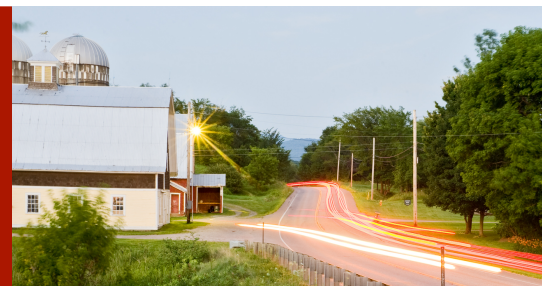


Quantifying Vermont Transportation Safety Factors

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ABSTRACT

VTrans and its partners have selected traffic safety priority areas in their Strategic Highway Safety Plan. In this project, researchers focus on three of these prioritized critical emphasis areas: 1) Keeping vehicles on the roadway, 2) Young drivers, 3) Keeping drivers alert.

This project has the following objectives:

1. Analyze factors which contribute to “departure from lane” crashes by severity (this includes the at-fault driver in a head-on crash as well as drivers in single vehicle crashes).
2. Analyze factors which contribute to “young driver” crashes by fault.

Unique Methods:

1. Combine the lane departure crashes in order to indirectly address distracted driving (only 0.5% of crashes cite technology related distractions).
2. Use of traditional severity as well as a combined fatal/incapacitating injury variable to address small database size in Vermont.

ACKNOWLEDGMENTS

This research was conducted with funding from the Vermont Agency of Transportation and the United States Department of Transportation through the University Transportation Center at the University of Vermont.

We gratefully acknowledge the earlier work of Richard Watts and Chen Zhang on this project.

DATA

The data used for this project includes all police-reported crashes in Vermont between 2003 and 2008. Young drivers are defined as those under 21 years old.

Table 1. Police-reported Crashes in Vermont 2003-2008

	N	%
Total Crashes	84,591	.
Total single-vehicle crashes	25,546	30.4
Total multi-vehicle crashes	58,168	69.5
Total departure from lane crashes	28,859	34.1
Total crashes involving large vehicles	5,220	6.2
Total crashes involving bicycles and pedestrians	1,457	1.7

Table 1. Police-reported Crashes in Vermont 2003-2008 (cont.)

	N	%
Total crashes involving young drivers	20,186	23.9
Young drivers at fault	16,488	76.1
Total fatal crashes	420	0.5
Total fatal crashes involving young drivers	95	0.1

Young Driver Fault Model

We used binary logistic regression to determine factors that contribute to young drivers being at fault in crashes. The response variable in this model is fault and the sampling unit is driver (N=20,345). We assigned fault based on the crash contributing factors. Young drivers were at fault in 76% of crashes (16,488) in which they were involved. 24% (5,098) of young driver crashes resulted in an injury or fatality. Table 2 presents the odds ratios of each variable determined to significantly affect the probability of a young driver being at fault in a crash.

Table 2. Young Driver Fault Model Odds Ratio Estimates

Effect	Point Estimate
Pavement (not paved vs. paved)	2.93
Horizontal curve (Curved vs. Straight)	2.09
Seatbelt worn (no vs. yes)	1.87
Young passenger present (presence of passenger under 21 vs. presence of passenger over 21)	1.47
Light (night vs. day)	1.35
Road surface conditions (snow/ice/slush vs. none)	1.24
Gender (female vs. male)	0.78

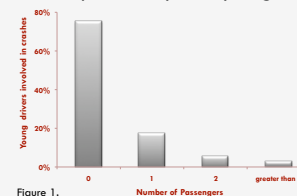


Figure 1.

Table 3. Common Contributing Factors of Fatal Crashes Involving Young Drivers

Contributing Factor	N	%
Excessive speed	41	43.1
Failure to stay in lane	41	43.1
Operating vehicle carelessly	16	16.8
Under the influence of medication/drugs/alcohol	9	9.5
Total	95	.

Departure from Lane Severity Model

The departure from lane dataset includes all drivers involved in single vehicle crashes and at fault drivers involved in head-on collisions (N=28,859). We used binary logistic regression to determine the factors that increase the probability of a fatal or incapacitating crash. In this model, the response variable is crash severity and crashes are classified as either 'fatal/incapacitating' or 'other'. Factors shown to significantly affect crash severity are shown in Table 4.

Table 4. Departure from Lane Severity Model Odds Ratio Estimates

Effect	Point Estimate
Gender (female vs. male)	0.80
Light (night vs. day)	0.87
Pavement (not paved vs. paved)	0.81
Road surface conditions (snow/ice/slush vs. none)	0.41
Horizontal curve (curved vs. straight)	1.47

Table 5. Common Contributing Factors of Fatal and Incapacitating Departure from Lane Crashes

Contributing Factor	N	%
Excessive speed	10,927	37.8
Failure to stay in lane	9,260	32.1
Inattention	2,228	7.7
Under the influence of medication/drugs/alcohol	2,181	7.6