	-9%	3%	4%	14%	0%

Key Predictor Variables:
Posted speed, local roadway mileage, male population

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How to Use Models

	Baseline Crashes (2010-2012)	Predicted Crashes (3-yr. period)	% Change	Change in Cost of Crashes
Total Crashes	29,478	29,199	-0.9%	$ (7,092,380)
Fatal and Serious Injury Crashes	1,138	1,201	5.5%	$ 15,551,186
Injury Crashes	3,925	4,077	0.6%	$ 14,750,342
Property Damage Only Crashes	24,988	24,698	-1.2%	$ (3,848,940)

TAZ	Total VMT	Primary Roa	Local Road	Highway V/	Primary Ro	Local Road	Speed (log)	Primary Ro Mileage	Secondary F Mileage	Local Road	Average Nu Lanes (HPM	Intersection	Number of
1	4522.5	0.0	3616.4	0.0	0.0	0.2	4.6	0.0	0.0	1.3	4.3	263.7	5.2
2	5463.1	0.0	3673.5	0.0	0.0	0.4	4.5	0.0	0.0	1.1	4.2	448.2	6.0
3	8492.7	0.0	9232.2	0.0	0.0	0.5	6.0	0.0	0.0	1.7	5.2	520.1	2.3
4	8978.2	0.0	10996.4	0.0	0.0	0.3	5.3	0.0	0.0	2.7	7.1	701.5	2.6
5	2579.1	0.0	4495.1	0.0	0.0	0.3	5.5	0.0	0.0	0.8	8.8	309.5	0.9
6	52200.0	2575.2	5114.4	0.9	0.0	0.1	4.7	0.0	0.0	0.7	1.3	5.9	297.6	2.5
7	1311.1	0.0	1861.1	0.0	0.0	0.2	3.8	0.0	0.0	0.6	8.0	873.9	0.0

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What MPOs Thought

- Short-range process is familiar – yet cautious to apply

- Long-range process looks valuable
  - Quantitatively consider safety as a prioritization factor
  - Comfortable with the relative comparison
  - Push the tool to influence investments

- Application
  - Less data is easier
  - Simpler tool is easier

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Next Steps

This Project

Next Steps

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