

## Major Crashes in Vermont, 1999-2003

### Data Analysis for Strategic Highway Safety Plan By Emphasis Area

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## **I. Introduction**

Data analysis for Vermont's Strategic Highway Safety Plan was conducted for seven emphasis areas: Keeping Vehicles on the Roadway; Instituting Graduated Licensing for Young Drivers; Improving the Design and Operation of Highway Intersections; Increasing Seat Belt Usage and Improving Airbag Effectiveness; Reducing Impaired Driving; Curbing Aggressive Driving and Keeping Drivers Alert. For each emphasis area, except Seat Belt Usage, a subset of major crashes from 1999-2003 was defined in Phase 1 of the SHSP project. An extensive analysis of Vermont's crash data was conducted for each subset by compiling data for elements surrounding the crashes to better understand the possible causes of the crashes and the resulting fatalities and/or severe injuries. For the Seat Belt emphasis area the analysis revolved around all 2,354 major crashes from 1999-2003.

Elements surrounding the crashes were categorized into three main areas: environment and roadways, person characteristics and vehicle characteristics. Environment and roadways examine the relationship of environment and road conditions to the crashes and includes such topics as weather, road types and surfaces, roadway curvature, geographic subdivisions, and time distribution. Person characteristics examine aspects of the crashes related to operators, passengers, pedestrians and bicyclists. Most of the analysis conducted in this study looked at information relating to operators, however, in some emphasis areas some analysis was conducted on passengers, pedestrians and bicyclists. Lastly, the area of vehicle characteristics focuses on crash involvement of various vehicle types. Analysis on vehicles was minimal in this study since most motor vehicle crashes are caused by operator actions rather than motor vehicle malfunctions or causes. Also, included in the analysis where the information was available was a comparison of the findings for the emphasis areas to distributions of findings for all reported crashes for 2003.

In addition to the crash data analysis, fatal crash reports for the period May 31, 2004 to May 31, 2005 were examined to supplement the analysis of the selected emphasis areas. Common events and circumstances as they related to each particular emphasis area were summarized to determine if information or patterns emerged that were not evident in the quantitative analysis.

## II. Emphasis Area – Keeping Vehicles on the Roadway

The data analysis for emphasis area, Keeping Vehicles on the Roadway, involved examining Vermont crash data from 1999-2003 for 901 major run-off the road crashes. Running off the road was defined from the data if a vehicle overturned or collided with a tree/large bush, pole/sign, guard rail/curb, other fixed object or ledge/boulder. This section of the report presents findings from the analysis on run-off the road crashes.

### Environment and Roadways

Table 1.1 below presents the number of run-off the road crashes by county, as well as the average annual rate per 1,000 population and the average annual rate per 100 million vehicle miles traveled. Chittenden County had the highest number (130) of crashes followed by Windham (101), Franklin (86) and Windsor (85) counties. However, the highest rate per population was found in Essex county (.59) followed by Grand Isle (.49) and Windham (.46) counties. Essex County (5.4) also had the highest rate per vehicle miles traveled followed by Grand Isle (4.1) and Orleans (4.0) counties. The lowest rates per population were found in Chittenden (.18) and Rutland (.19) counties. Chittenden (1.7), Rutland (1.7), Windsor (1.7) and Washington (1.8) counties had the lowest rates per vehicle miles traveled. This is depicted graphically below in Figures 1.1 and 1.2.

An examination of the number and percent of major run-off the road crashes and all crashes for 2003 by highway class is presented in Table 1.2 and Figure 1.3 below. The highest proportion of run-off the road crashes occurred on state highways at 43% (387 crashes); a fairly large number also happened on city/village roadways, 272 crashes or 30.2%. Interstate and town highways had fewer crashes at 111 (12.3%) and 120 (13.3%), respectively. In comparing the distribution for run-off the road crashes to the 2003 distribution for all crashes, some notable differences can be seen. Far more run-off the road crashes occur on city/village roads (30.2%) compared to all crashes (12.5%). A slightly higher percent (12.3%) of major run-off the road crashes occurred on interstate highways than did all crashes in 2003 (8.7%). State highways for both categories had nearly the same proportion, 43% for run-off road crashes and 44.3% for 2003 crashes. Fewer run-off the road crashes took place on town roads (13.3%) compared to 21.5% for all crashes in 2003.

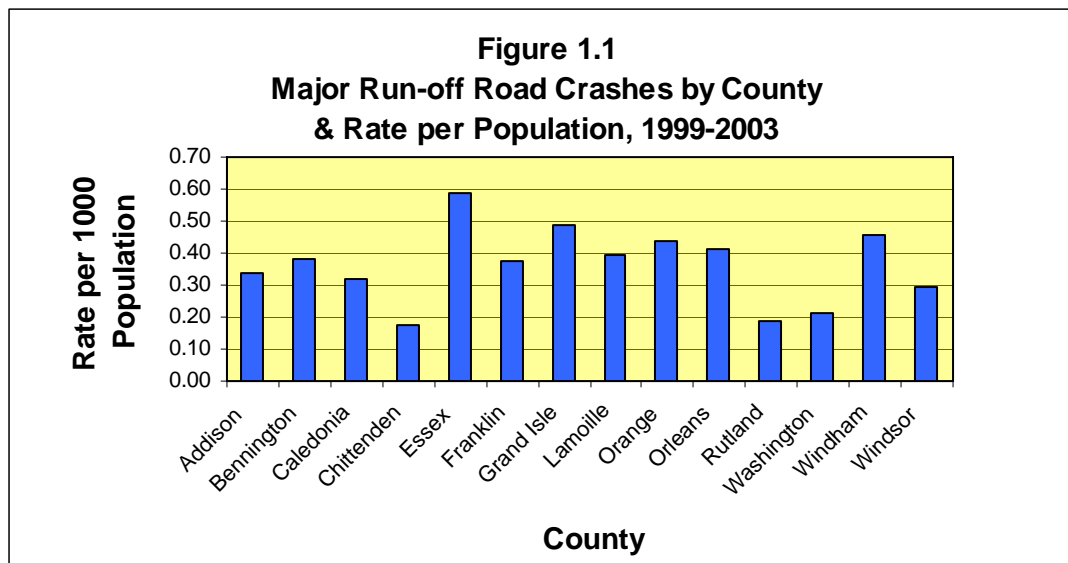
Looking at the crash data in regards to the time of day shows that a large portion of run-off the road crashes occurred during the nighttime hours of 6 pm to 6 am, 43.1% (387 crashes). This is shown in Table 1.3 and Figure 1.4 below. In looking at the distribution for all crashes in 2003, proportionally far fewer occurred during these nighttime hours (24.0%). Proportionally more run-off the road crashes occurred in the categories of evening, night and early morning compared to 2003 crashes. Conversely, the distribution for all 2003 crashes shows that proportionally more crashes occur during the daytime categories of morning, midday and afternoon than in run-off the road crashes. Many crashes occurred during the afternoon hours of 2-6 pm in both run-off the road crashes and all crashes-2003 at 27.2% and 32.7%, respectively.

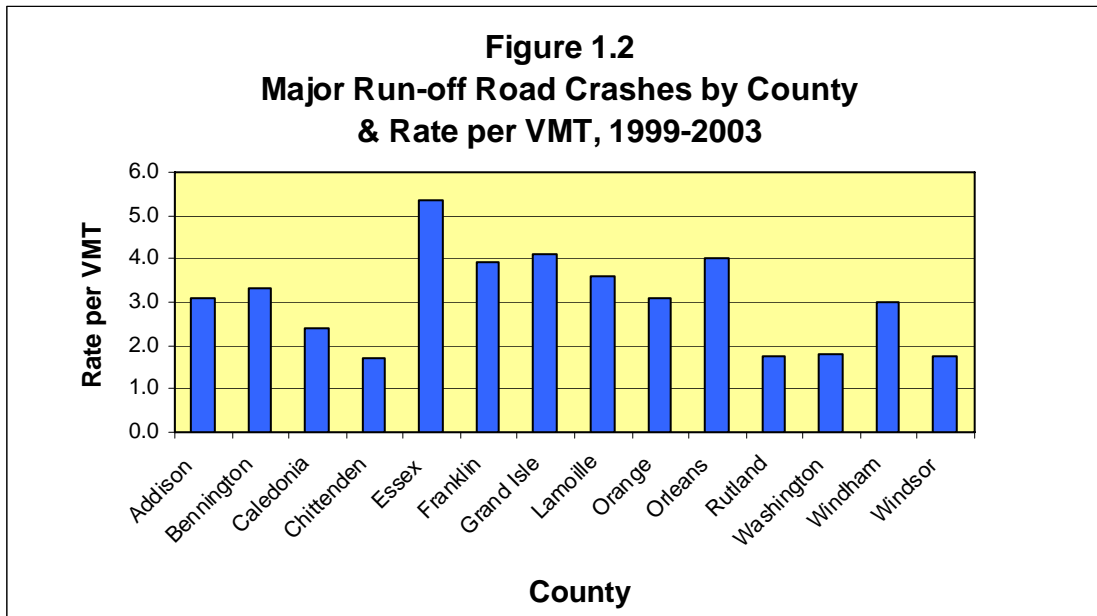
**Table 1.1. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crashes by County, 1999-2003  
Number, Rate per Population & Rate per Vehicle Miles Traveled**

County	N	%	Average Annual Rate* per Population	Average Annual Rate** per Vehicle Miles Traveled
Addison	61	6.8%	0.34	3.1
Bennington	70	7.8%	0.38	3.3
Caledonia	47	5.2%	0.32	2.4
Chittenden	130	14.4%	0.18	1.7
Essex	19	2.1%	0.59	5.4
Franklin	86	9.5%	0.38	3.9
Grand Isle	17	1.9%	0.49	4.1
Lamoille	46	5.1%	0.39	3.6
Orange	62	6.9%	0.44	3.1
Orleans	55	6.1%	0.42	4.0
Rutland	60	6.7%	0.19	1.7
Washington	62	6.9%	0.21	1.8
Windham	101	11.2%	0.46	3.0
Windsor	85	9.4%	0.30	1.7
State Total	901	100.0%	0.30	2.5

\*Rate per 1,000 population.

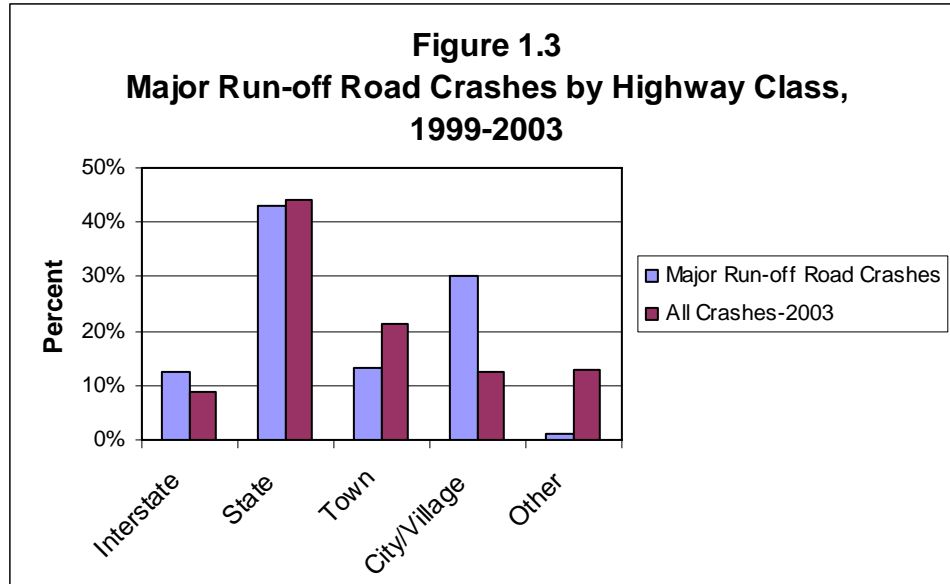
\*\*Rate per 100 Million VMT





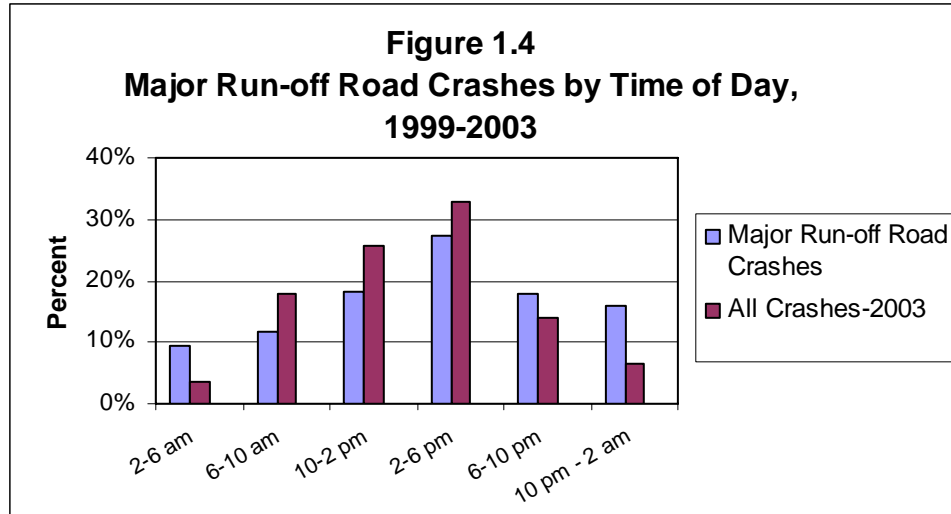
**Table 1.2. Emphasis Area - Keeping Vehicles on the Roadway**  
**Major Run-off Road Crashes by Highway Class, 1999-2003**

Highway Class	N	All Crashes 2003	
		%	%
Interstate	111	12.3%	8.7%
State	387	43.0%	44.3%
Town	120	13.3%	21.5%
City/Village	272	30.2%	12.5%
Other	11	1.2%	12.9%
<b>Total</b>	<b>901</b>	<b>100.0%</b>	<b>100.0%</b>



**Table 1.3. Emphasis Area - Keeping Vehicles on the Roadway**  
**Major Run-off Road Crashes by Time of Day, 1999-2003**

Time of Day	N	%	All Crashes 2003
			%
Early Morn (2-6 am)	85	9.5%	3.6%
Morning (6-10 am)	104	11.6%	17.8%
Midday (10 am-2 pm)	162	18.1%	25.6%
Afternoon (2-6 pm)	244	27.2%	32.7%
Evening (6-10 pm)	159	17.7%	13.9%
Night (10 pm - 2 am)	143	15.9%	6.5%
<b>Total</b>	<b>897</b>	<b>100.0%</b>	<b>100.0%</b>



Information on when major run-off the road crashes and all crashes-2003 occurred by day of week is presented in [Table 1.4](#) and [Figure 1.5](#). Interestingly, a higher proportion of run-off the road crashes occurred during the weekend, 20.1% (181 crashes) on Saturday and 17.9% (161) crashes on Sunday. Friday had the next largest percent at 15.2% (137 crashes). The smallest number of crashes (79) occurred midweek on Wednesday. Almost the same number or percent occurred on Monday, Tuesday and Thursday at 12.4%, 12.8% and 12.9%, respectively for run-off the road crashes. In comparison, the distribution for all crashes-2003 shows that proportionally fewer crashes happened on weekends while more happened during the week. Specifically, for all crashes-2003 there were 13.7% on Saturday and 11.6% on Sunday, smaller proportions than found for run-off the road crashes on those days. An average of 14.9% of crashes occurred on a weekday for all crashes-2003, a higher proportion than that found for run-off the road crashes.

**Table 1.4. Emphasis Area - Keeping Vehicles on the Roadway**  
**Major Run-off Road Crashes by Day of Week, 1999-2003**

Day of Week	N	%	All Crashes 2003
			%
Sunday	161	17.9%	11.6%
Monday	112	12.4%	14.1%
Tuesday	115	12.8%	15.0%
Wednesday	79	8.8%	14.5%
Thursday	116	12.9%	14.4%
Friday	137	15.2%	16.7%
Saturday	181	20.1%	13.7%
Total	901	100.0%	100.0%

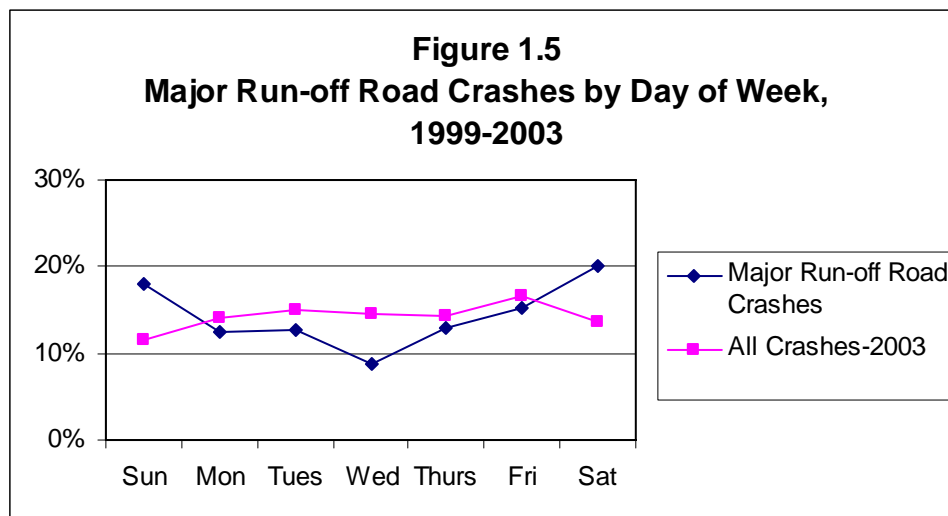


Table 1.5 below shows the number of major run-off the road crashes by time of day and day of week. Also, the number of crashes per hour is computed for each time period by day of week. Not surprisingly, the highest rates per hour by day were found on Saturday (7.5) and Sunday (6.7) while the lowest was found on Wednesday (3.3). For all days except Saturday, the highest crash rates per hour were found in the afternoon (2-6 pm) time period. The time periods with the highest rates per hour for Saturday were midday (10 am-2 pm) (10.0) and afternoon (2-6 pm) (9.5); in addition the crash rates per hour for Saturday evening (8.0) and Saturday night (8.5) were fairly high relative to other time periods as well. For Sunday the highest crash rate per hour was found in the afternoon (2-6 pm) at 13.3 followed by midday (10 am-2 pm) at 7.5 crashes per hour. The lowest crash rates for Tuesday through Saturday were found in the early morning hours from 2-6 am ranging from a low of 1.3 on Thursday to 4.3 on Saturday. On Monday the lowest number of crashes per hour (2.0) was found at night (10 pm-2 am) while on Sunday the lowest number (3.3) was found during the morning between the hours of 6-10 am.

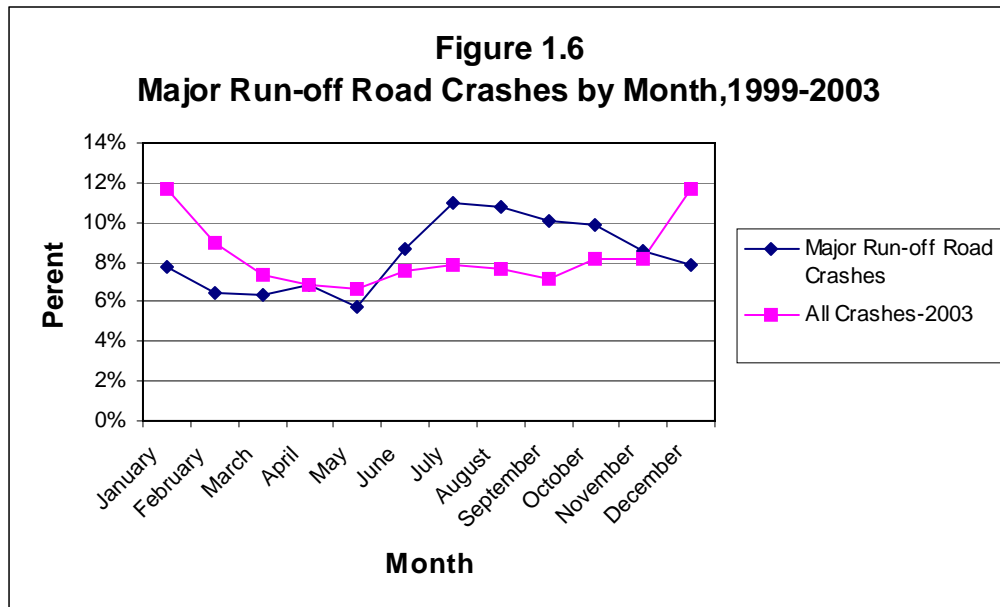
The number and percent of major run-off the road crashes by month are presented in Table 1.6 and Figure 1.6 below. Included as well is a distribution by month for all crashes-2003. Proportionally more major run-off the road crashes occurred during the months of July (11.0%), August (10.8%), September (10.1%) and October (9.9%), all ranging above the monthly average of 8.3%. June (8.7%) and November (8.5%) were slightly above the monthly average for the period while the months December through May were all below the average with percentiles ranging from 5.8% in May to 7.9% in December. Interestingly, the distribution for all crashes-2003 is quite different with the highest proportions seen in December (11.7%) and January (11.7%), followed by February at 9%. The percentages for the rest of the year, March through November, were fairly consistent with percentages averaging around 7.5%

**Table 1.5. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Crashes, Time of Day by Day of Week, 1999-2003**

Time of day	Day of Week															
	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Total	
	Crashes		Crashes		Crashes		Crashes		Crashes		Crashes		Crashes		Crashes	
	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.
Early morning (2-6 am)	10	2.5	11	2.8	8	2.0	5	1.3	11	2.8	17	4.3	23	5.8	85	21.3
Morning (6-10 am)	13	3.3	13	3.3	15	3.8	9	2.3	21	5.3	20	5.0	13	3.3	104	26.0
Midday (10 am-2 pm)	21	5.3	22	5.5	13	3.3	21	5.3	15	3.8	40	10.0	30	7.5	162	40.5
Afternoon (2-6 pm)	31	7.8	29	7.3	21	5.3	37	9.3	35	8.8	38	9.5	53	13.3	244	61.0
Evening (6-10 pm)	28	7.0	21	5.3	11	2.8	21	5.3	23	5.8	32	8.0	23	5.8	159	39.8
Night (10 pm-2 am)	8	2.0	17	4.3	10	2.5	23	5.8	32	8.0	34	8.5	19	4.8	143	35.8
Total	111	4.6	113	4.7	78	3.3	116	4.8	137	5.7	181	7.5	161	6.7	897	37.4

**Table 1.6. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crashes by Month, 1999-2003**

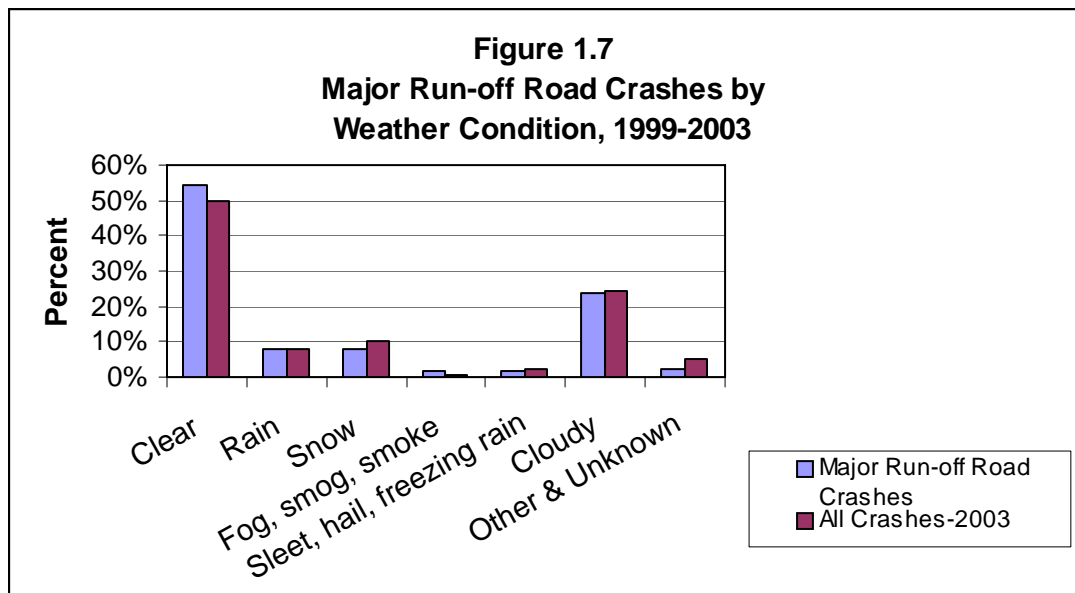
Month	N	%	All Crashes 2003
			%
January	70	7.8%	11.7%
February	58	6.4%	9.0%
March	57	6.3%	7.4%
April	62	6.9%	6.8%
May	52	5.8%	6.6%
June	78	8.7%	7.6%
July	99	11.0%	7.9%
August	97	10.8%	7.7%
September	91	10.1%	7.2%
October	89	9.9%	8.2%
November	77	8.5%	8.2%
December	71	7.9%	11.7%
Average	75		
Total	901	100.0%	100.0%



Weather conditions for major run-off the road crashes and all crashes-2003 are presented below in Table 1.7 and Figure 1.7. A large number of run-off the road crashes occurred under clear or cloudy conditions, 705 or 78.3%. Fewer happened under the conditions of rain (7.8%) or snow (8.1%). Only 31 (3.5%) run-off the road crashes occurred during fog, smog, smoke or sleet, hail, freezing rain. Figure 1.7 clearly shows that the distribution for all crashes-2003 is nearly the same as the distribution for run-off the road crashes with only slight differences between the two. A slightly lower percentage of 2003 crashes occurred under clear conditions (49.7%) while almost exactly the same percentages occurred under clouds (24.4%) or rain (8.0%).

**Table 1.7. Emphasis Area - Keeping Vehicles on the Roadway  
Weather Conditions in Major Run-off Road Crashes, 1999-2003**

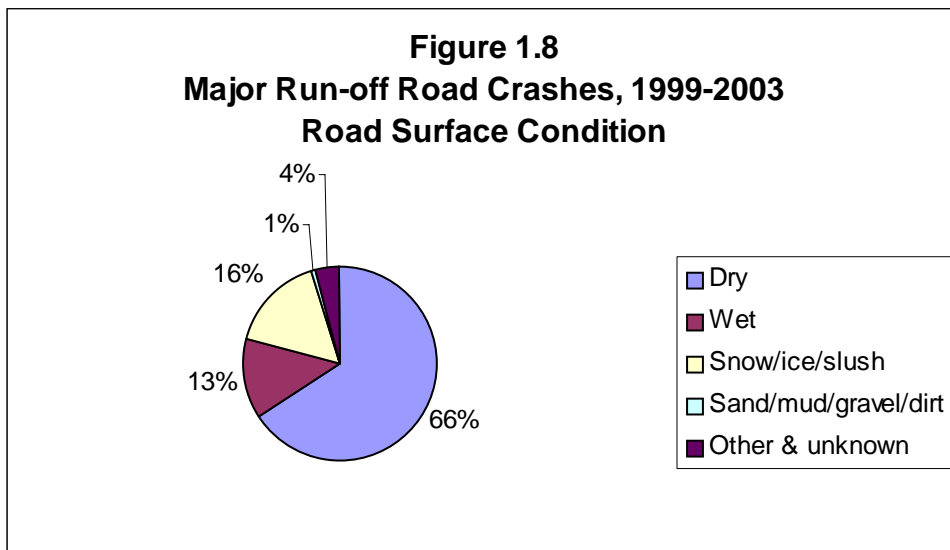
Weather	N	All Crashes 2003	
		%	%
Clear	489	54.3%	49.7%
Rain	70	7.8%	8.0%
Snow	73	8.1%	10.0%
Fog, smog, smoke	14	1.6%	0.7%
Sleet, hail, freezing rain	17	1.9%	2.4%
Cloudy	216	24.0%	24.4%
Other & Unknown	21	2.3%	5.0%
Total	900	100.0%	100.0%



An examination of road surface condition shows that 589 (65.4%) of the major run-off the road crashes occurred on dry road surfaces. Considerably fewer of these crashes happened on snow/ice/slush (16.3%) or wet road surfaces (13.4%). Comparing the run-off the road distribution to the all crash-2003 distribution, proportionally less (55.9%) crashes in 2003 occurred on dry surfaces while proportionally more occurred on snow/ice/slush (21.9%) or wet surfaces (17.0%). This is shown in Table 1.8, Figure 1.8 and Figure 1.9 below.

**Table 1.8. Emphasis Area - Keeping Vehicles on the Roadway  
Road Surface Condition for Major Run-off Road Crashes, 1999-2003**

Surface Condition	N	%	All Crashes 2003
			%
Dry	589	65.4%	55.9%
Wet	121	13.4%	17.0%
Snow/ice/slush	147	16.3%	21.9%
Sand/mud/gravel/dirt	8	0.9%	0.9%
Other & unknown	35	3.9%	4.4%
Total	900	100.0%	100.0%



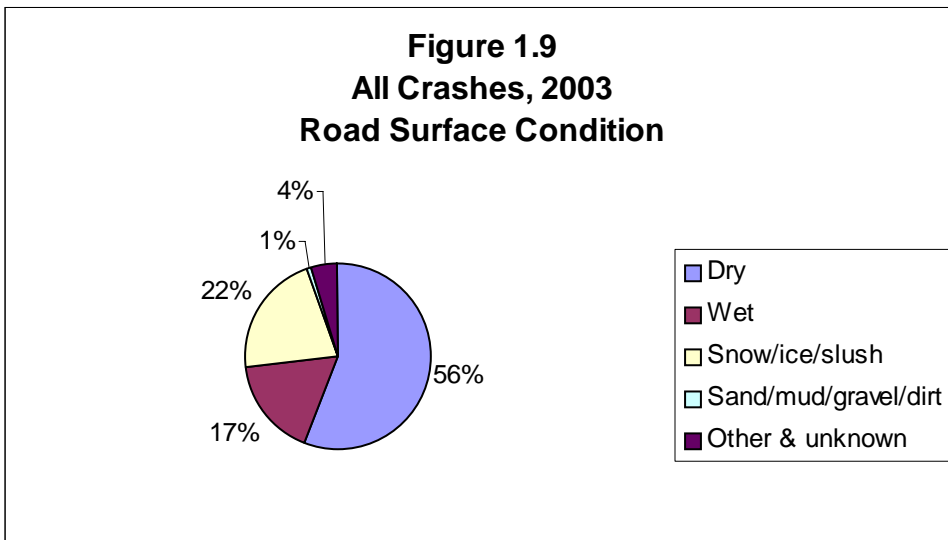


Table 1.9 below presents the distributions for lighting conditions for major run-off the road crashes and all-crashes 2003. Not surprisingly, around 44.9% of run-off the road crashes happened at dusk, while it was dark or while it was dark with street lights. A larger percentage occurred at dawn or during the day, 54.5%. Proportionally, more all-crashes 2003 (71.8%) occurred under these same lighting conditions, dawn or day, which is not surprising since proportionally more of these crashes happened during the day than did run-off the road crashes. Under lighting conditions of dusk, dark or dark with street lights, proportionally fewer (25.7%) took place in 2003 for all crashes than in the run-off the road category.

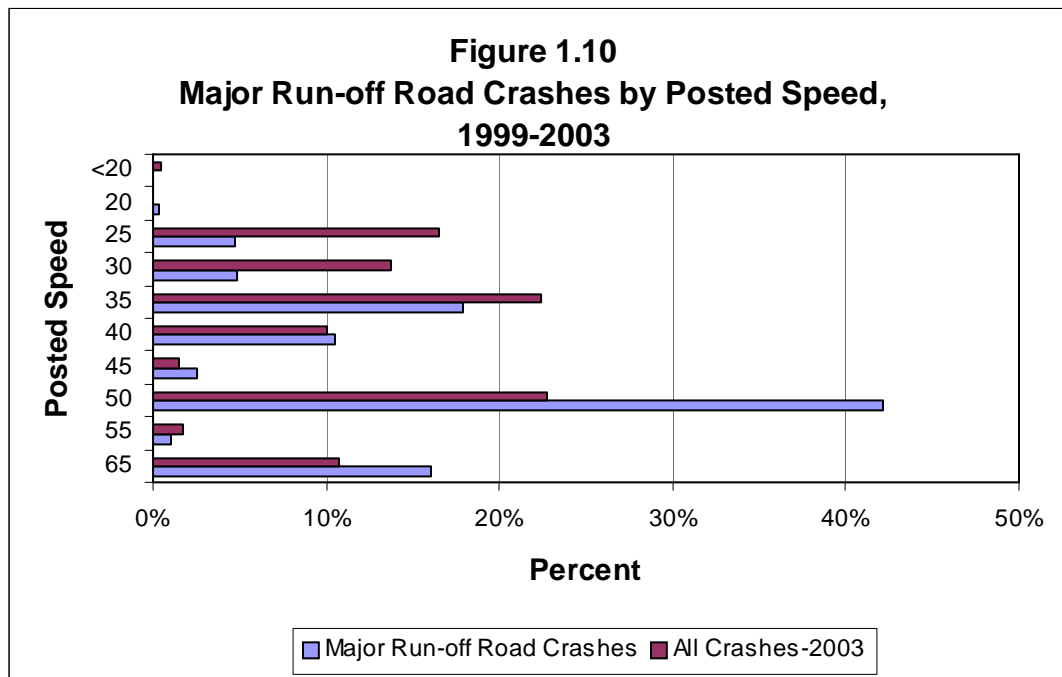
**Table 1.9. Emphasis Area - Keeping Vehicles on the Roadway  
Lighting Conditions in Major Run-off Road Crashes, 1999-2003**

Lighting Condition	N	%	All Crashes 2003
			%
Dawn	21	2.3%	1.3%
Day	469	52.2%	70.5%
Dusk	44	4.9%	3.0%
Dark	330	36.7%	13.7%
Street Lights	30	3.3%	9.0%
Other/Unknown	5	0.6%	2.5%
Total	899	100.0%	100.0%

The analysis for posted speed shows that over half (59.3%) of the run-off the road crashes with available data occurred where posted speed limits were 50 miles per hour or above. The proportion was much lower for all crashes-2003 at 35.2%. Conversely, 64.8% of the crashes in 2003 occurred in the lower posted speed categories of 45 miles per hour or below while only 40.7% of the major run-off the road crashes occurred in this below 45 mph category. This is presented below in Table 1.10 and Figure 1.10. Note that 108 crashes had missing data on posted speed.

**Table 1.10. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crashes by Posted Speed, 1999-2003**

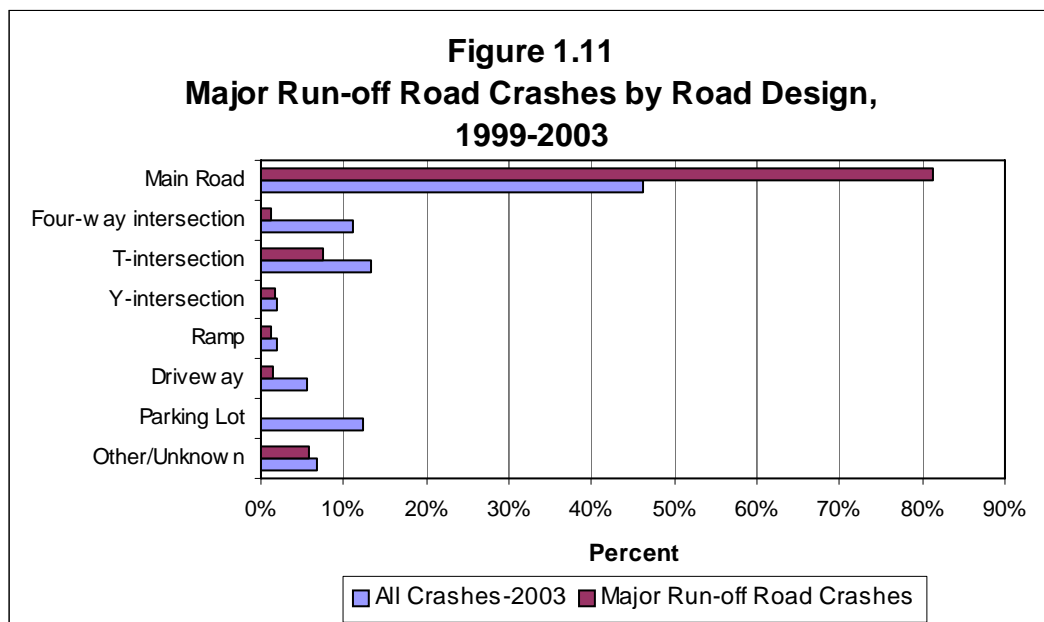
Posted Speed	N	All Crashes 2003	
		%	%
<20	0	0.0%	0.5%
20	2	0.3%	0.1%
25	37	4.7%	16.5%
30	38	4.8%	13.7%
35	142	17.9%	22.4%
40	83	10.5%	10.1%
45	20	2.5%	1.5%
50	335	42.2%	22.8%
55	8	1.0%	1.7%
65	128	16.1%	10.7%
Total	793	100.0%	100.0%



Findings for the analysis of road design indicate that run-off the road crashes frequently occurred on a main road (81.2%) or at an intersection (10.3%). Statistics on road design are presented below in [Table 1.11](#) and [Figure 1.11](#). Of all intersection types, T-intersections were more problematic for run-off the road crashes with 7.5% occurring at these road design locations. In comparison, far fewer of the all crashes-2003 occurred on a main road (46.2%) while proportionally more happened at intersections (26.4%).

**Table 1.11. Emphasis Area - Keeping Vehicles on the Roadway  
Road Design in Major Run-off Road Crashes, 1999-2003**

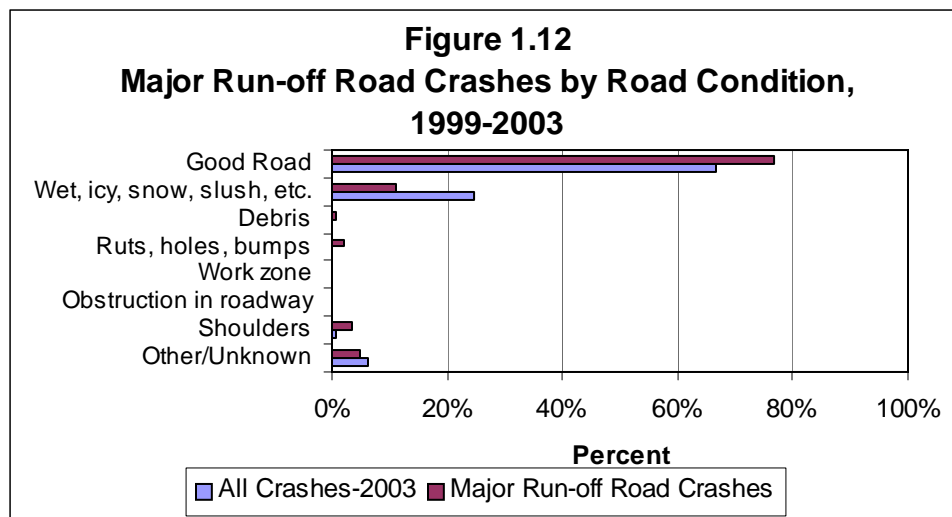
Road Design	N	%	All Crashes 2003
			%
Main Road	730	81.2%	46.2%
Four-way intersection	11	1.2%	11.1%
T-intersection	67	7.5%	13.3%
Y-intersection	14	1.6%	2.0%
Traffic circle/roundabout	0	0.0%	0.2%
Five-point, or more	0	0.0%	0.2%
Ramp	12	1.3%	2.0%
Driveway	13	1.4%	5.6%
RR Crossing	0	0.0%	0.2%
Parking Lot	0	0.0%	12.4%
Other/Unknown	52	5.8%	6.8%
Total	899	100.0%	100.0%



A large proportion (76.8%) of the major run-off the road crashes with available data occurred on good road conditions. Surprisingly, only 11.1% happened on wet, icy, snow, slush, etc. Still fewer occurred on roads with ruts, holes, bumps (2.2%) and shoulders (3.5%). This information is shown below in [Table 1.12](#) and [Figure 1.12](#). In comparison, 66.8% of the crashes in 2003 took place on good roads, a lower proportion than for crashes running off the road. Also, almost 25% of 2003 crashes happened on roads characterized by wet, icy, snow, slush, etc conditions, a considerably higher proportion than that found for run-off the road crashes. Note that there were 20 run-off the road crashes with missing road condition data.

**Table 1.12. Emphasis Area - Keeping Vehicles on the Roadway  
Road Condition in Major Run-off Road Crashes, 1999-2003**

Road Condition	N	%	All Crashes 2003
			%
Good Road	677	76.8%	66.8%
Wet, icy, snow, slush, etc.	98	11.1%	24.7%
Debris	7	0.8%	0.1%
Ruts, holes, bumps	19	2.2%	0.6%
Work zone	4	0.5%	0.5%
Obstruction in roadway	1	0.1%	0.4%
Shoulders	31	3.5%	0.6%
Other/Unknown	44	5.0%	6.3%
Total	881	100.0%	100.0%



Information on roadway curvature degrees by curve length in miles for major run-off the road crash is presented below in Table 1.13. Of the 901 run-off the road crashes, there were 186 crashes with available data on curvature degrees. Of these 186 crashes, almost 84% occurred in locations on roadways where curvature degrees were in the categories of 2.01-5 and 5.01-10. Of the 109 crashes where the curvature degrees were in the 2.01-5 range, most (82.5%) were in the shorter ranges of .1 or below in curve length in miles. Specifically, 47 crashes (43.1%) occurred in the smallest range of .01-.05 and 43 (39.4%) were in the category of .051-.1. In the next larger category of roadway curvature degrees of 5.01-10, almost half, 23 of the 47 occurred in the smallest curve length in miles category of .01-.05 while 31.9% were in the .051-.1 range and 19.1% were in the range of .101-.2. Closer examination shows that only 7% of the 186 crashes were in the ranges above 14 degrees in curvature roadway and very few (4 crashes) happened on roadways where curve length in miles was greater than .201.

**Table 1.13. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crashes - Curvature Degrees by Curve Length in Miles, 1999-2003**

Curvature Degrees*	Curve Length in Miles										Total	
	0.01-0.05		0.051 - 0.1		0.101-0.2		0.201-0.3		>0.3			
	N	%	N	%	N	%	N	%	N	%	N	%
2.01-5	47	43.1%	43	39.4%	15	13.8%	3	2.8%	1	0.9%	109	100.0%
5.01-10	23	48.9%	15	31.9%	9	19.1%	0	0.0%	0	0.0%	47	100.0%
10.01-14	7	41.2%	2	11.8%	8	47.1%	0	0.0%	0	0.0%	17	100.0%
14.01-20	4	44.4%	3	33.3%	2	22.2%	0	0.0%	0	0.0%	9	100.0%
20.01-30	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%
>30	1	50.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%
Total	82	44.1%	66	35.5%	34	18.3%	3	1.6%	1	0.5%	186	100.0%

\*Negative values for curvature degrees were converted to an absolute value.

The cross tabulation for curvature degrees by travel lane width is shown in Table 1.14 below. For crashes on roadways characterized by curvature degrees in the 2.01-5 range, a large portion 71.7% (76 of 106 crashes) occurred on travel lane width of 24 feet. Twenty-one crashes (19.8%) in this same curvature degrees category happened on roadway width of 22 feet. Examination of the 5.01-10 curvature degrees grouping shows that a large percentage (73.4%) of these crashes also occur on roadways with travel lane width of 22 ft. and 24 ft. while fewer happen on a roadway with travel lane width of 20 ft. (17.8%) or on one with travel lane width of greater than 24 ft. (8.9%). Of the 17 crashes that occurred on roads where the curvature degrees fell in the 10.01-14 range, the largest number, 6 crashes (35.3%), fell in the travel lane width of 22 ft. For this same curvature degree grouping, the other travel lane widths of 20, 24, and greater than 24 ft were more evenly with percents at 23.5%, 23.5% and 17.6%, respectively. Of the 9 crashes that fell in the roadway curvature range of 14.01-20, over half (55.6%) fell in the 22 ft. travel lane width. As seen in the previous cross tabulation, few crashes took place on roads where the curvature degrees were 20.01 or above.

**Table 1.14. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crashes - Curvature Degrees by Travel Lane Width, 1999-2003**

Curvature Degrees*	Travel Lane Width								Total	
	20		22		24		>24			
	N	%	N	%	N	%	N	%	N	%
2.01-5	5	4.7%	21	19.8%	76	71.7%	4	3.8%	106	100.0%
5.01-10	8	17.8%	17	37.8%	16	35.6%	4	8.9%	45	100.0%
10.01-14	4	23.5%	6	35.3%	4	23.5%	3	17.6%	17	100.0%
14.01-20	1	11.1%	5	55.6%	2	22.2%	1	11.1%	9	100.0%
20.01-30	1	50.0%	1	50.0%	0	0.0%	0	0.0%	2	100.0%
>30	1	50.0%	0	0.0%	1	50.0%	0	0.0%	2	100.0%
Total	20	11.0%	50	27.6%	99	54.7%	12	6.6%	181	100.0%

\*Negative values for curvature degrees were converted to an absolute value.

The last cross tabulation, curvature degrees by roadway width, is presented in Table 1.15 below. Inspection of the available data shows that 75 crashes (68.8%) occurred on roads with curvature degrees of 2.01-5 and roadway width of >35 ft. In the 5.01-10 degrees range, 60.5% of the 43 crashes happened on roadways less than 25 ft. or 25-28 ft. wide. Likewise, in the 10.01-14 road curvature range, 81.3% fell in these same categories of less than 25 ft. or 25-28 ft. wide. Six crashes (66.7%) occurred in the 14.01-20 curvature degrees category with roadway width of 25-28 ft.

**Table 1.15. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crashes - Curvature Degrees by Roadway Width, 1999-2003**

Curvature Degrees*	Roadway Width								Total	
	<25		25-28		29-35		>35			
	N	%	N	%	N	%	N	%	N	%
2.01-5	6	5.5%	14	12.8%	14	12.8%	75	68.8%	109	100.0%
5.01-10	10	23.3%	16	37.2%	12	27.9%	5	11.6%	43	100.0%
10.01-14	6	37.5%	7	43.8%	2	12.5%	1	6.3%	16	100.0%
14.01-20	1	11.1%	6	66.7%	1	11.1%	1	11.1%	9	100.0%
20.01-30	1	50.0%	1	50.0%	0	0.0%	0	0.0%	2	100.0%
>30	1	50.0%	0	0.0%	1	50.0%	0	0.0%	2	100.0%
Total	25	13.8%	44	24.3%	30	16.6%	82	45.3%	181	100.0%

\*Negative values for curvature degrees were converted to an absolute value.

## Person Characteristics

Findings in this section on run-off the road crashes examine the available demographic characteristics of the operators involved. Also, key factors relating mainly to the operators are analyzed to determine what circumstances could have led to the crash or to the resulting fatality or severe injury.

The first step in this part of the analysis was to examine the age of the operators by sex. [Table 1.16](#) and [Figure 1.3](#) present the distribution of all operators involved in run-off the road crashes for whom age and sex were known. The distribution shows that males represented a large proportion (68.6%) of the operators in these crashes. Female drivers only accounted for 31.4% of the total. In the age categories of 18-20, 21-24 and 35-44, males accounted for even higher proportions, specifically, 73.0%, 73.4% and 74.5%, respectively. At the younger ages of 15 and 16, the numbers were more evenly distributed by sex with about 54% male and 46% female for both years. In comparison to a distribution for all crashes, run-off the road crashes had a larger proportion of operators that were male than did the 2003 all crash distribution (68.6% vs. 57.4%) and a lower proportion that were female (31.4% vs. 42.6%).

**Table 1.16. Emphasis Area - Keeping Vehicles on the Roadway  
Age & Sex of Operators Involved in Major Run-off Road Crashes, 1999-2003**

Age Group	Male		Female		Total	
	N	%	N	%	N	%
15	6	54.5%	5	45.5%	11	100.0%
16	20	54.1%	17	45.9%	37	100.0%
17	31	62.0%	19	38.0%	50	100.0%
18-20	100	73.0%	37	27.0%	137	100.0%
21-24	94	73.4%	34	26.6%	128	100.0%
25-34	106	67.5%	51	32.5%	157	100.0%
35-44	105	74.5%	36	25.5%	141	100.0%
45-54	83	64.8%	45	35.2%	128	100.0%
55-64	35	71.4%	14	28.6%	49	100.0%
65-74	22	57.9%	16	42.1%	38	100.0%
75+	21	65.6%	11	34.4%	32	100.0%
<b>Total</b>	<b>623</b>	<b>68.6%</b>	<b>285</b>	<b>31.4%</b>	<b>908</b>	<b>100.0%</b>
All Crash Involved Operators 2003		57.4%		42.6%		

Note: persons with unknown age were excluded from the analysis.

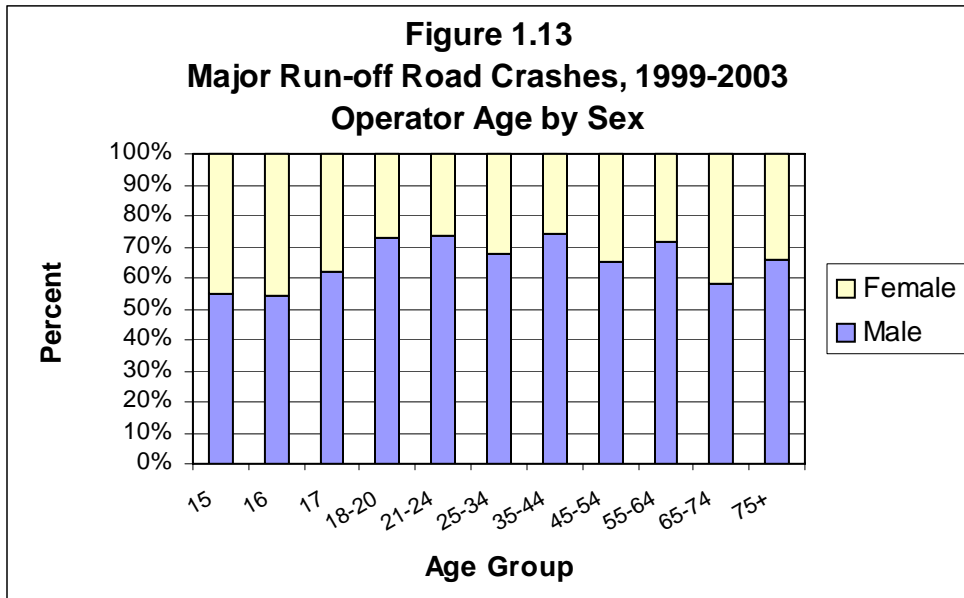


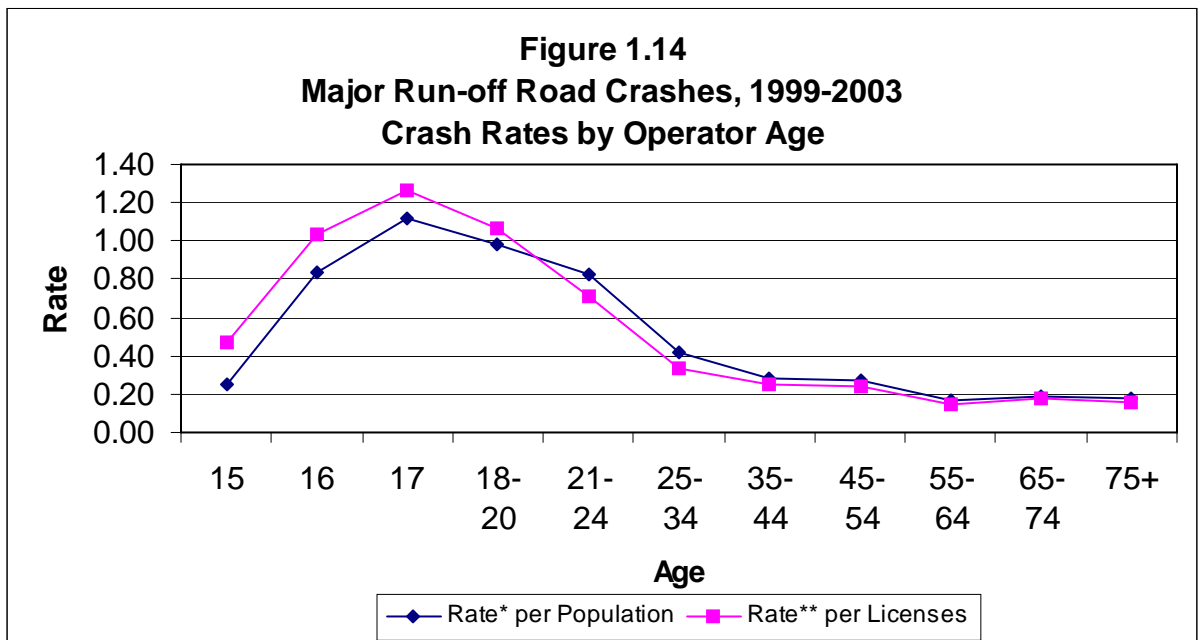
Table 1.17 below shows the distribution of the crash operators by age, the average annual rate per population and the average annual rate per licenses. Figure 1.4 depicts graphically the crash rates by age groups. The age category with the largest number of crash operators was the 25-34 year olds with 158 (17.4%) falling in this range. However, the average annual rate per population and the average annual rate per licensed drivers were the highest for 17 year olds at 1.12 and 1.26, respectively. The rate per population was also higher for other young drivers as well: .98 for 18-20 year olds, .83 for 16 year olds and .82 for 21-24 year olds. The rate per licenses followed the same pattern with higher rates for the young drivers, specifically the rate for 18-20 year olds was 1.06 followed by 16 year olds at 1.04. Older drivers in the above 25 age range had lower crash rates per population ranging from .42 for 25-34 year olds to .17 for drivers in the 55-64 and 75+ age ranges. Likewise, rates per licensed drivers ranged from .34 for 25-34 year olds to .15 for the 55-64 year olds.

**Table 1.17. Emphasis Area - Keeping Vehicles on the Roadway  
Major Crash Rates by Operator Age, 1999-2003**

Age Group	Crash Operators		Average Annual Rate* per Population	Average Annual Rate** per Licenses
	N	%		
15	11	1.2%	0.25	0.47
16	37	4.1%	0.83	1.04
17	50	5.5%	1.12	1.26
18-20	137	15.1%	0.98	1.06
21-24	128	14.1%	0.82	0.71
25-34	158	17.4%	0.42	0.34
35-44	141	15.5%	0.28	0.25
45-54	128	14.1%	0.27	0.24
55-64	49	5.4%	0.17	0.15
65-74	38	4.2%	0.19	0.18
75+	32	3.5%	0.17	0.16
<b>Total</b>	<b>909</b>	<b>100.0%</b>	<b>0.37</b>	<b>0.34</b>

\*Rate per 1000 population.

\*\*Rate per 1000 licensed drivers.



Many run-off the road crash operators tended to be involved in crashes during the afternoon hours between 2-6 pm. The only age category where this did not hold true was for the 21-24 year old drivers where the largest percent (27.6%) of crash operators was found at night between the hours of 10 pm-2 am. For the older drivers age 35 and older the next most prevalent time to crash was during midday from 10 am–2 pm. For the younger age categories of 24 years of age or less the next most frequent time to crash was either during the evening (6 pm -10 pm) or at night (10 pm -2 am). This is shown in Table 1.18 below.

**Table 1.18. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crashes, Operator Age by Time of Day, 1999-2003**

Age Group	Time of Day												Total	
	Early Morning 2am-6am		Morning 6am-10am		Midday 10am-2pm		Afternoon 2pm-6pm		Evening 6pm-10pm		Night 10pm-2am			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15	0	0.0%	0	0.0%	2	18.2%	5	45.5%	0	0.0%	4	36.4%	11	100.0%
16	1	2.7%	3	8.1%	8	21.6%	12	32.4%	9	24.3%	4	10.8%	37	100.0%
17	4	8.0%	4	8.0%	3	6.0%	16	32.0%	10	20.0%	13	26.0%	50	100.0%
18 to 20	23	17.0%	17	12.6%	21	15.6%	25	18.5%	25	18.5%	24	17.8%	135	100.0%
21 to 24	21	16.5%	10	7.9%	16	12.6%	21	16.5%	24	18.9%	35	27.6%	127	100.0%
25 to 34	14	8.9%	20	12.7%	30	19.0%	35	22.2%	29	18.4%	30	19.0%	158	100.0%
35 to 44	7	5.0%	18	12.8%	32	22.7%	35	24.8%	31	22.0%	18	12.8%	141	100.0%
45 to 54	11	8.7%	18	14.2%	24	18.9%	46	36.2%	17	13.4%	11	8.7%	127	100.0%
55 to 64	2	4.1%	4	8.2%	10	20.4%	22	44.9%	9	18.4%	2	4.1%	49	100.0%
65 to 74	1	2.6%	8	21.1%	10	26.3%	13	34.2%	5	13.2%	1	2.6%	38	100.0%
75 and older	0	0.0%	3	9.4%	11	34.4%	16	50.0%	1	3.1%	1	3.1%	32	100.0%
Total	84	9.3%	105	11.6%	167	18.5%	246	27.2%	160	17.7%	143	15.8%	905	100.0%

Findings on contributing circumstances of the operators in major run-off the road crashes are presented in Table 1.19 below. Driving too fast for conditions was a common occurrence in these crashes, specifically; of the 1,156 total contributing circumstance data entries 267 (23.1%) were for driving too fast for conditions. The next most prevalent contributing circumstance found was failure to keep in proper lane/off road at 16.3 %. Other common factors contributing to the crashes were driving under the influence of medication/drugs/alcohol (11.4%), excessive speed (9.1%) and falling asleep (7.6%). Other causes included operating vehicle recklessly (4.6%), inattention (4.4%) and failure to maintain control (3.7%). The distribution for all crashes-2003 shows that driving too fast for conditions accounted for a high percentage (16.7%) of these crashes also. However, the next most common factor was inattention (15.4%) followed by failure to yield (12.7%). Failure to keep in proper lane/off road (8.7%) and following too closely (8.5%) were also prevalent in these crashes. All causes in the all crash-2003 category were at much different proportions than those found for the run-off the road crashes.

**Table 1.19. Emphasis Area - Keeping Vehicles on the Roadway  
Contributing Circumstances of Operators in Major Run-off Road Crashes, 1999-2003**

Contributing Circumstances	N*	All Crashes 2003	
		%	%
Driving too fast for conditions	267	23.1%	16.7%
Failure to keep in proper lane/off road	189	16.3%	8.7%
Operating vehicle recklessly	53	4.6%	1.2%
Visibility obstructed	1	0.1%	2.9%
Excessive speed	105	9.1%	1.3%
Following too closely	0	0.0%	8.5%
Improper turn	0	0.0%	2.3%
Disregarded traffic signs, signals	2	0.2%	1.6%
Failure to yield	5	0.4%	12.7%
Inattention	51	4.4%	15.4%
Wrong side or wrong way	11	1.0%	0.6%
Fell asleep	88	7.6%	1.3%
Under influence of medication/drugs/alcohol	132	11.4%	2.1%
Operating defective equipment	16	1.4%	0.7%
Distraction caused by technology	7	0.6%	0.2%
Distracted	8	0.7%	1.5%
Swerving due to wind, slippery surface, etc	9	0.8%	2.2%
Failure to maintain control	43	3.7%	0.0%
Other/Unknown operator cause	169	14.6%	20.1%
Total	1,156	100.0%	100.0%

\*There can be a maximum of 2 contributing circumstances per operator.

Citations issued in major run-off the road crashes are examined below in [Table 1.20](#). DUI citations accounted for 24.4% of the total 405 written followed by speeding at 19.5%. Other common citations written included driving with license suspended (9.9%), operating without insurance (8.1%), driving in road laned for traffic (6.2%) and careless & negligent (5.7%).

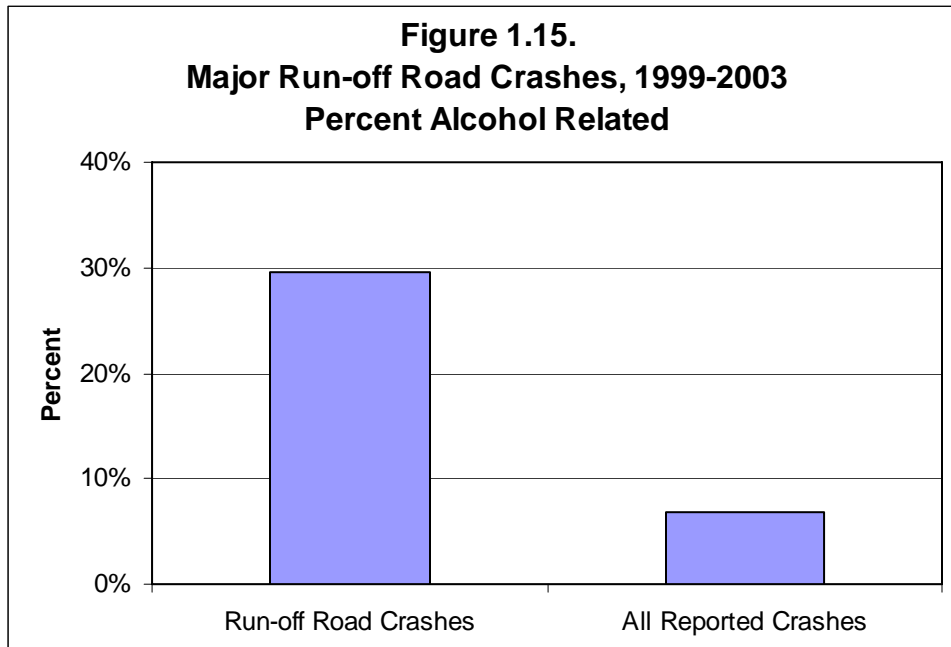
**Table 1.20. Emphasis Area - Keeping Vehicles on the Roadway  
Citations Issued in Major Run-off Road Crashes, 1999-2003**

Violation	N	%
DUI	99	24.4%
Speeding	79	19.5%
Operating without insurance	33	8.1%
DLS	40	9.9%
Leaving scene of accident	3	0.7%
Following too closely	0	0.0%
Operating without license	9	2.2%
Careless & negligent	23	5.7%
Fail to yield	3	0.7%
Not registered	16	4.0%
Defective equipment	8	2.0%
Driving in road laned for traffic	25	6.2%
Driving to right	7	1.7%
Vehicle not inspected	3	0.7%
Under 18 & .02% or more alc conc	3	0.7%
Minor (16+) consumption of alcohol	8	2.0%
Consuming alcohol while driving	7	1.7%
Traffic control signal/device	1	0.2%
Operating w/o owner consent	1	0.2%
All other	37	9.1%
Total	405	100.0%

Examination of the data indicates that alcohol was a contributing factor for many of the run-off the road crashes. Of the 901 run-off the road crashes 266 (29.5%) were alcohol related. This is a much higher proportion than for all reported crashes in the five year period of 1999-2003 where only 6.8% were alcohol related. Findings are presented below in Table 1.21 and Figure 1.15.

**Table 1.21. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crashes - Alcohol Related, 1999-2003**

	Number of Crashes	Alcohol Related Crashes	Percent Alcohol Related
Run-off Road Crashes	901	266	29.5%
All Reported Crashes	34,094	2,304	6.8%

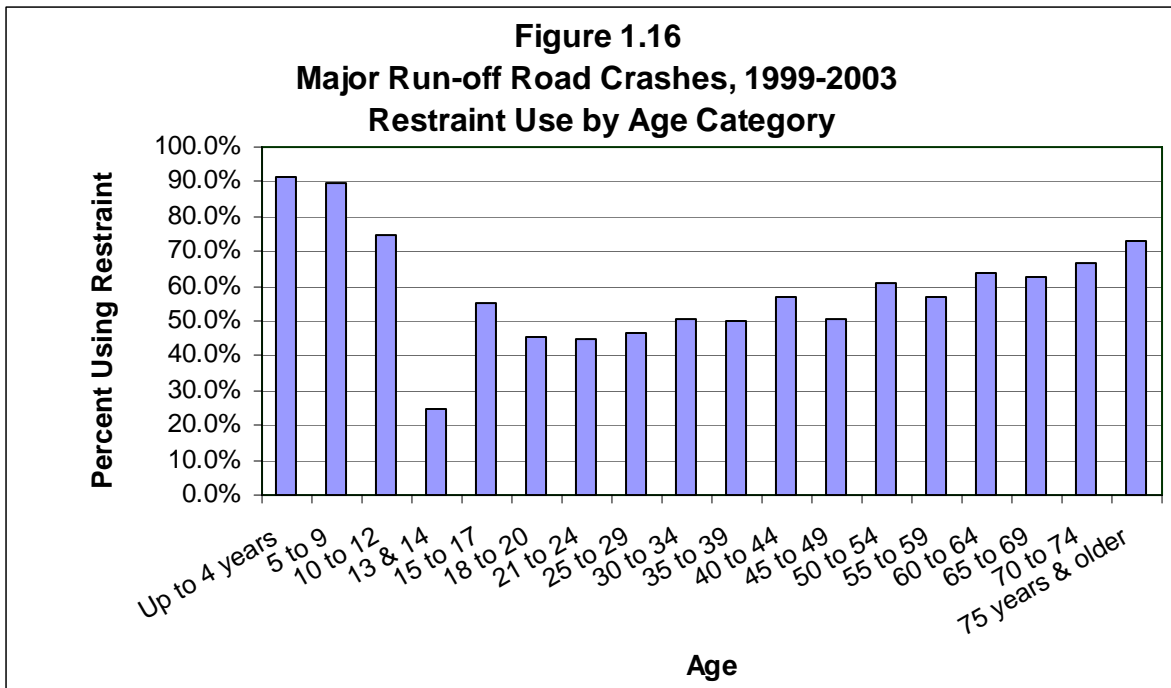


The last cross tabulation examined in this section was restraint usage by age category for vehicle occupants, operators and passengers, in major run-off the road crashes. Vehicle types included in the analysis for restraint use were passenger cars, sport utility vehicles, pick-up truck and large trucks. [Table 1.22](#) and [Figure 1.16](#) below present the findings. Overall, restraint usage was relatively low with only 52.8 % of the vehicle occupants using a restraint, 35.9% were not using a restraint and for 11.4% restraint use was unknown. Children had the largest percents for restraint use, specifically, up through 4 years, 5-9 and 10-12 had restraint usages of 91.7%, 89.5% and 75.0%, respectively. The older age group of 75 years or older also had higher restraint usage, 73.0%. Other usage percentiles range from a low of 25.0% for 13 & 14 year olds to 66.7% for 70-74 year olds.

**Table 1.22. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crash Vehicle Occupants by Age Group & Restraint Use, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use		Number	Percent
	Number	Percent	Number	Percent	Number	Percent		
Up to 4 years	11	91.7%	0	0.0%	1	8.3%	12	100.0%
5 to 9	17	89.5%	2	10.5%	0	0.0%	19	100.0%
10 to 12	6	75.0%	1	12.5%	1	12.5%	8	100.0%
13 & 14	4	25.0%	8	50.0%	4	25.0%	16	100.0%
15 to 17	90	55.2%	57	35.0%	16	9.8%	163	100.0%
18 to 20	78	45.3%	75	43.6%	19	11.0%	172	100.0%
21 to 24	76	45.0%	66	39.1%	27	16.0%	169	100.0%
25 to 29	44	46.8%	40	42.6%	10	10.6%	94	100.0%
30 to 34	40	50.6%	31	39.2%	8	10.1%	79	100.0%
35 to 39	33	50.0%	22	33.3%	11	16.7%	66	100.0%
40 to 44	37	56.9%	24	36.9%	4	6.2%	65	100.0%
45 to 49	36	50.7%	24	33.8%	11	15.5%	71	100.0%
50 to 54	31	60.8%	14	27.5%	6	11.8%	51	100.0%
55 to 59	20	57.1%	12	34.3%	3	8.6%	35	100.0%
60 to 64	14	63.6%	7	31.8%	1	4.5%	22	100.0%
65 to 69	15	62.5%	6	25.0%	3	12.5%	24	100.0%
70 to 74	14	66.7%	6	28.6%	1	4.8%	21	100.0%
75 years & older	27	73.0%	8	21.6%	2	5.4%	37	100.0%
<b>Total</b>	<b>593</b>	<b>52.8%</b>	<b>403</b>	<b>35.9%</b>	<b>128</b>	<b>11.4%</b>	<b>1,124</b>	<b>100.0%</b>

Note: persons with unknown age were excluded from the analysis.



Vehicle Characteristics

The only data analysis conducted on vehicles in run-off the road crashes was a cross tabulation on vehicle type by what the vehicle collide with. This information is presented in Table 1.23 below. A large proportion of passenger cars (52.8%), sport utility vehicles (60.9%) and light trucks/vans (62.4%) either overturned or hit a tree. Large trucks (81.1%) and motorcycles (60.3%) typically overturned or hit a guardrail. Findings are presented in Table 1.23 below.

**Table 1.23. Emphasis Area - Keeping Vehicles on the Roadway  
Major Run-off Road Crashes - Collided with by Vehicle Type, 1999-2003**

Collided with	VEHICLE TYPE											
	Passenger Car		Sport Utility		Light Truck or Van		Large Truck		Motorcycle or Moped		All Other	
	N	%	N	%	N	%	N	%	N	%	N	%
Overtuned	112	22.3%	41	33.3%	40	30.1%	21	56.8%	24	27.3%	6	27.3%
Guard rail, curb	46	9.2%	12	9.8%	16	12.0%	9	24.3%	29	33.0%	3	13.6%
Tree	153	30.5%	34	27.6%	43	32.3%	1	2.7%	6	6.8%	7	31.8%
Pole, sign	88	17.5%	12	9.8%	10	7.5%	1	2.7%	9	10.2%	0	0.0%
Ledge, boulder	41	8.2%	7	5.7%	10	7.5%	2	5.4%	10	11.4%	1	4.5%
Other fixed object	62	12.4%	17	13.8%	14	10.5%	3	8.1%	10	11.4%	5	22.7%
<b>TOTAL</b>	<b>502</b>	<b>100.0%</b>	<b>123</b>	<b>100.0%</b>	<b>133</b>	<b>100.0%</b>	<b>37</b>	<b>100.0%</b>	<b>88</b>	<b>100.0%</b>	<b>22</b>	<b>100.0%</b>

### III. Emphasis Area – Instituting Graduated Licensing for Young Drivers

Data analysis for emphasis area, Instituting Graduated Licensing for Young Drivers, was conducted using crash data for Vermont for 1999-2003. The study involved examining 636 major crashes in which at least one driver was under the age of 21. Findings from the analysis are presented in this section of the report.

#### Environment and Roadways

The first step in the analysis was to examine the frequency distribution of major crashes involving a driver under the age of 21 by county, along with the average annual rate per population and the average annual rate per vehicle miles traveled by county. This information is presented in Table 2.1, Figure 2.1 and Figure 2.2 below. The distribution for the number of crashes indicates that the largest number (142 or 22.3%) of these crashes occurred in Chittenden County. The county with next largest number was Rutland with 63 (9.9%) crashes followed by Franklin and Windham counties with 54 (8.5%) and 53 (8.3%) occurring, respectively. Washington, Bennington and Windsor counties had on the average 46 crashes for the 5-year study period. Relatively few young driver major crashes occurred in Essex (1.6%) and Grand Isle (1.3%) counties.

Examination of the average annual rate per population, however, shows that Lamoille County experienced the highest crash rate per 1,000 population (age 15-20) at 3.89 followed by Essex County (3.77). Bennington, Franklin, Grand Isle, Orleans, and Windham counties all had crash rates close in value ranging from 2.86 in Grand Isle to 3.05 in Bennington. The lowest crash rates per population were found in Addison (1.71) and Washington (1.79) counties. Likewise, the highest rates per vehicle miles traveled were also found in Lamoille (3.1) and Essex (2.8) counties. The next highest vmt rates were found in Franklin (2.5), Orleans (2.3) and Bennington (2.2) counties. The lowest vmt rates in the study period were experienced in Windsor (0.9) and Washington (1.3) counties.

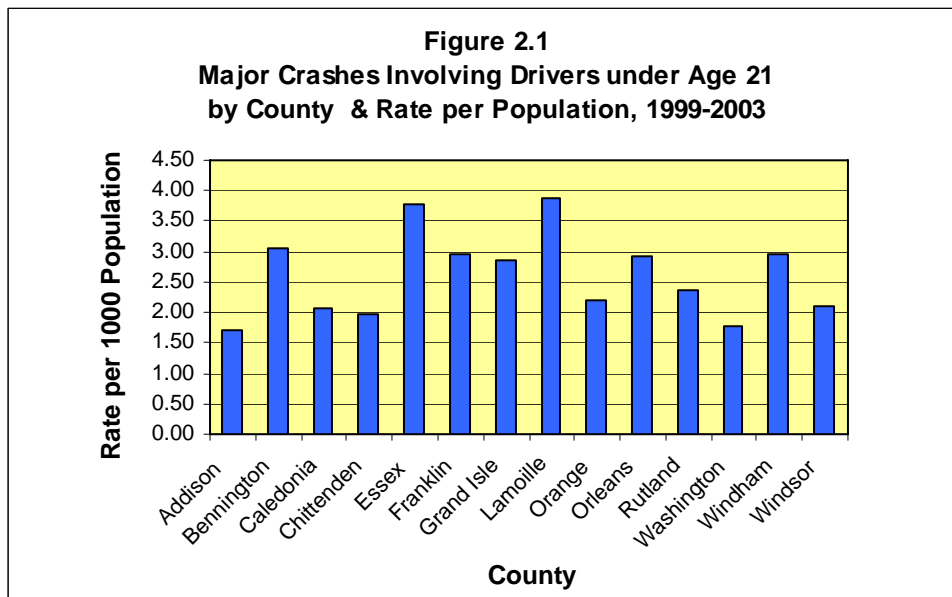
Table 2.2 and Figure 2.3 below present findings on the number and percent of young driver major crashes by highway class. For comparison purposes, also included is a highway class distribution for all crashes in 2003. Over half (55.0%) of the crashes involving young drivers occurred on state highways and almost one-fourth (24.8%) happened on city/village roadways. Ninety-one (14.3%) crashes occurred on town roads and relatively few, 26 crashes (4.1%), took place on interstate highways. In comparison to all crashes 2003, relatively more young driver crashes occurred on state highways (55.0% vs. 44.3%) and city/village roads (24.8% vs. 12.5%) while relatively fewer of these crashes occurred on interstates (4.1% vs. 8.7%) and town roadways (14.3% vs. 21.5%) relative to all crashes-2003.

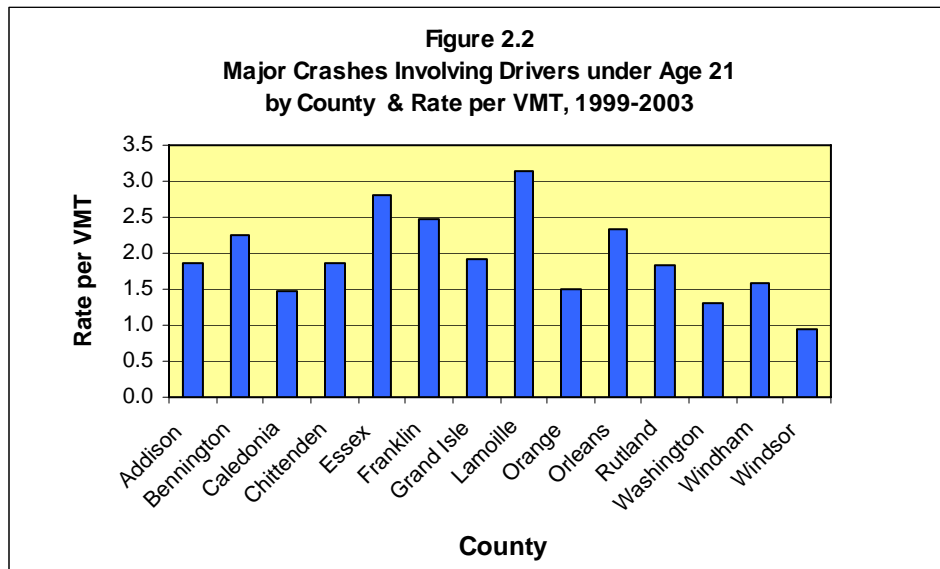
**Table 2.1. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21 by County, 1999-2003  
Number, Rate per Population & Rate per Vehicle Miles Traveled**

County	N	%	Average Annual Rate* per Population	Average Annual Rate** per Vehicle Miles Traveled
Addison	37	5.8%	1.71	1.9
Bennington	47	7.4%	3.05	2.2
Caledonia	29	4.6%	2.06	1.5
Chittenden	142	22.3%	1.96	1.9
Essex	10	1.6%	3.77	2.8
Franklin	54	8.5%	2.97	2.5
Grand Isle	8	1.3%	2.86	1.9
Lamoille	40	6.3%	3.89	3.1
Orange	30	4.7%	2.21	1.5
Orleans	32	5.0%	2.93	2.3
Rutland	63	9.9%	2.36	1.8
Washington	45	7.1%	1.79	1.3
Windham	53	8.3%	2.96	1.6
Windsor	46	7.2%	2.12	0.9
State Total	636	100.0%	2.33	1.7

\*Rate per 1,000 population age 15-20.

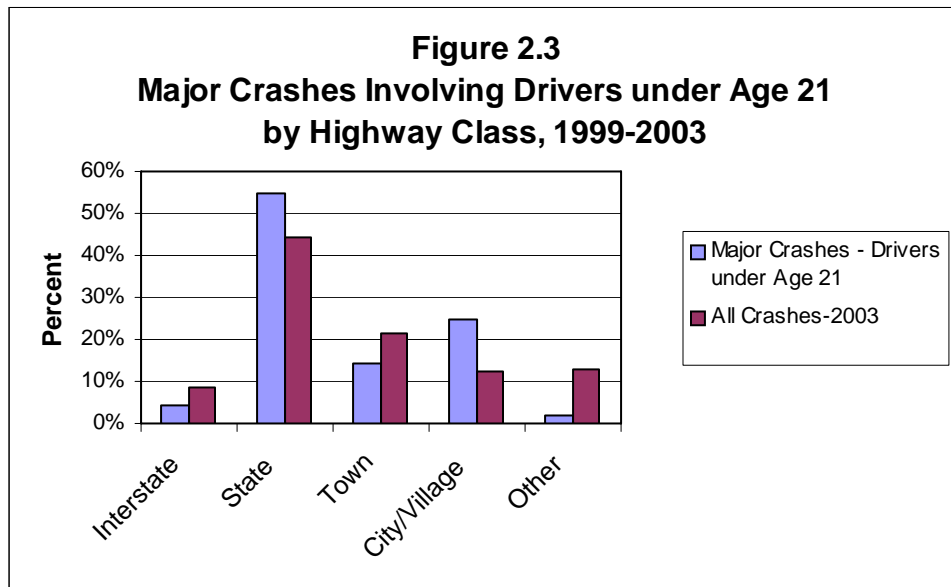
\*\*Rate per 100 Million VMT





**Table 2.2. Emphasis Area - Instituting Graduated Licensing for Young Drivers**  
**Major Crashes Involving Drivers under Age 21 by Highway Class, 1999-2003**

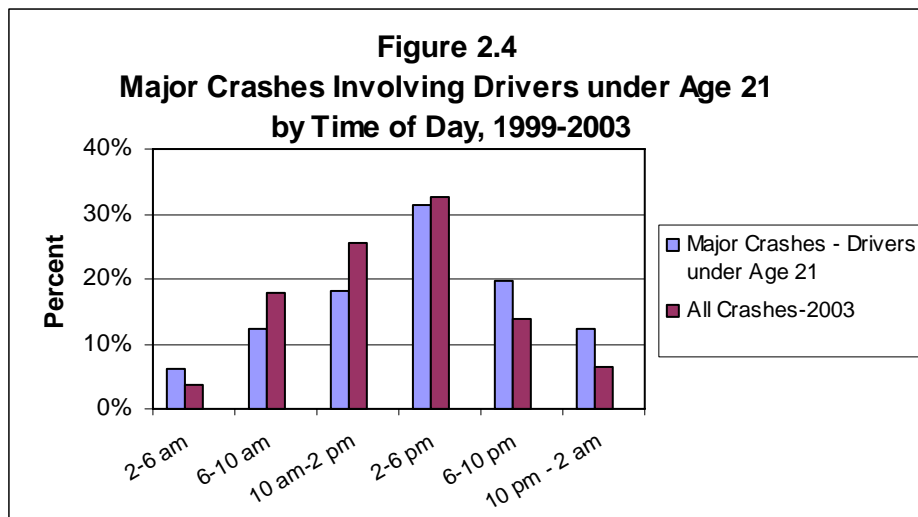
Highway Class	N	All Crashes 2003	
		%	%
Interstate	26	4.1%	8.7%
State	350	55.0%	44.3%
Town	91	14.3%	21.5%
City/Village	158	24.8%	12.5%
Other	11	1.7%	12.9%
<b>Total</b>	<b>636</b>	<b>100.0%</b>	<b>100.0%</b>



An examination of major crashes involving drivers under age 21 by time of day indicates that 199 crashes (31.5%) occurred in the afternoon from 2-6 pm, 125 (19.8%) in the evening hours from 6-10 pm and 114 (18.0%) took place during midday (10-2 pm). Distribution by time of day is presented in [Table 2.3](#) and [Figure 2.4](#) below. In total, 241 young driver crashes (38.1%) occurred during the nighttime hours of 6 pm-6 am. Comparing the young driver time of day distribution to the all crashes-2003 distributions shows some interesting differences. Proportionally more young driver major crashes occurred in the evening (19.8% vs.13.9%), at night (12.3% vs. 6.5%) and in the early morning hours (6.0% vs. 3.6%) compared to all crashes in 2003. Conversely, proportionally less of the crashes with young drivers happened during the morning (12.3% vs. 17.8%) and midday hours (18.0% vs. 25.6%) than did all crashes-2003. Both young driver crashes and all-crashes 2003 had nearly the same percentage of crashes in the afternoon hours at 31.5% and 32.7%, respectively.

**Table 2.3. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21 by Time of Day, 1999-2003**

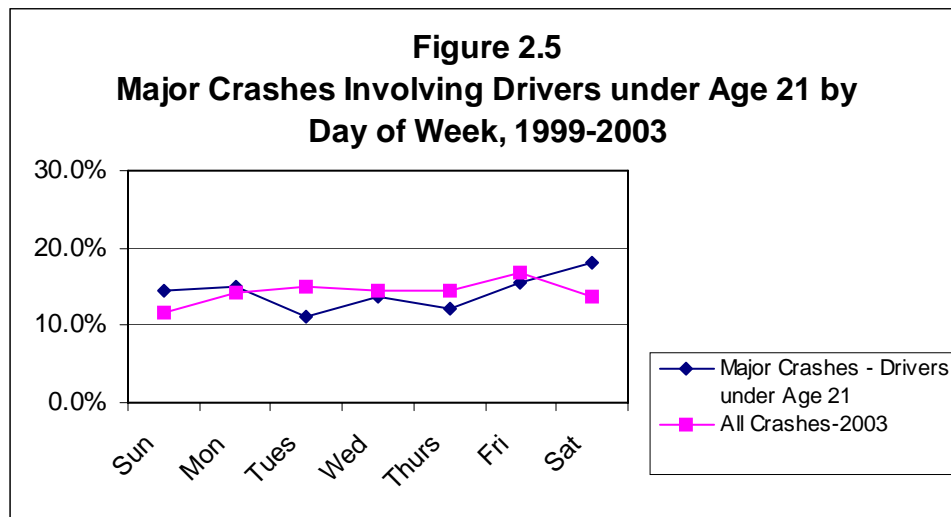
Time of Day	N	All Crashes 2003	
		%	%
Early Morn (2-6 am)	38	6.0%	3.6%
Morning (6-10 am)	78	12.3%	17.8%
Midday (10 am-2 pm)	114	18.0%	25.6%
Afternoon (2-6 pm)	199	31.5%	32.7%
Evening (6-10 pm)	125	19.8%	13.9%
Night (10 pm - 2 am)	78	12.3%	6.5%
Total	632	100.0%	100.0%



Findings on the analysis for major young driver crashes indicate that the highest number of these crashes (115 or 18.1%) occurred on Saturday. Above average numbers of crashes were also found on Friday, Sunday and Monday, 98 (15.4%), 93 (14.6%) and 96 (15.1%), respectively. Not surprisingly, lower numbers were found during weekdays on Tuesday (11.0%), Wednesday (13.7%) and Thursday (12.1%). In comparison to the distribution for all crashes, proportionally more crashes involving young drivers occurred on Saturday and Sunday, specifically, 18.1% vs. 13.7%, 14.6% vs. 11.6%. Only slightly more happened on Monday, 15.1% vs. 14.1% while proportionally less occurred on other weekdays. Day of week frequency distributions are presented below in [Table 2.4](#) and [Figure 2.5](#).

**Table 2.4. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21 by Day of Week, 1999-2003**

Day of Week	N	%	All Crashes 2003
			%
Sunday	93	14.6%	11.6%
Monday	96	15.1%	14.1%
Tuesday	70	11.0%	15.0%
Wednesday	87	13.7%	14.5%
Thursday	77	12.1%	14.4%
Friday	98	15.4%	16.7%
Saturday	115	18.1%	13.7%
Total	636	100.0%	100.0%



A cross tabulation of time of day by day of week for crashes involving young drivers is presented in [Table 2.5](#) below. The number of crashes and subsequent number of crashes per hour by time of day and day of week were the highest every day of the week during the afternoon hours between 2-6 pm. Monday, Sunday and Saturday had the highest number of crashes per hour at 9.0, 8.5, and 7.8, respectively, during this time period. Tuesday and Friday both had a crash rate per hour of 6.8 for this same period followed by Wednesday and Thursday at 5.5 crashes per hour. Not surprisingly, Saturday also had relatively high crashes per hour at night (5.5), during midday (5.3) and during the evening (5.3). Other high crash rate periods were Friday evening (5.3), Sunday midday (5.0) and Monday evening (5.0). For most days the lowest number of crashes per hour were found in the early morning hour from 2-6 am and ranged from .8 to 2.5 crashes per hour. However, on Sunday the number was slightly lower at night (1.5) than in the early morning hours.

Findings from the analysis for when the major crashes for young drivers occurred by month are presented below in [Table 2.6](#) and [Figure 2.6](#). For comparison purposes a month distribution for all crashes in 2003 is presented as well. The results show that 72 (11.3%) young driver crashes occurred in July, this was the highest number for any given month during the study period. The next highest number was found in January with 67 crashes (10.5%) occurring. August and September had a slightly higher than the average number of crashes, 57 took place (9.0%) in both months. May had the lowest number of major crashes (37 or 5.8%), followed by April (40 or 6.3%) and March (43 or 6.8%). Proportionally fewer young driver crashes occurred from December through May while proportionally more happened from June through September and in November compared to all crashes-2003. In October both young driver crashes and all-crashes 2003 had the same proportion at 8.2%.

An examination of weather conditions in major young driver crashes, presented below in [Table 2.7](#) and [Figure 2.7](#), shows that almost 80% of these crashes occurred under clear or cloudy conditions. Considerably fewer happened when it was snowing (8.8%) or raining (7.5%) and even fewer took place when there was fog, smog or smoke or sleet, hail or freezing rain (2.5%). Comparatively, proportionately more young driver crashes occurred under clear conditions than did all crashes-2003 (56.0% vs. 49.7%) while other weather categories had nearly the same proportions for both.

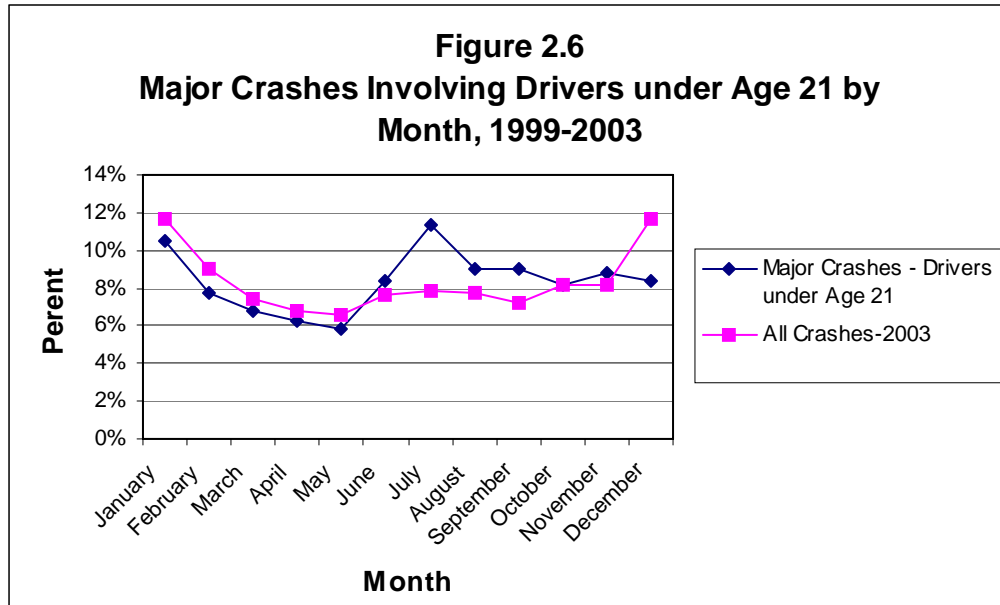
There were 417 (65.6%) young driver crashes that occurred on dry road surfaces, 107 (16.8%) on wet surfaces and 90 (14.2%) on snow/ice/slush. Looking at all crashes for 2003 proportionally fewer occurred on dry road surfaces (55.9%) than in the young driver crash scenario, nearly the same occurred on wet roads (17.0% vs. 16.8%) and proportionally more happened on snow/ice/slush road surface conditions (21.9% vs. 14.2%). [Table 2.8](#), [Figure 2.8](#) and [Figure 2.9](#) present these findings.

**Table 2.5. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21, Time of Day by Day of Week, 1999-2003**

Time of day	Day of Week															
	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Total	
	Crashes		Crashes		Crashes		Crashes		Crashes		Crashes		Crashes		Crashes	
	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.
Early morning (2-6 am)	4	1.0	3	0.8	3	0.8	4	1.0	5	1.3	10	2.5	9	2.3	38	9.5
Morning (6-10 am)	13	3.3	5	1.3	17	4.3	9	2.3	14	3.5	9	2.3	11	2.8	78	19.5
Midday (10 am-2 pm)	19	4.8	12	3.0	15	3.8	13	3.3	14	3.5	21	5.3	20	5.0	114	28.5
Afternoon (2-6 pm)	36	9.0	27	6.8	22	5.5	22	5.5	27	6.8	31	7.8	34	8.5	199	49.8
Evening (6-10 pm)	20	5.0	14	3.5	19	4.8	17	4.3	21	5.3	21	5.3	13	3.3	125	31.3
Night (10 pm-2 am)	4	1.0	7	1.8	10	2.5	12	3.0	17	4.3	22	5.5	6	1.5	78	19.5
Total	96	4.0	68	2.8	86	3.6	77	3.2	98	4.1	114	4.8	93	3.9	632	26.3

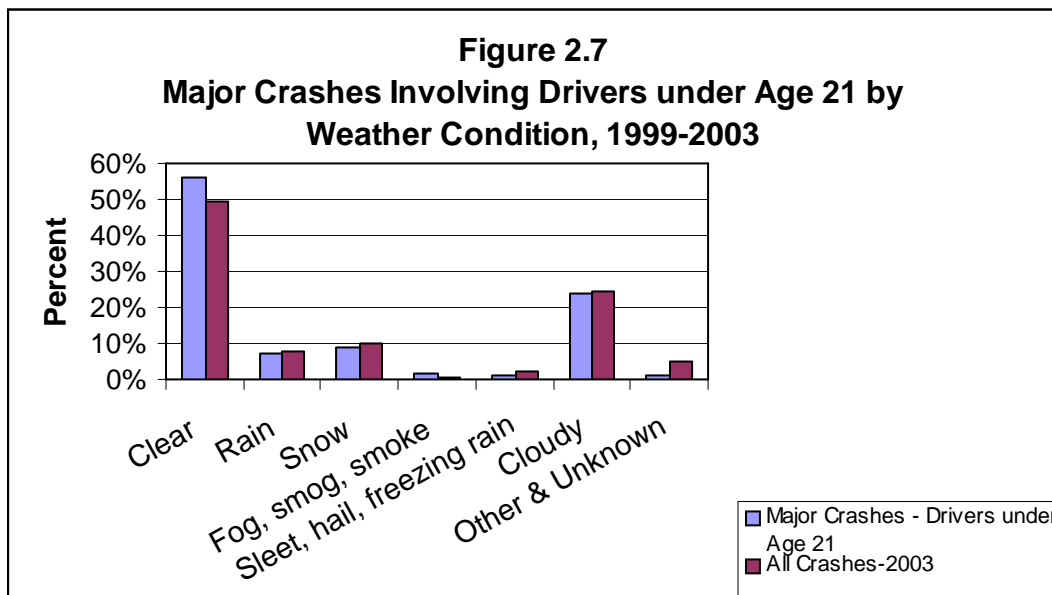
**Table 2.6. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21 by Month, 1999-2003**

Month	N	%	All Crashes 2003
			%
January	67	10.5%	11.7%
February	49	7.7%	9.0%
March	43	6.8%	7.4%
April	40	6.3%	6.8%
May	37	5.8%	6.6%
June	53	8.3%	7.6%
July	72	11.3%	7.9%
August	57	9.0%	7.7%
September	57	9.0%	7.2%
October	52	8.2%	8.2%
November	56	8.8%	8.2%
December	53	8.3%	11.7%
Average	53		
Total	636	100.0%	100.0%



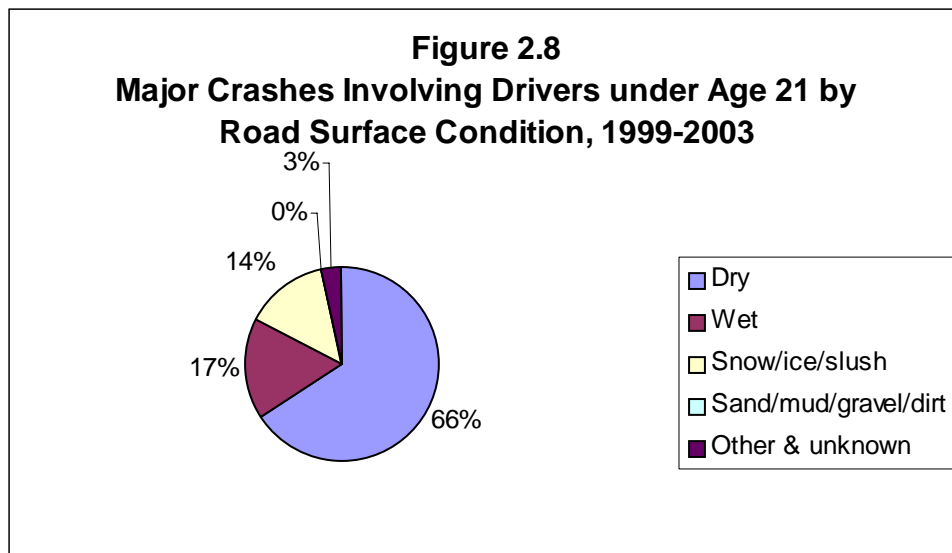
**Table 2.7. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Weather Conditions in Major Crashes Involving Drivers under Age 21, 1999-2003**

Weather	N	%	All Crashes 2003
			%
Clear	356	56.0%	49.7%
Rain	48	7.5%	8.0%
Snow	56	8.8%	10.0%
Fog, smog, smoke	10	1.6%	0.7%
Sleet, hail, freezing rain	6	0.9%	2.4%
Cloudy	152	23.9%	24.4%
Other & Unknown	8	1.3%	5.0%
Total	636	100.0%	100.0%



**Table 2.8. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Road Surface Condition for Major Crashes Involving Drivers under Age 21, 1999-2003**

Surface Condition	N	%	All Crashes 2003
			%
Dry	417	65.6%	55.9%
Wet	107	16.8%	17.0%
Snow/ice/slush	90	14.2%	21.9%
Sand/mud/gravel/dirt	1	0.2%	0.9%
Other & unknown	21	3.3%	4.4%
Total	636	100.0%	100.0%



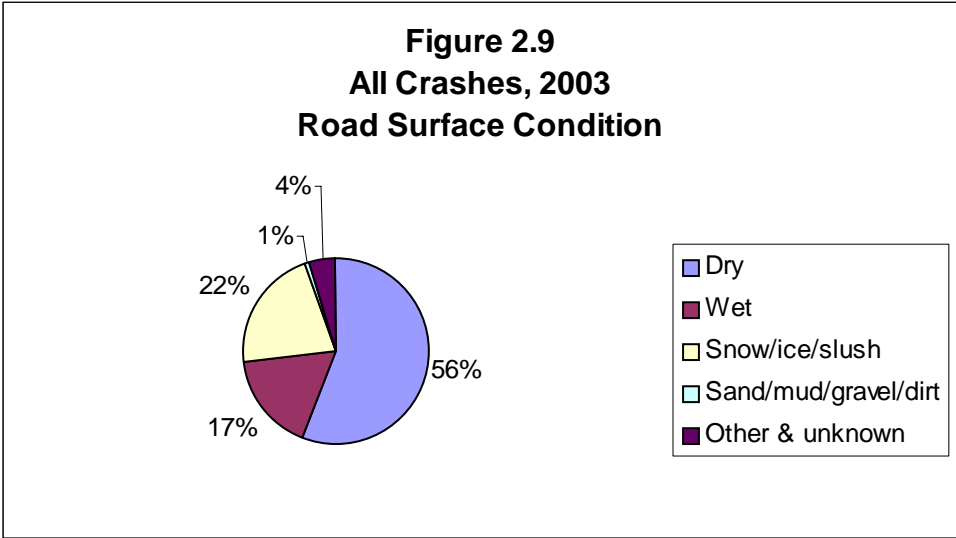
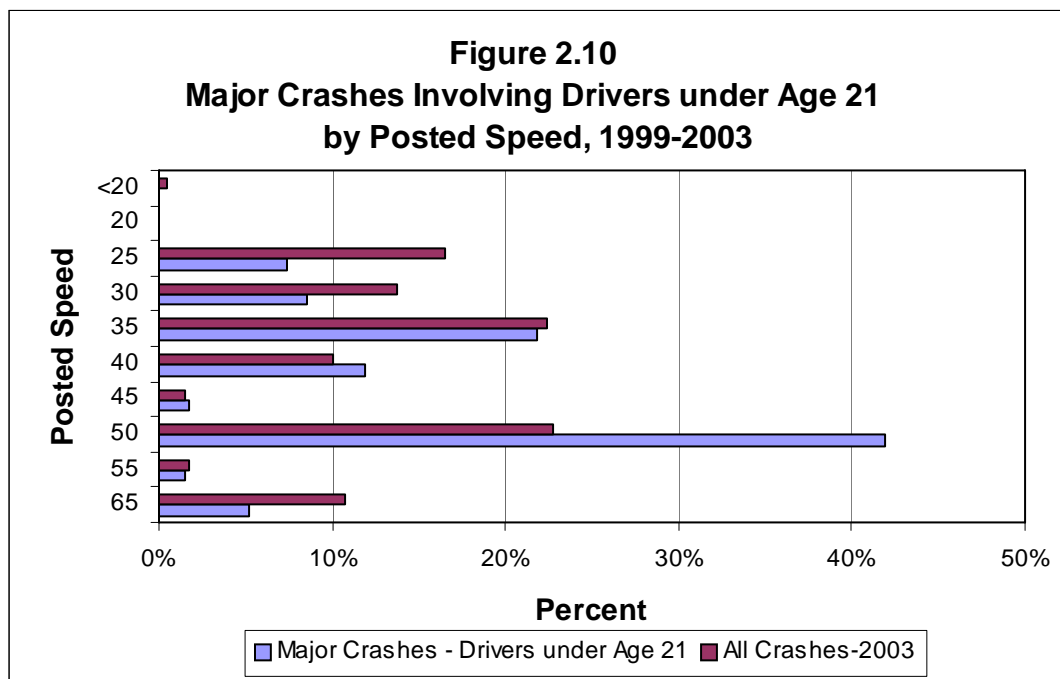


Table 2.9 and Figure 2.10 below show that of the 537 young driver crashes with available data on posted speed nearly half (48.6%) were in the 50 miles per hour or plus category. This was higher than the all crashes 2003 proportion of 35.2%. Looking at the 25-40 mph category shows that 49.7% of these young driver crashes occurred in these lower posted speed ranges with the largest number of crashes (117) in this group happening at a posted speed of 35 mph. Proportionally more (62.7%) of all crashes in 2003 happened in the lower posted speed ranges. There were 99 young driver crashes that had missing data for posted speed.

**Table 2.9. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21 by Posted Speed, 1999-2003**

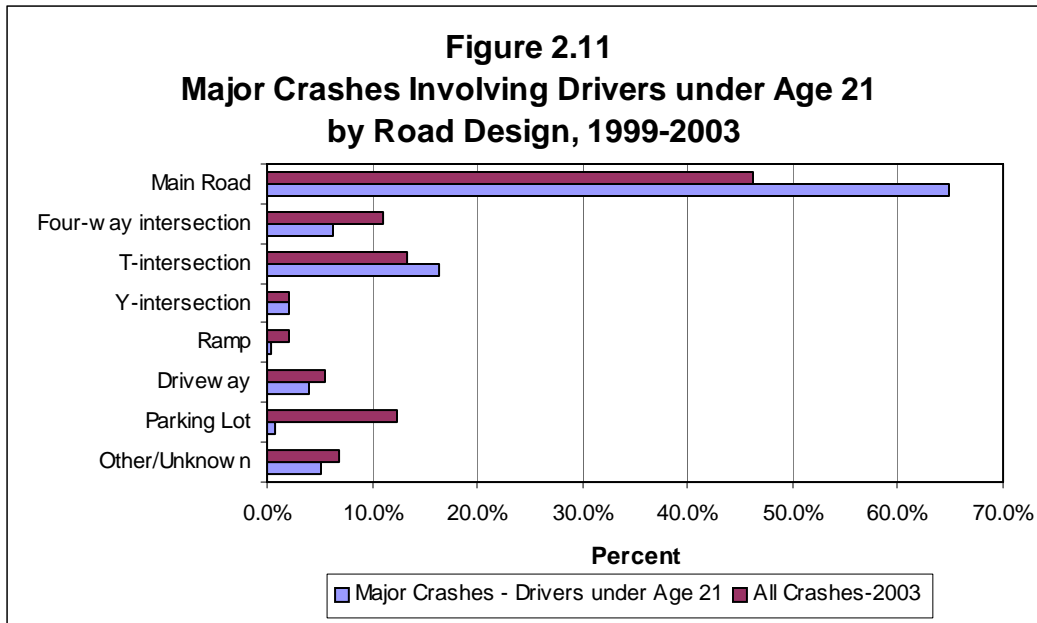
Posted Speed	N	All Crashes 2003	
		%	%
<20	0	0.0%	0.5%
20	0	0.0%	0.1%
25	40	7.4%	16.5%
30	46	8.6%	13.7%
35	117	21.8%	22.4%
40	64	11.9%	10.1%
45	9	1.7%	1.5%
50	225	41.9%	22.8%
55	8	1.5%	1.7%
65	28	5.2%	10.7%
<b>Total</b>	<b>537</b>	<b>100.0%</b>	<b>100.0%</b>



Road design in major crashes involving drivers under the age of 21 is presented below in [Table 2.10](#) and [Figure 2.11](#). Findings from the study indicate that many of the young driver crashes (412 or 64.9% of the 635 with available data) occurred on a main road or at intersection (157 or 24.7%). More young driver major crashes took place at T-intersections (16.4%) than at four-way intersections (6.3%) or Y-intersections (2.0%). Twenty-five young driver crashes (3.9%) occurred at a driveway. Comparatively, proportionally more major crashes involving young drivers happened on main roads and at T-intersections than in the all crash-2003 distributions, specifically, 64.9% vs. 46.2% and 16.4% vs. 13.3%, respectively. Y-intersection crashes happened at the same proportion, 2.0%, in both the young driver major crash and all crashes-2003 distributions. In the other road design categories of four-way intersection, ramp, driveway and parking lot all crashes in 2003 had higher proportions.

**Table 2.10. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Road Design in Major Crashes Involving Drivers under Age 21, 1999-2003**

Road Design	N	%	All Crashes 2003
			%
Main Road	412	64.9%	46.2%
Four-way intersection	40	6.3%	11.1%
T-intersection	104	16.4%	13.3%
Y-intersection	13	2.0%	2.0%
Traffic circle/roundabout	0	0.0%	0.2%
Five-point, or more	0	0.0%	0.2%
Ramp	2	0.3%	2.0%
Driveway	25	3.9%	5.6%
RR Crossing	1	0.2%	0.2%
Parking Lot	5	0.8%	12.4%
Other/Unknown	33	5.2%	6.8%
Total	635	100.0%	100.0%



Person Characteristics

Findings from the data analysis relating to young operators and their passengers are presented in this section on major crashes involving young drivers. Available demographic information on drivers and passengers is examined as well as key crash contributing factors of the driver.

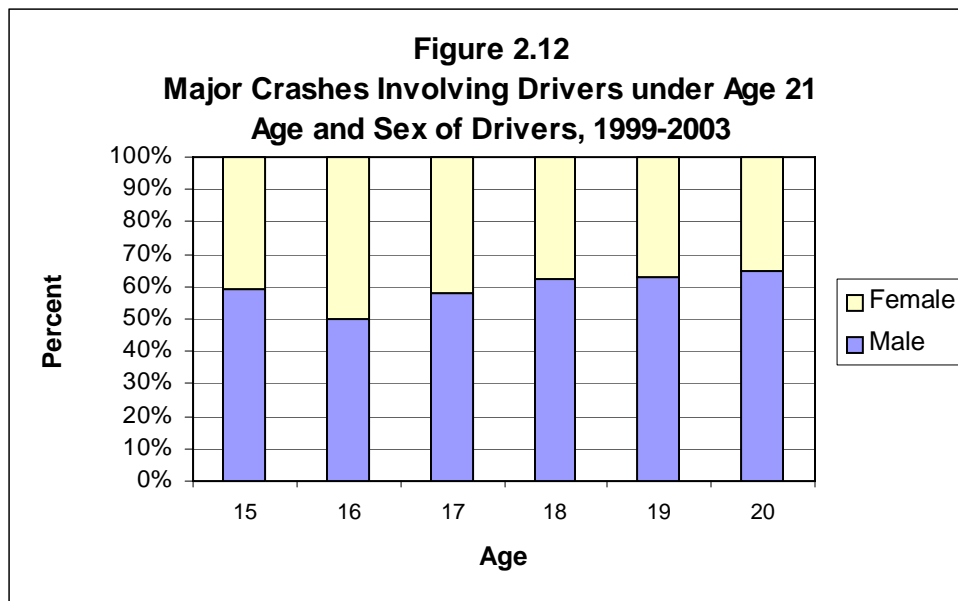
First, a cross tabulation was examined on operator age by sex for all operators under age 21 with known age and sex. This information is presented in Table 2.11 and Figure 2.12 below. The distribution shows that of the 681 young drivers, 411 (60.4%) were male and 270 (39.6%) female. Note that in some crashes involving multiple vehicles there was more than one driver in the age range of 15-20 years of age. Examining the distribution by age shows that for 20 year olds males accounted for a slightly higher percentage, 64.6% vs. 35.4% for female. Males age 18 and 19 also accounted for a slightly higher proportion than the overall percent, specifically, 62.6% and 62.8%, respectively. For 16 year olds, crash operators were evenly split by sex, 50% male and 50% female. In comparison to a distribution for all crashes, crashes involving young drivers had a slightly larger proportion of drivers that were male than did all crashes-2003 (60.4% vs. 57.4%) and a slightly lower percentage that were female (39.6% vs. 42.6%).

**Table 2.11. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Age and Sex of Operators in Major Crashes Involving Drivers under Age 21, 1999-2003**

Age	Male		Female		Total	
	N	%	N	%	N	%
15	13	59.1%	9	40.9%	22	100.0%
16	44	50.0%	44	50.0%	88	100.0%
17	81	58.3%	58	41.7%	139	100.0%
18	107	62.6%	64	37.4%	171	100.0%
19	93	62.8%	55	37.2%	148	100.0%
20	73	64.6%	40	35.4%	113	100.0%
Total	411	60.4%	270	39.6%	681	100.0%

All Crash Involved Operators 2003 57.4%

42.6%



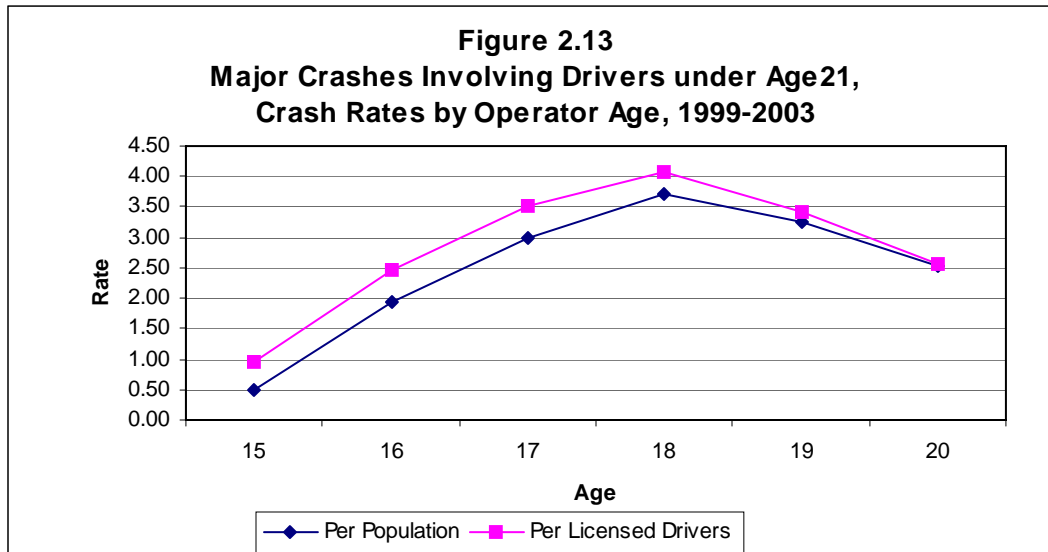
The distribution of the number of crash operators by operator age, the average annual rate per population and the average annual rate per licenses are presented below in [Table 2.12](#). The crash rates by operator age are depicted graphically in [Figure 2.13](#). The 18 year olds comprised the largest number of crash operators (171 or 25.1%) followed by 19 year olds (148 or 21.7%) and 17 year olds (139 or 20.4%). There was slightly fewer 20 year olds (113 or 16.6%) and even less 16 year olds (88 or 12.9%). Not surprisingly, 17, 18 and 19 year olds had the highest rates per population, 2.99, 3.71 and 3.25, respectively. Likewise, the highest rates per licensed drivers were also for 17, 18 and 19 year olds at 3.50, 4.07 and 3.42, respectively. Shown graphically, both rates per population and rates per licenses increase from age 15 to a peak at age 18 and then decline after age 18.

**Table 2.12. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crash Rates by Operator Age, 1999-2003**

Age Group	Crash Operators		Average Annual Rate* per Population	Average Annual Rate** per Licenses
	N	%		
15	22	3.2%	0.49	0.94
16	88	12.9%	1.94	2.46
17	139	20.4%	2.99	3.50
18	171	25.1%	3.71	4.07
19	148	21.7%	3.25	3.42
20	113	16.6%	2.52	2.58
Total	681	100.0%	2.49	2.99

\*Rate per 1000 population.

\*\*Rate per 1000 licensed drivers.



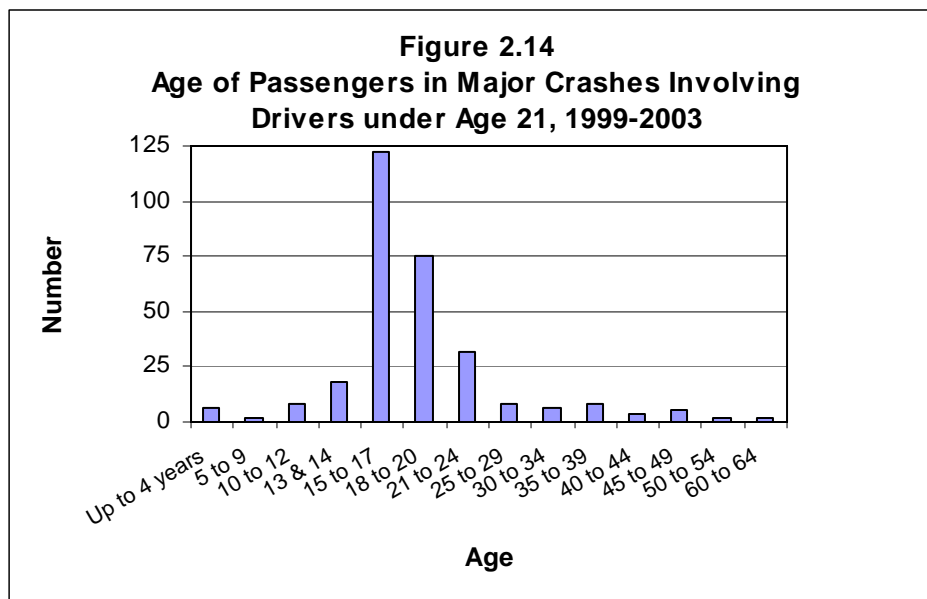
Next, an examination of the available data on passengers of young drivers for whom age and sex were known is presented below in [Table 2.13](#) and [Figure 2.14](#). Of the total 298 passengers riding with a young driver, 175 (58.7%) were male and 123 (41.3%) were female. Looking at individual age categories shows that for the largest group, 15-17 year olds, sex was evenly distributed with 61 (50%) for both males and females. In the next largest group, 18-20 year olds, there were 56 (74.7%) male passengers and only 19 (25.3%) female passengers. Likewise, the 21-24 year old age group was predominantly male with 26 (81.3%) of the 32 total passengers being of the male gender. Only 6 (18.8%) were females. Examining the total 298 passengers indicates that 76.8% (229) were fairly young and between the ages of 15-24, specifically, 40.9% were in the 15-17 age group, 25.2% in the 18-20 age range and 10.7% were between the ages of 21-24.

The analysis of operator age by time of day for young drivers involved in major crashes indicates that for every operator age 15-20 proportionately more crashes occurred in the afternoon hours between 2-6 pm with percentages by age ranging from 29.5% for 20 year olds to 42.9% for 15 year olds. For the 16, 17, 19 and 20 year olds the next most likely time to crash was in the evening hours between 6-10 pm, however, for the 18 year olds the next most likely time to crash was during midday, 10 am-2 pm and for 15 year olds the distribution was evenly split between midday and night. Midday was the next most common time period for many young drivers to be involved in crashes. This is presented in [Table 2.14](#) below.

**Table 2.13. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Age and Sex of Passengers in Major Crashes Involving Drivers under Age 21, 1999-2003**

Age	Male		Female		Total	
	N	%	N	%	N	%
Up to 4 years	1	16.7%	5	83.3%	6	100.0%
5 to 9	1	50.0%	1	50.0%	2	100.0%
10 to 12	3	37.5%	5	62.5%	8	100.0%
13 & 14	12	66.7%	6	33.3%	18	100.0%
15 to 17	61	50.0%	61	50.0%	122	100.0%
18 to 20	56	74.7%	19	25.3%	75	100.0%
21 to 24	26	81.3%	6	18.8%	32	100.0%
25 to 29	5	62.5%	3	37.5%	8	100.0%
30 to 34	5	83.3%	1	16.7%	6	100.0%
35 to 39	3	37.5%	5	62.5%	8	100.0%
40 to 44	0	0.0%	4	100.0%	4	100.0%
45 to 49	2	40.0%	3	60.0%	5	100.0%
50 to 54	0	0.0%	2	100.0%	2	100.0%
55 to 59	0	n.a.	0	n.a.	0	n.a.
60 to 64	0	0.0%	2	100.0%	2	100.0%
<b>Total</b>	<b>175</b>	<b>58.7%</b>	<b>123</b>	<b>41.3%</b>	<b>298</b>	<b>100.0%</b>

Note: persons with unknown age were excluded from the analysis.



**Table 2.14. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21, Operator Age by Time of Day, 1999-2003**

Age	Time of Day												Total	
	Early Morning 2am-6am		Morning 6am-10am		Midday 10am-2pm		Afternoon 2pm-6pm		Evening 6pm-10pm		Night 10pm-2am			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15	0	0.0%	0	0.0%	5	23.8%	9	42.9%	2	9.5%	5	23.8%	21	100.0%
16	1	1.1%	13	14.8%	17	19.3%	29	33.0%	22	25.0%	6	6.8%	88	100.0%
17	8	5.8%	11	7.9%	21	15.1%	47	33.8%	31	22.3%	21	15.1%	139	100.0%
18	11	6.5%	21	12.4%	36	21.2%	55	32.4%	28	16.5%	19	11.2%	170	100.0%
19	8	5.4%	19	12.9%	26	17.7%	48	32.7%	28	19.0%	18	12.2%	147	100.0%
20	12	10.7%	17	15.2%	15	13.4%	33	29.5%	22	19.6%	13	11.6%	112	100.0%
Total	40	5.9%	81	12.0%	120	17.7%	221	32.6%	133	19.6%	82	12.1%	677	100.0%

Findings on the contributing circumstances of young operators involved in major crashes are presented below in [Table 2.15](#). Not surprisingly, in many of these crashes the operators were driving too fast for conditions, specifically, 152 (19.1%) of the total 797 contributing circumstances listed were for driving too fast for conditions. Failure to yield (11.7%) and inattention (9.2%) were the next most prevalent contributing circumstances in young driver major crashes followed by excessive speed (7.7%) and failure to keep in proper lane/off road (7.0%). Other contributing circumstances included driving on the wrong side or wrong way (5.6%), operating vehicle recklessly (5.3%), under the influence of medication/drugs/alcohol (4.9%) and following too closely (4.5%). Causes including fell asleep, disregarded traffic signs, signals and improper turn were all in the 2-3% range. In comparison to the all crashes-2003 distribution, some of the young driver contributing circumstances which were proportionately higher included driving too fast for conditions (19.1% vs. 16.7%), operating vehicle recklessly (5.3% vs. 1.2%), excessive speed (7.7% vs. 1.3%), wrong side or wrong way (5.6% vs. .6%) and driving under the influence of medication/drugs/alcohol (4.9% vs. 2.1%). Some of the causes for the all crashes-2003 distribution which were higher than the young driver distribution included following too closely (8.5% vs. 4.5%), inattention (15.4% vs. 9.2%) and failure to keep in proper lane/off road (8.7% vs. 7.0%).

**Table 2.15. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21 by Operator Contributing Circumstances, 1999-2003**

Contributing Circumstances	N*	All Crashes 2003	
		%	%
Driving too fast for conditions	152	19.1%	16.7%
Failure to keep in proper lane/off road	56	7.0%	8.7%
Operating vehicle recklessly	42	5.3%	1.2%
Visibility obstructed	2	0.3%	2.9%
Excessive speed	61	7.7%	1.3%
Following too closely	36	4.5%	8.5%
Improper turn	26	3.3%	2.3%
Disregarded traffic signs, signals	22	2.8%	1.6%
Failure to yield	93	11.7%	12.7%
Inattention	73	9.2%	15.4%
Wrong side or wrong way	45	5.6%	0.6%
Fell asleep	19	2.4%	1.3%
Under influence of medication/drugs/alcohol	39	4.9%	2.1%
Operating defective equipment	9	1.1%	0.7%
Distraction caused by technology	2	0.3%	0.2%
Distracted	9	1.1%	1.5%
Swerving due to wind, slippery surface, etc	3	0.4%	2.2%
Failure to maintain control	15	1.9%	0.0%
Other/Unknown operator cause	93	11.7%	20.1%
<b>Total</b>	<b>797</b>	<b>100.0%</b>	<b>100.0%</b>

\*There can be a maximum of 2 contributing circumstances per operator.

An examination of citations issued to drivers under the age of 21 involved in major crashes indicates that 66 (20.2%) were written for speeding, 28 (8.6%) for operating without insurance and 25 (7.7%) for driving in road laned for traffic. The same number was written for DUI, DLS and failure to yield, i.e. 24 (7.4%). Other alcohol related citations accounted for 6.8% of the total and included under 18/21 & .02% or more alcohol concentration, minor (16+) consumption/possession of alcohol and consuming alcohol while driving. The distribution is presented in [Table 2.16](#) below.

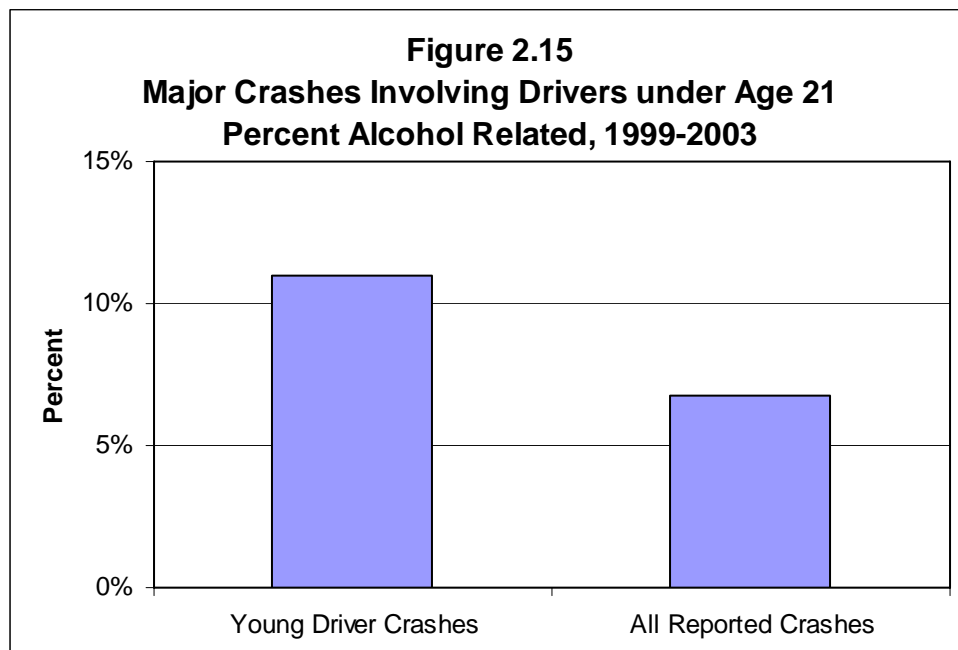
**Table 2.16. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Citations Issued to Drivers under 21 in Major Crashes, 1999-2003**

Violation	N	%
DUI	24	7.4%
Speeding	66	20.2%
Operating without insurance	28	8.6%
DLS	24	7.4%
Leaving scene of accident	7	2.1%
Following too closely	7	2.1%
Operating without license	7	2.1%
Careless & negligent	23	7.1%
Fail to yield	24	7.4%
Not registered	13	4.0%
Defective equipment	2	0.6%
Driving in road laned for traffic	25	7.7%
Driving to right	7	2.1%
Vehicle not inspected	0	0.0%
Under 18/21 & .02% or more alc conc	4	1.2%
Minor (16+) cons/poss of alcohol	10	3.1%
Consuming alcohol while driving	8	2.5%
Traffic control signal/device	4	1.2%
Operating w/o owner consent	3	0.9%
Turn prohibited	10	3.1%
All other	30	9.2%
<b>Total</b>	<b>326</b>	<b>100.0%</b>

Results of the analysis show that of the 636 young driver major crashes, 70 crashes (11%) were alcohol related. This is a higher proportion than that found for all reported crashes for 1999-2003 where 6.8% were found to be alcohol related. This is shown below in [Table 2.7](#) and [Figure 2.15](#).

**Table 2.17. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21 - Alcohol Related, 1999-2003**

	Number of Crashes	Alcohol Related Crashes	Percent Alcohol Related
Young Driver Crashes	636	70	11.0%
All Reported Crashes	34,094	2,304	6.8%

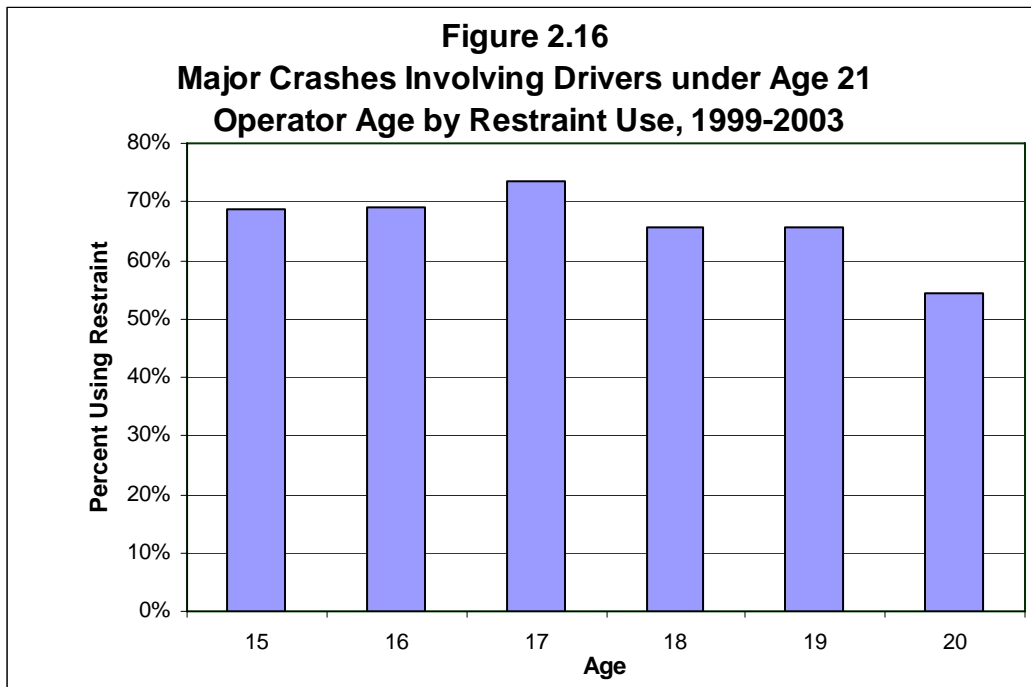


Restraint use findings by operator age for major crashes involving drivers under age 21 are presented below in [Table 2.18](#) and [Figure 2.16](#). The restraint usage analysis looked at passenger cars, sport utility vehicles, pick-up trucks and large trucks. Overall, 66.0% of these young drivers were using a restraint, 25.3% were not using a restraint and for 8.7% restraint use was unknown. Restraint use was the highest for the 17 year olds at 73.5% while the lowest was for 20 year olds at 54.3%. For the 15 and 16 year olds, restraint use was almost the same, specifically, 68.8% and 69.0%, respectively. The 18 and 19 year olds also had nearly the same restraint usage at 65.6% and 65.7%, respectively.

**Table 2.18. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21 by Operator Age & Restraint Use, 1999-2003**

Age	Restraint Use						Total	
	Used		Not Used		Unknown Use			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
15	11	68.8%	4	25.0%	1	6.3%	16	100.0%
16	60	69.0%	19	21.8%	8	9.2%	87	100.0%
17	100	73.5%	23	16.9%	13	9.6%	136	100.0%
18	107	65.6%	47	28.8%	9	5.5%	163	100.0%
19	90	65.7%	32	23.4%	15	10.9%	137	100.0%
20	57	54.3%	38	36.2%	10	9.5%	105	100.0%
Total	425	66.0%	163	25.3%	56	8.7%	644	100.0%

Note: persons with unknown age were excluded from the analysis.

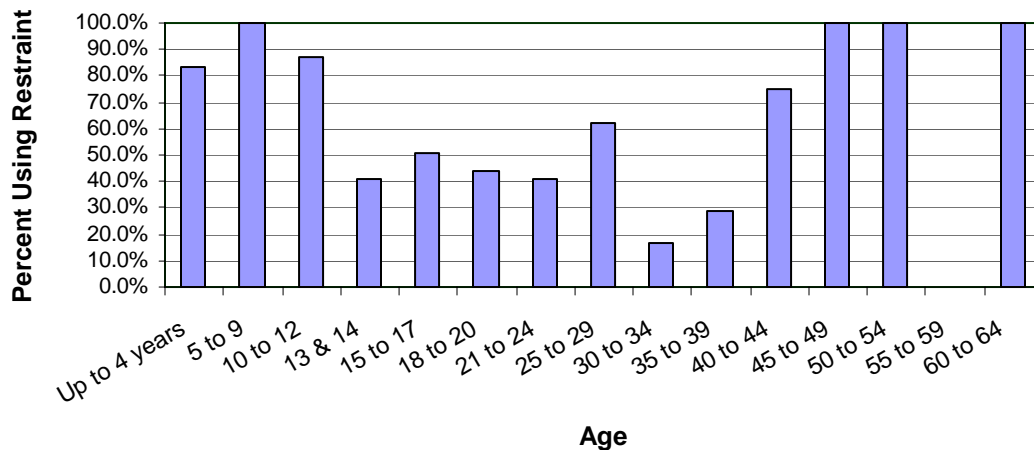


Lastly, a cross tabulation was examined for passenger age by restraint use in major crashes with young drivers. This information is presented below in [Table 2.19](#) and [Figure 2.17](#). Again, vehicle types included in the analysis were passenger cars, sport utility vehicles pick-up trucks and large trucks. The available data on passengers with known age shows that overall restraint usage was relatively low with only 50.2% reported as using a restraint. One hundred sixteen (39.3%) of the passengers were not using a restraint and for 31 (10.5%) passengers restraint use was unknown. A closer examination indicates that in the age group that comprised the most number of passengers, 15-17 year olds, 50.4% were using a restraint. For 18-20 year olds, 21-24 year olds and children age 13-14 the restraint usage was even lower at 43.8%, 40.6% and 41.2%, respectively.

**Table 2.19. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21 by Passenger Age & Restraint Use, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use		Number	Percent
	Number	Percent	Number	Percent	Number	Percent		
Up to 4 years	5	83.3%	0	0.0%	1	16.7%	6	100.0%
5 to 9	2	100.0%	0	0.0%	0	0.0%	2	100.0%
10 to 12	7	87.5%	0	0.0%	1	12.5%	8	100.0%
13 & 14	7	41.2%	7	41.2%	3	17.6%	17	100.0%
15 to 17	62	50.4%	54	43.9%	7	5.7%	123	100.0%
18 to 20	32	43.8%	28	38.4%	13	17.8%	73	100.0%
21 to 24	13	40.6%	14	43.8%	5	15.6%	32	100.0%
25 to 29	5	62.5%	3	37.5%	0	0.0%	8	100.0%
30 to 34	1	16.7%	5	83.3%	0	0.0%	6	100.0%
35 to 39	2	28.6%	4	57.1%	1	14.3%	7	100.0%
40 to 44	3	75.0%	1	25.0%	0	0.0%	4	100.0%
45 to 49	5	100.0%	0	0.0%	0	0.0%	5	100.0%
50 to 54	2	100.0%	0	0.0%	0	0.0%	2	100.0%
55 to 59	0	n.a.	0	n.a.	0	n.a.	0	n.a.
60 to 64	2	100.0%	0	0.0%	0	0.0%	2	100.0%
<b>Total</b>	<b>148</b>	<b>50.2%</b>	<b>116</b>	<b>39.3%</b>	<b>31</b>	<b>10.5%</b>	<b>295</b>	<b>100.0%</b>

**Table 2.17**  
**Major Crashes Involving Drivers under Age 21,**  
**Passenger Restraint Use by Age Category, 1999-2003**

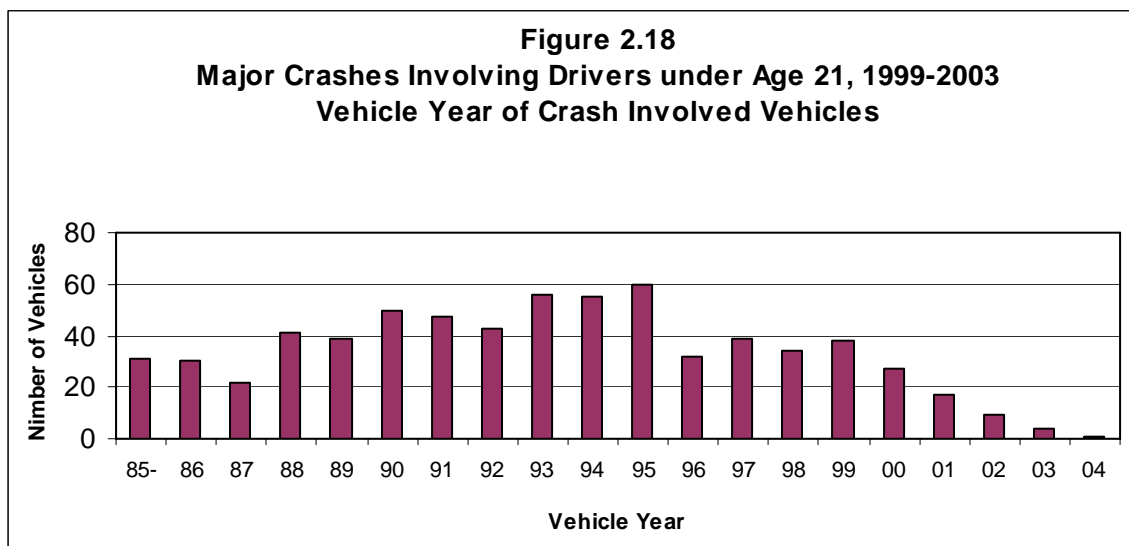


### Vehicle Characteristics

The only analysis done on vehicle characteristics for major crashes involving drivers under the age of 21 was a cross tabulation on vehicle year by age of driver. An examination of the findings shows that 4.5% of the vehicles involved in the crashes were in the 2001-2004 model year range, 25.1% were in the 1996-2000 year range, 38.7% were in the 1991-1995 year range and 31.6% were 1990 year model or older. This is presented below in Tables 2.20 and Figure 2.18.

**Table 2.20. Emphasis Area - Instituting Graduated Licensing for Young Drivers  
Major Crashes Involving Drivers under Age 21, Vehicle Year by Age of Drivers, 1999-2003**

Vehicle Year	Age												Total	
	15		16		17		18		19		20			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
1985 and Prior	0	0.0%	2	2.3%	5	3.6%	10	5.9%	7	4.8%	7	6.3%	31	4.6%
1986	0	0.0%	4	4.5%	5	3.6%	7	4.1%	9	6.2%	5	4.5%	30	4.4%
1987	2	9.5%	4	4.5%	3	2.2%	7	4.1%	2	1.4%	4	3.6%	22	3.3%
1988	0	0.0%	3	3.4%	9	6.5%	14	8.2%	8	5.5%	7	6.3%	41	6.1%
1989	2	9.5%	4	4.5%	6	4.3%	13	7.6%	11	7.5%	3	2.7%	39	5.8%
1990	0	0.0%	8	9.1%	7	5.1%	12	7.1%	13	8.9%	10	8.9%	50	7.4%
1991	2	9.5%	6	6.8%	15	10.9%	7	4.1%	10	6.8%	7	6.3%	47	7.0%
1992	0	0.0%	2	2.3%	12	8.7%	13	7.6%	7	4.8%	9	8.0%	43	6.4%
1993	0	0.0%	7	8.0%	9	6.5%	14	8.2%	15	10.3%	11	9.8%	56	8.3%
1994	1	4.8%	8	9.1%	16	11.6%	12	7.1%	11	7.5%	7	6.3%	55	8.1%
1995	0	0.0%	9	10.2%	21	15.2%	10	5.9%	13	8.9%	7	6.3%	60	8.9%
1996	2	9.5%	4	4.5%	4	2.9%	12	7.1%	3	2.1%	7	6.3%	32	4.7%
1997	1	4.8%	9	10.2%	6	4.3%	9	5.3%	8	5.5%	6	5.4%	39	5.8%
1998	2	9.5%	6	6.8%	8	5.8%	6	3.5%	7	4.8%	5	4.5%	34	5.0%
1999	1	4.8%	8	9.1%	7	5.1%	9	5.3%	7	4.8%	6	5.4%	38	5.6%
2000	3	14.3%	3	3.4%	2	1.4%	4	2.4%	9	6.2%	6	5.4%	27	4.0%
2001	4	19.0%	1	1.1%	2	1.4%	4	2.4%	3	2.1%	3	2.7%	17	2.5%
2002	1	4.8%	0	0.0%	0	0.0%	4	2.4%	2	1.4%	2	1.8%	9	1.3%
2003	0	0.0%	0	0.0%	1	0.7%	3	1.8%	0	0.0%	0	0.0%	4	0.6%
2004	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.7%	0	0.0%	1	0.1%
<b>Total</b>	<b>21</b>	<b>100.0%</b>	<b>88</b>	<b>100.0%</b>	<b>138</b>	<b>100.0%</b>	<b>170</b>	<b>100.0%</b>	<b>146</b>	<b>100.0%</b>	<b>112</b>	<b>100.0%</b>	<b>675</b>	<b>100.0%</b>



#### **IV. Emphasis Area – Improving the Design and Operation of Highway Intersections**

Data Analysis for the third emphasis area, Improving the Design and Operation of Highway Intersections, was conducted on 580 major crashes that occurred at an intersection during the period 1999-2003. Findings from the study for these crashes are presented in this section of the report.

##### Environment and Roadways

Examination of where the major intersection crashes occurred by county was the first step in the analysis for this emphasis area. Findings on the number of crashes, average annual rate per population and average annual rate per vehicle miles traveled are presented below in [Table 3.1](#), [Figure 3.1](#) and [Figure 3.2](#). Not surprisingly, a large number (160 or 27.6%) of these crashes occurred in the more densely populated area of Chittenden County. Bennington County (74 or 12.8%) had the next highest number of crashes followed by Rutland (56 or 9.7%) and Addison (50 or 8.6%) counties. Counties with the lowest number of major crashes at an intersection were Essex (4 or .7%), Grand Isle (7 or 1.2%) and Orange (11 or 1.9%). Inspection of the rate per 1,000 population indicates that Bennington County had the highest rate (.40) followed by Addison (.28), Lamoille (.27) and Chittenden (.22) counties. The lowest rates were found in Orange (.08), Essex (.12), Windsor (.12) and Washington (.13) counties. Grand Isle (.20), Rutland (.18) and Windham (.18) all had rates fairly close to the state average of .19. Looking at the rate per vehicle miles traveled shows that, again, the highest rates were found in Bennington (3.5), Addison (2.5), Lamoille (2.5) and Chittenden (2.1) counties. The lowest were found in Orange (.5) and Windsor (.7) counties.

Findings on major crashes occurring at an intersection by highway class are presented below in [Table 3.2](#) and [Figure 3.3](#). Almost 70% of these crashes occurred on state highways, 20.2% happened on town highways and only 9.8% on city/village highways. In comparison to all crashes in 2003 proportionally more major crashes at an intersection occurred on state highways (68.8% vs. 44.3%), about the same on town highways (20.2% vs. 21.5%) and less on city/village roads (9.8% vs. 12.5%) and interstates (.5 vs. 8.7%).

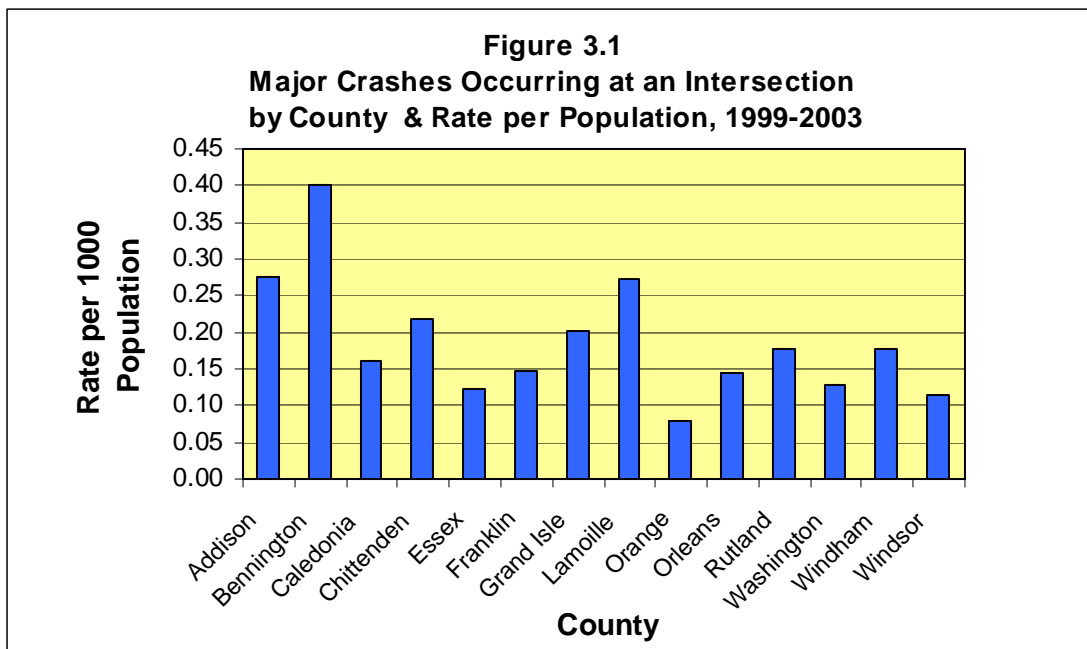
Results from the analysis of the major crashes occurring at an intersection by time of day show that 202 (35.0%) crashes occurred during the afternoon hours of 2-6 pm, 139 (24.1%) during midday (10 am-2 pm), 89 (15.4 %) in the evening (6-10 pm) and 80 (13.9%) during the morning hours of 6-10 am. Distribution by time of day is presented below in [Table 3.3](#) and [Figure 3.4](#). Comparing proportions for major crashes at an intersection by time of day to proportions for all crashes-2003 indicates some slight differences. Proportionately more major crashes at intersections happened in the afternoon (35.0% vs. 32.7%), during the evening (15.4% vs. 13.9%) and at night (8.0% vs. 6.5%) compared to all crashes in 2003. Slightly lower proportions occurred in the morning hours (13.9% vs. 17.8%) and during midday (24.1% vs. 25.6%) and exactly the same percentage took place during the early morning hours (3.6%) for both the intersection major crashes and the all crashes-2003. Note that 3 crashes had missing data on time of day.

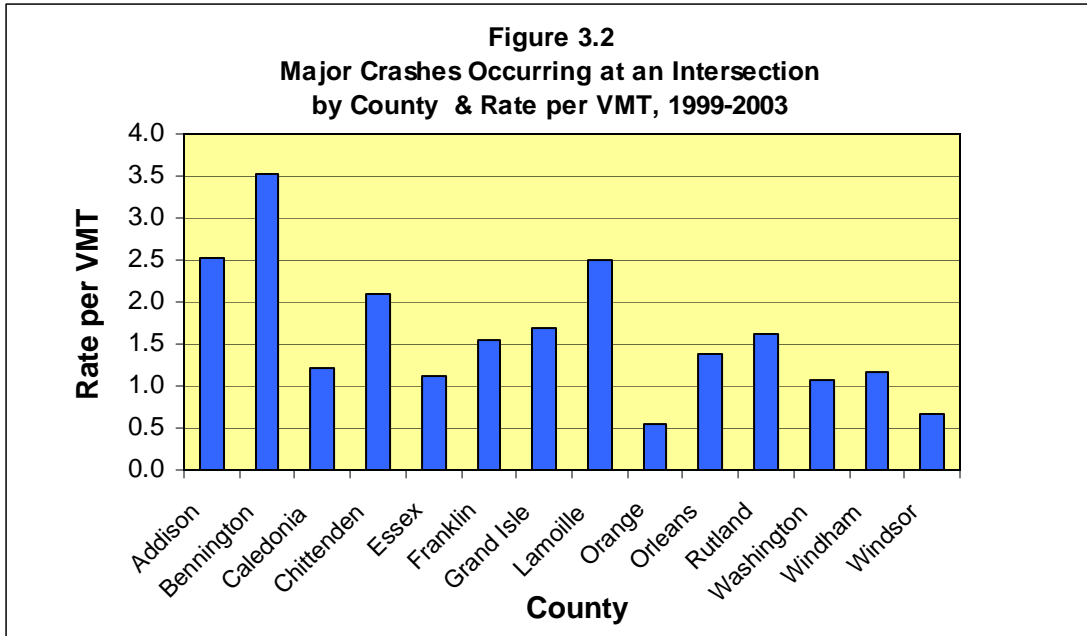
**Table 3.1. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by County, 1999-2003  
Number, Rate per Population & Rate per Vehicle Miles Traveled**

County	N	%	Average Annual Rate* per Population	Average Annual Rate** per Vehicle Miles Traveled
Addison	50	8.6%	0.28	2.5
Bennington	74	12.8%	0.40	3.5
Caledonia	24	4.1%	0.16	1.2
Chittenden	160	27.6%	0.22	2.1
Essex	4	0.7%	0.12	1.1
Franklin	34	5.9%	0.15	1.6
Grand Isle	7	1.2%	0.20	1.7
Lamoille	32	5.5%	0.27	2.5
Orange	11	1.9%	0.08	0.5
Orleans	19	3.3%	0.14	1.4
Rutland	56	9.7%	0.18	1.6
Washington	37	6.4%	0.13	1.1
Windham	39	6.7%	0.18	1.2
Windsor	33	5.7%	0.12	0.7
State Total	580	100.0%	0.19	1.6

\*Rate per 1,000 population.

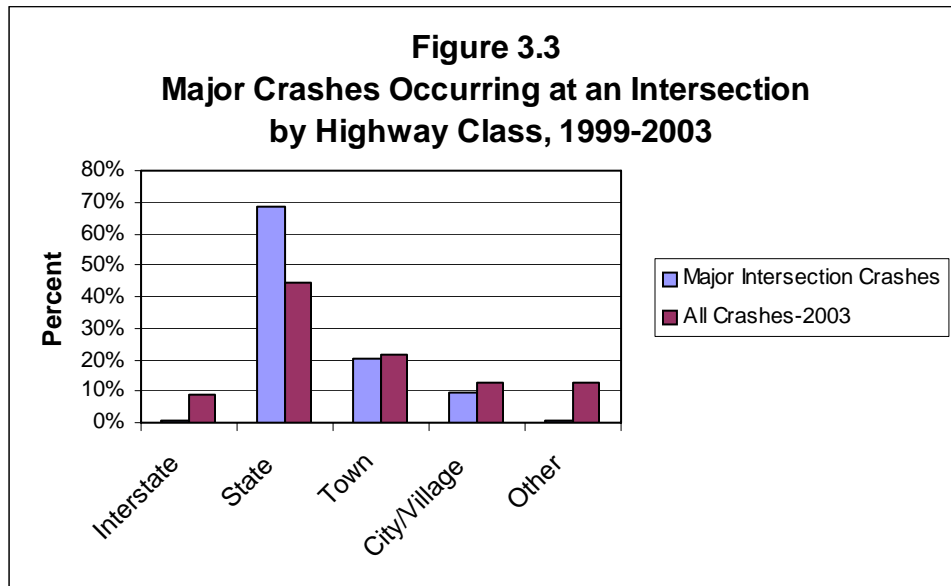
\*\*Rate per 100 Million VMT





**Table 3.2. Emphasis Area - Improving the Design and Operation of Highway Intersections**  
**Major Crashes Occurring at an Intersection by Highway Class, 1999-2003**

Highway Class	N	%	All Crashes 2003
			%
Interstate	3	0.5%	8.7%
State	399	68.8%	44.3%
Town	117	20.2%	21.5%
City/Village	57	9.8%	12.5%
Other	4	0.7%	12.9%
<b>Total</b>	<b>580</b>	<b>100.0%</b>	<b>100.0%</b>



**Table 3.3. Emphasis Area - Improving the Design and Operation of Highway Intersections**  
**Major Crashes Occurring at an Intersection by Time of Day, 1999-2003**

Time of Day	N	%	All Crashes 2003
			%
Early Morn (2-6 am)	21	3.6%	3.6%
Morning (6-10 am)	80	13.9%	17.8%
Midday (10 am -2 pm)	139	24.1%	25.6%
Afternoon (2-6 pm)	202	35.0%	32.7%
Evening (6-10 pm)	89	15.4%	13.9%
Night (10 pm - 2 am)	46	8.0%	6.5%
<b>Total</b>	<b>577</b>	<b>100.0%</b>	<b>100.0%</b>

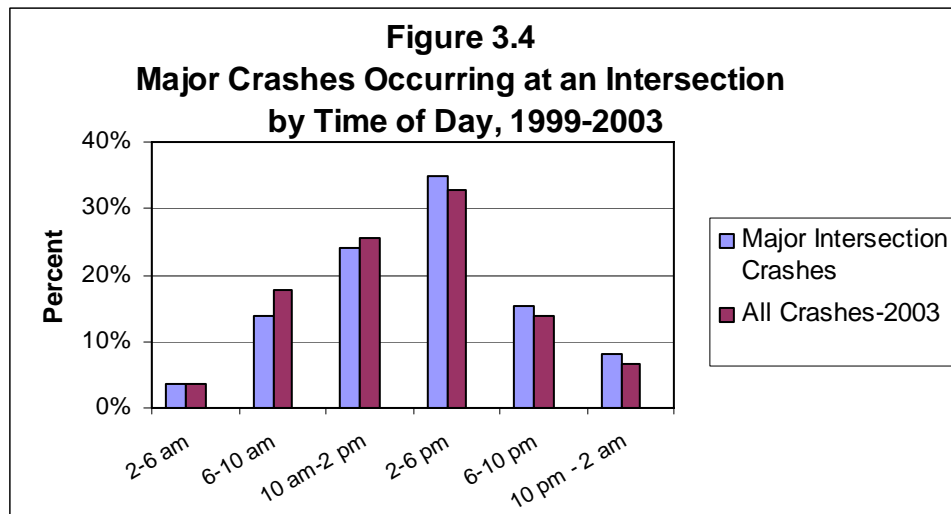
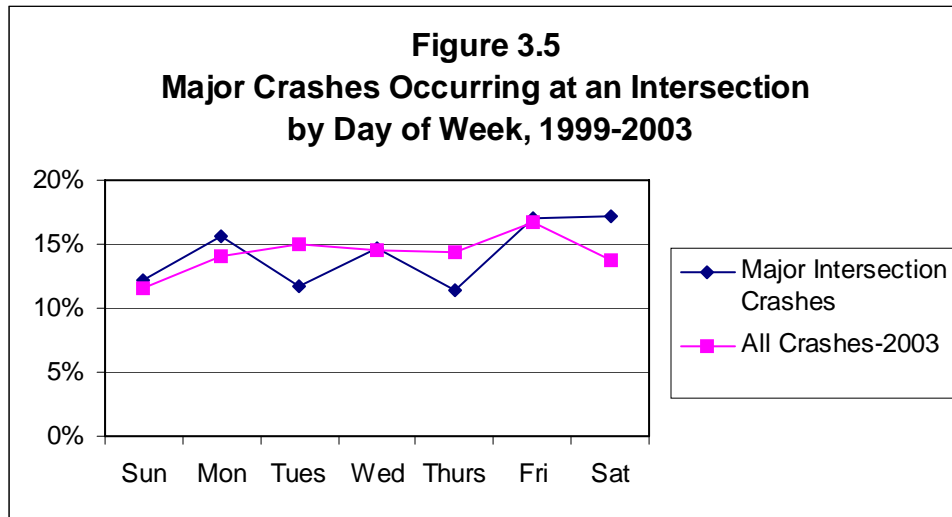


Table 3.4 and Figure 3.5 below present the analysis on major crashes occurring at intersections by day of week. More of these crashes took place on Friday (99) and Saturday (100) followed by Monday (91) and Wednesday (85) while fewer happened on Thursday (66), Tuesday (68) and Sunday (71). In comparing major crashes at an intersection by day of week to the all crashes-2003 distribution shows proportionately more of the intersection crashes occurred on Saturday (17.2% vs. 13.7%), slightly more happened on Monday (15.7% vs. 14.1%) while less occurred on Tuesday (11.7% vs. 15.0%) and Thursday (11.4% vs. 14.4%). Major crashes at intersections had nearly the same proportions as all crashes in 2003 on Sunday (12.2% vs. 11.6%), Wednesday (14.7% vs. 14.5%) and Friday (17.1% vs. 16.7%).

An examination of major crashes occurring at intersections by month indicates that higher than the average number of crashes occurred in August (58), January (57), November (57), September (55) and February (52). The months with the lowest number of crashes were April (37) and October (37). Almost nearly the same proportions of crashes occurred during February through July for major crashes at an intersection and all crashes in 2003. Proportionately higher numbers of intersection major crashes compared to all crashes-2003 occurred during August, September and November, specifically, 10.0% vs. 7.7%, 9.5% vs. 7.2% and 9.8% vs. 8.2%, respectively. Conversely, proportionately fewer major crashes occurring at an intersection happened in January (9.8% vs. 11.7%), October (6.4% vs. 8.2%) and December (9.0% vs. 11.7%). These findings are presented below in Table 3.5 and Figure 3.6.

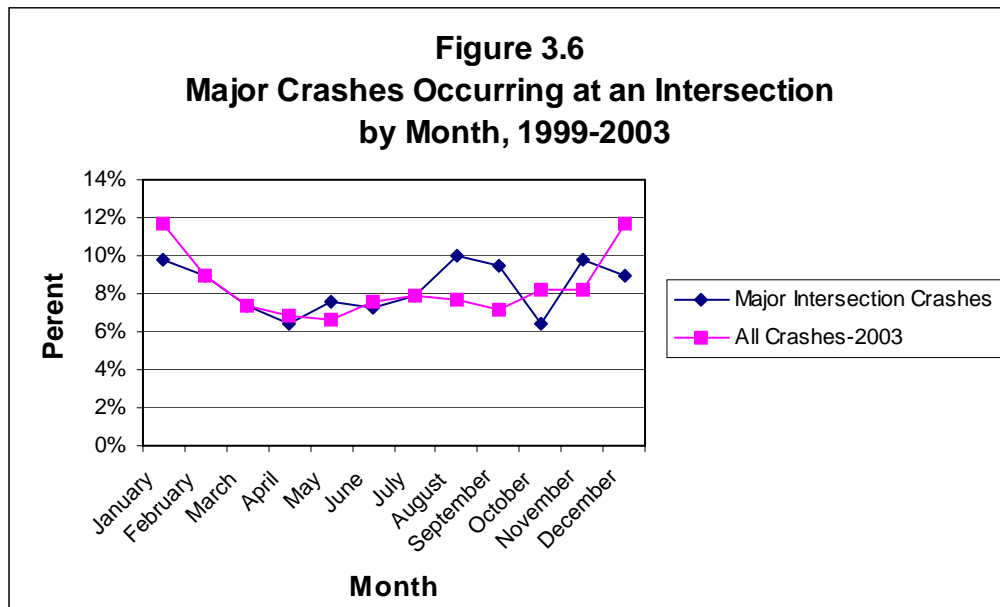
**Table 3.4. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by Day of Week, 1999-2003**

Day of Week	N	%	All Crashes 2003
			%
Sunday	71	12.2%	11.6%
Monday	91	15.7%	14.1%
Tuesday	68	11.7%	15.0%
Wednesday	85	14.7%	14.5%
Thursday	66	11.4%	14.4%
Friday	99	17.1%	16.7%
Saturday	100	17.2%	13.7%
Total	580	100.0%	100.0%



**Table 3.5. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by Month, 1999-2003**

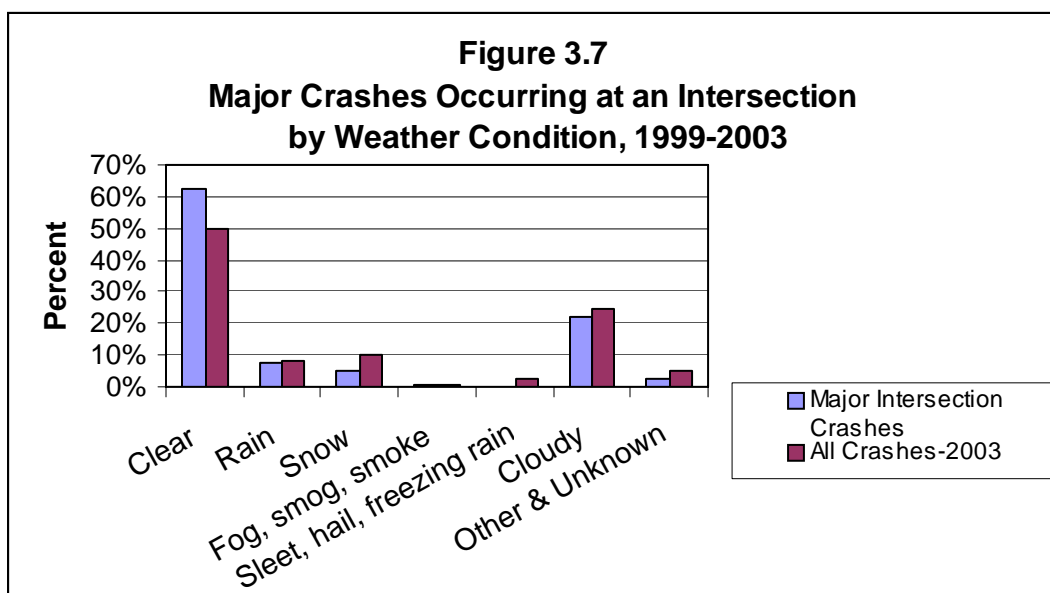
Month	N	%	All Crashes 2003 %
January	57	9.8%	11.7%
February	52	9.0%	9.0%
March	43	7.4%	7.4%
April	37	6.4%	6.8%
May	44	7.6%	6.6%
June	42	7.2%	7.6%
July	46	7.9%	7.9%
August	58	10.0%	7.7%
September	55	9.5%	7.2%
October	37	6.4%	8.2%
November	57	9.8%	8.2%
December	52	9.0%	11.7%
Average	48		
Total	580	100.0%	100.0%



Most major crashes at an intersection occurred under clear (361 crashes or 62.2%) or cloudy (128 or 22.1%) weather conditions. Not many happened when it was raining (45 or 7.8%) or snowing (29 or 5.0%) and even less occurred under fog, smog, smoke (2 or .3%) and sleet, hail, freezing rain (1 or .2%). Distributions for weather conditions are presented below in [Table 3.6](#) and [Figure 3.7](#). Comparatively, proportionately more intersection major crashes occurred when weather conditions were clear than in the all crashes-2003 distribution, specifically, 62.2% vs. 49.7%. In all other weather conditions the all crashes-2003 had slightly higher proportions.

**Table 3.6. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by Weather Conditions, 1999-2003**

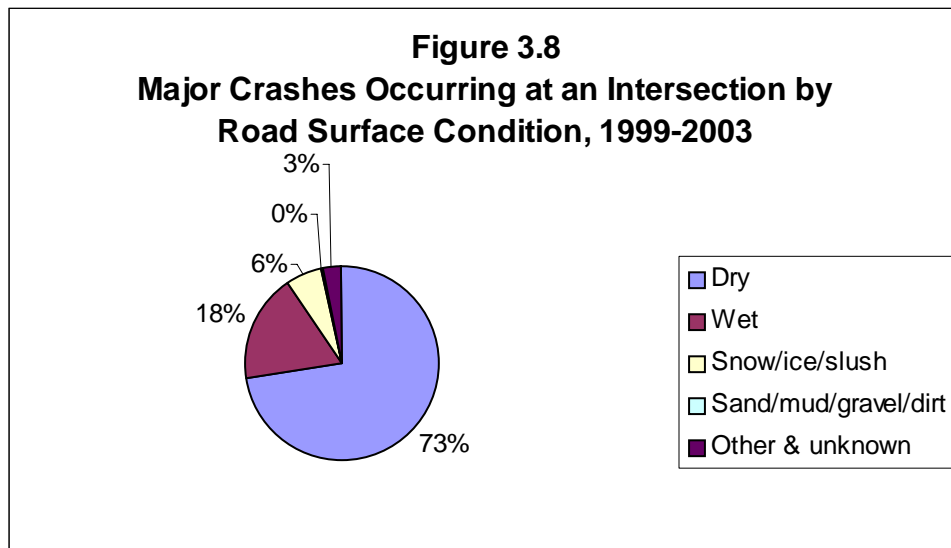
Weather	N	%	All Crashes 2003 %
Clear	361	62.2%	49.7%
Rain	45	7.8%	8.0%
Snow	29	5.0%	10.0%
Fog, smog, smoke	2	0.3%	0.7%
Sleet, hail, freezing rain	1	0.2%	2.4%
Cloudy	128	22.1%	24.4%
Other & Unknown	14	2.4%	5.0%
Total	580	100.0%	100.0%

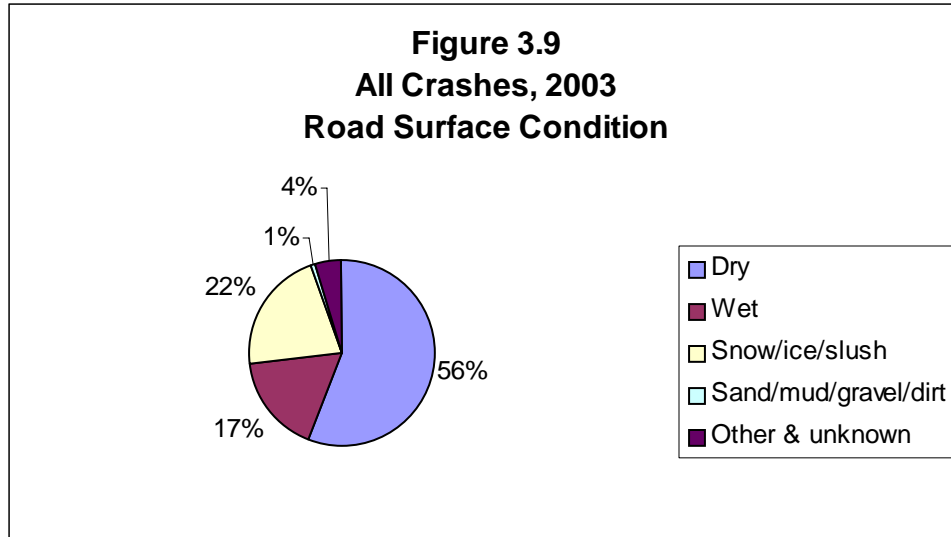


Next, findings from the analysis on major crashes occurring at an intersection by road surface condition indicate that, not surprisingly, most (90.7%) of these crashes occurred when the roads were either dry or wet. Examining these categories separately shows that almost 73% (421 crashes) took place on dry roads and 18.1% (105) on wet roads. Only 35 (6.0%) intersection major crashes occurred on snow/ice/slush. A comparative analysis shows proportionately less of the all crashes-2003 happened on dry road surfaces (55.9% vs. 72.6%) compared to the intersection distribution. Both distributions had nearly the same proportions for wet surfaces, i.e., 17.0% for all crashes 2003 and 18.1% for intersection major crashes. Lastly, proportionally more crashes in 2003 occurred on road surfaces with snow/ice/slush (21.9%) than in the intersection major crash scenario (6.0%). This information is presented below in [Table 3.7](#), [Figure 3.8](#) and [Figure 3.9](#).

**Table 3.7. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by Road Surface Condition, 1999-2003**

Surface Condition	N	%	All Crashes 2003
			%
Dry	421	72.6%	55.9%
Wet	105	18.1%	17.0%
Snow/ice/slush	35	6.0%	21.9%
Sand/mud/gravel/dirt	1	0.2%	0.9%
Other & unknown	18	3.1%	4.4%
Total	580	100.0%	100.0%





Distributions for lighting conditions for major crashes occurring at an intersection and all crashes in 2003 are presented in [Table 3.8](#) below. Almost 72% (417 crashes) occurred in daylight and around 26% occurred when it was dusk (22), dark (77) or dark with streetlights (53). The distributions for both intersection major crashes and all crashes in 2003 were nearly the same proportions for all lighting conditions.

**Table 3.8. Emphasis Area - Improving the Design and Operation of Highway Intersections**  
**Major Crashes Occurring at an Intersection by Lighting Conditions, 1999-2003**

Lighting Condition	N	%	All Crashes 2003
			%
Dawn	9	1.6%	1.3%
Day	417	71.9%	70.5%
Dusk	22	3.8%	3.0%
Dark	77	13.3%	13.7%
Street Lights	53	9.1%	9.0%
Other/Unknown	2	0.3%	2.5%
<b>Total</b>	<b>580</b>	<b>100.0%</b>	<b>100.0%</b>

Available data on 479 major crashes occurring at an intersection shows that 65.1% of these crashes happened in the lower posted speed ranges of 25-40 miles per hour while 32.5% occurred in the 50-65 miles per hour range. Looking at the all crash-2003 distribution shows similar proportions for these ranges, i.e., 62.7% for 25-40 mph and 35.2% for 50-65 mph. For intersection major crashes the posted speed with the largest number of crashes (141) was 50 miles per hour. Proportionally more of these intersection crashes (29.4%) occurred in the 50 mph range than did the all crashes-2003 (22.8%). The posted speed limit with the next largest number of major intersection crashes (104) was 35 miles per hour. Nearly the same proportions were found in both distributions for this posted speed limit. Note that there were 101 intersection major crashes with missing data on posted speed. Findings on posted speed are presented below in [Table 3.9](#) and [Figure 3.10](#).

**Table 3.9. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by Posted speed, 1999-2003**

Posted Speed	N	%	All Crashes 2003 %
<20	1	0.2%	0.5%
20	0	0.0%	0.1%
25	59	12.3%	16.5%
30	75	15.7%	13.7%
35	104	21.7%	22.4%
40	74	15.4%	10.1%
45	10	2.1%	1.5%
50	141	29.4%	22.8%
55	10	2.1%	1.7%
65	5	1.0%	10.7%
Total	479	100.0%	100.0%

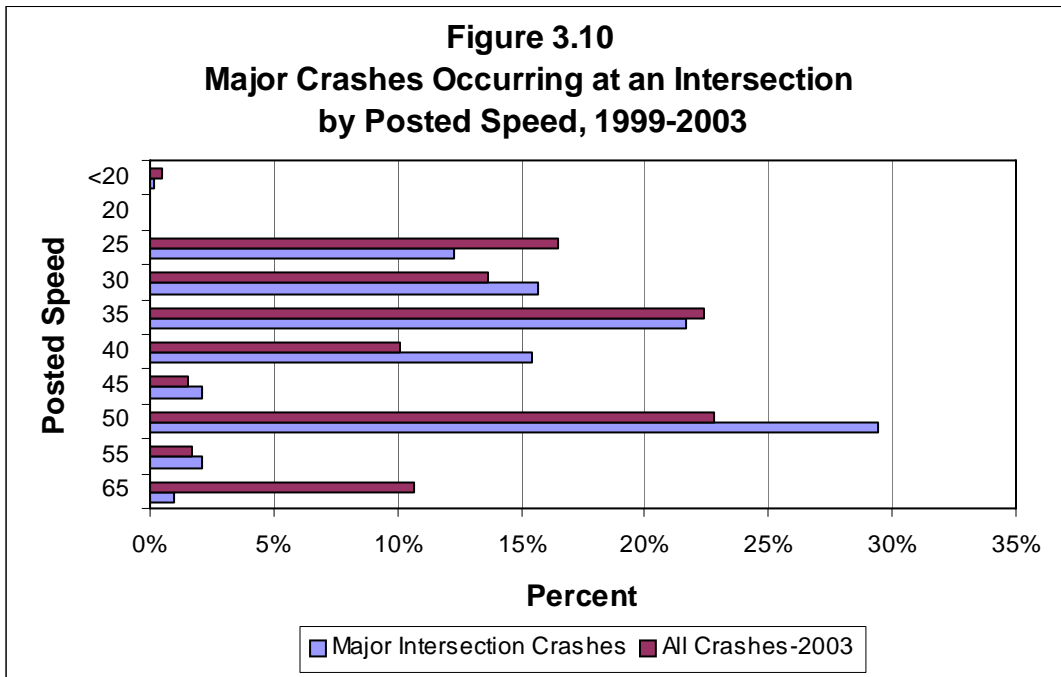
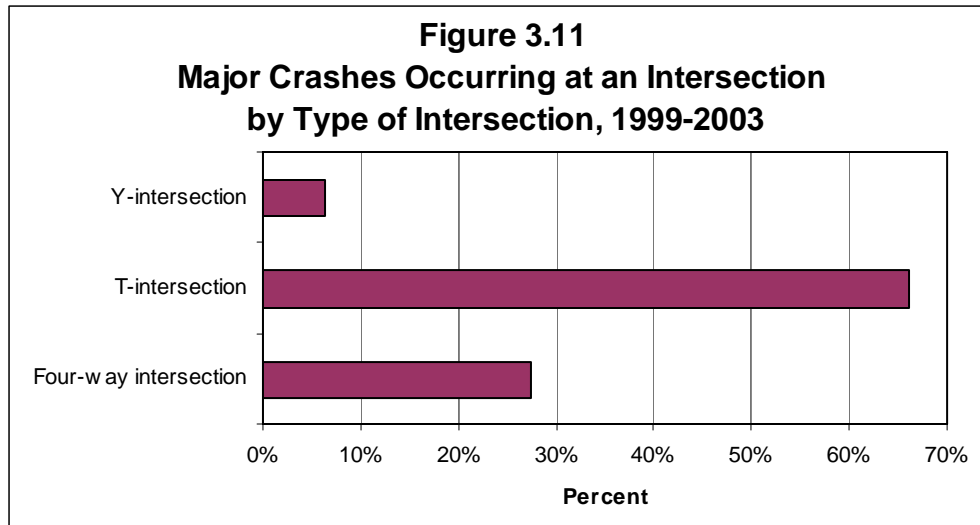


Table 3.10 and Figure 3.11 below show the number and percent of major crashes occurring at an intersection by type of intersection. Specifically, 384 (66.2%) of these crashes happened at T-intersections, 159 (27.4%) occurred at four-way intersections and only 37 (6.4%) happened at Y-intersections.

**Table 3.10. Emphasis Area - Improving the Design and Operation of Highway Intersections**  
**Major Crashes Occurring at an Intersection by Type of Intersection, 1999-2003**

Type Intersection	N	%
Four-way intersection	159	27.4%
T-intersection	384	66.2%
Y-intersection	37	6.4%
Total	580	100.0%



An examination of traffic control for major crashes occurring at intersections indicates that 164 (28.3%) of these crashes happened at stop signs on cross street only and 150 (25.9%) took place where there was no traffic control. Only 29 crashes (5.0%) occurred at a traffic signal (normal operation). A large number of these crashes (221) were coded other or unknown in the data. Table 3.11 below shows the distribution for traffic control.

**Table 3.11. Emphasis Area - Improving the Design and Operation of Highway Intersections**  
**Major Crashes Occurring at an Intersection by Traffic Control, 1999-2003**

Traffic Control	N	%
None	150	25.9%
Stop signs on cross street only	164	28.3%
Stop signs on mainline only	2	0.3%
All-way stop signs	3	0.5%
All-way flasher (red on cross street)	3	0.5%
All-way flasher (red on mainline)	0	0.0%
All-way flasher (red on all)	1	0.2%
Yield signs on cross street only	5	0.9%
Yield signs on mainline only	1	0.2%
Traffic Signal (normal operation)	29	5.0%
Traffic signal (flashing)	1	0.2%
Officer	0	0.0%
Flagman	0	0.0%
Other/Unknown	221	38.1%
<b>Total</b>	<b>580</b>	<b>100.0%</b>

Findings for traffic control by time of day are presented in [Table 3.12](#) below. Not surprisingly, for most traffic control types more crashes happen in the afternoon hours from 2-6 pm. A closer examination indicates that for stop signs 62 crashes (36.9%) occurred in the afternoon, 42 (25.0%) happened during midday (10 am-2 pm) and 26 (15.5%) took place in the morning hours of 6 am – 10 am. Where there was no traffic control 47 (31.3%) crashes occurred in the afternoon, 38 (25.3%) during midday and 29 (19.3%) in the evening. For traffic signals, 12 crashes (40%) happened in the afternoon and 11 (36.7%) occurred during midday.

**Table 3.12. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes at Intersections, Traffic Control by Time of Day, 1999-2003**

Traffic Control	Time of Day												Total	
	Early Morning 2am-6am		Morning 6am-10am		Midday 10am-2pm		Afternoon 2pm-6pm		Evening 6pm-10pm		Night 10pm-2am			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
None	6	4.0%	17	11.3%	38	25.3%	47	31.3%	29	19.3%	13	8.7%	150	100.0%
Stop signs	5	3.0%	26	15.5%	42	25.0%	62	36.9%	18	10.7%	15	8.9%	168	100.0%
All-way flashers	1	25.0%	0	0.0%	1	25.0%	1	25.0%	1	25.0%	0	0.0%	4	100.0%
Yield signs	0	0.0%	3	50.0%	0	0.0%	3	50.0%	0	0.0%	0	0.0%	6	100.0%
Traffic Signal	0	0.0%	4	13.3%	11	36.7%	12	40.0%	3	10.0%	0	0.0%	30	100.0%
Other/Unknown	9	4.1%	30	13.7%	47	21.5%	77	35.2%	38	17.4%	18	8.2%	219	100.0%
Total	21	3.6%	80	13.9%	139	24.1%	202	35.0%	89	15.4%	46	8.0%	577	100.0%

Lastly, an analysis of average annual daily traffic volume by major crashes occurring at an intersection shows that of the 428 intersection major crashes with available data around 39% occurred at an intersection with the average annual daily traffic volume range of 10,000+. For the traffic volume ranges 5,000-9,999 and 1,000-4,999 similar proportions were found, i.e., 28.7% and 27.8%, respectively. These proportions are for the 2000 average annual daily traffic variable, however, the 2002 variable had nearly the same proportions. This information is presented in [Table 3.13](#) below.

**Table 3.13. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by Average Annual Daily Traffic, 1999-2003**

AADT Group	AADT - 2000		AADT - 2002	
	N	%	N	%
<400	13	3.0%	14	3.3%
400-999	6	1.4%	5	1.2%
1,000-4,999	119	27.8%	116	27.1%
5,000-9,999	123	28.7%	123	28.7%
10,000+	167	39.0%	170	39.7%
Total	428	100.0%	428	100.0%

### Person Characteristics

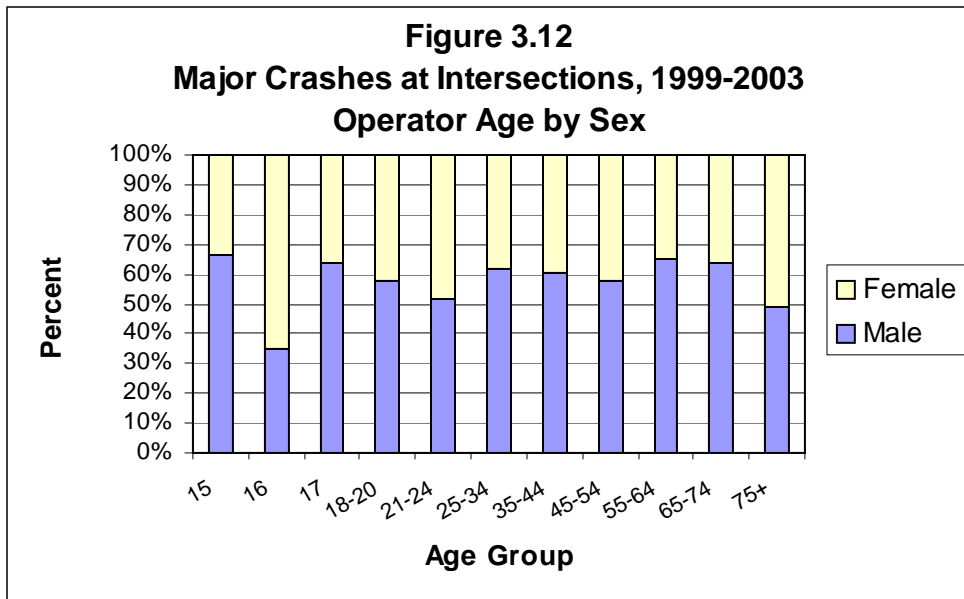
Analytical results from the study regarding people are presented in this section of the report on intersection major crashes. The primary focus is driver involvement in the crashes, however, some analysis was conducted for pedestrians and bicyclists. Available demographic data on drivers was examined as well as key crash contributing factors attributed to the driver.

First, a cross tabulation was examined for age of operators by sex for all operators with known age and sex. Findings are presented below in [Table 3.14](#) and [Figure 3.12](#). The results show that of the 1,044 operators, 609 (58.3%) were male and 435 (41.7%) were female. A closer examination by particular age groups shows that in the 21-24 year old and 75+ age groups, crash operators were almost evenly split by sex, specifically, 51.7% male vs. 48.3% female and 49.2% male vs. 50.8% female, respectively. For age groups 55-64, 65-74 and 17 year olds, males accounted for slightly higher proportions than the overall percent at 65.1%, 63.8% and 63.6%, respectively. Drivers in intersection major crashes and drivers in all crashes-2003 had nearly the same percentages by sex.

Next, findings on the number of crash operators by age, average annual rate per population and average annual rate per licenses are presented below in [Table 3.15](#). Crash rates are depicted graphically in [Figure 3.15](#). The 35-44 year old operators comprised the largest number of crash operators (199 or 19.0%) followed by 25-34 year olds (180 or 17.2%) and 45-54 year olds (156 or 14.9%). Young drivers under the age of 24 accounted for around 28.3% of the total. Examination of the average annual rate per population shows that the highest rates are for the 17, 18-20 and 21-24 year olds at .74, .82 and .78, respectively. Similarly, average annual rates per licenses were higher for younger drivers with 18-20 year olds experiencing the highest rate at .89 followed by 17 year olds at .83. The 21-24 year olds and the 16 year olds also had higher rates per licenses at .67 and .64, respectively.

**Table 3.14. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Age & Sex of Operators Involved in Major Crashes at Intersections, 1999-2003**

Age Group	Male		Female		Total	
	N	%	N	%	N	%
15	2	66.7%	1	33.3%	3	100.0%
16	8	34.8%	15	65.2%	23	100.0%
17	21	63.6%	12	36.4%	33	100.0%
18-20	66	57.4%	49	42.6%	115	100.0%
21-24	62	51.7%	58	48.3%	120	100.0%
25-34	110	61.5%	69	38.5%	179	100.0%
35-44	120	60.3%	79	39.7%	199	100.0%
45-54	90	57.7%	66	42.3%	156	100.0%
55-64	56	65.1%	30	34.9%	86	100.0%
65-74	44	63.8%	25	36.2%	69	100.0%
75+	30	49.2%	31	50.8%	61	100.0%
<b>Total</b>	<b>609</b>	<b>58.3%</b>	<b>435</b>	<b>41.7%</b>	<b>1,044</b>	<b>100.0%</b>
All Crash Involved Operators 2003		57.4%		42.6%		



**Table 3.15. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by Operator Age, 1999-2003  
Number, Rate per Population & Rate per Licenses**

Age Group	Crash Operators		Average Annual Rate* per Population	Average Annual Rate** per Licenses
	N	%		
15	3	0.3%	0.07	0.13
16	23	2.2%	0.52	0.64
17	33	3.2%	0.74	0.83
18-20	115	11.0%	0.82	0.89
21-24	121	11.6%	0.78	0.67
25-34	180	17.2%	0.48	0.39
35-44	199	19.0%	0.40	0.36
45-54	156	14.9%	0.33	0.30
55-64	86	8.2%	0.29	0.26
65-74	69	6.6%	0.35	0.33
75+	61	5.8%	0.33	0.31
<b>Total</b>	<b>1,046</b>	<b>100.0%</b>	<b>0.43</b>	<b>0.39</b>

\*Rate per 1000 population.

\*\*Rate per 1000 licensed drivers.

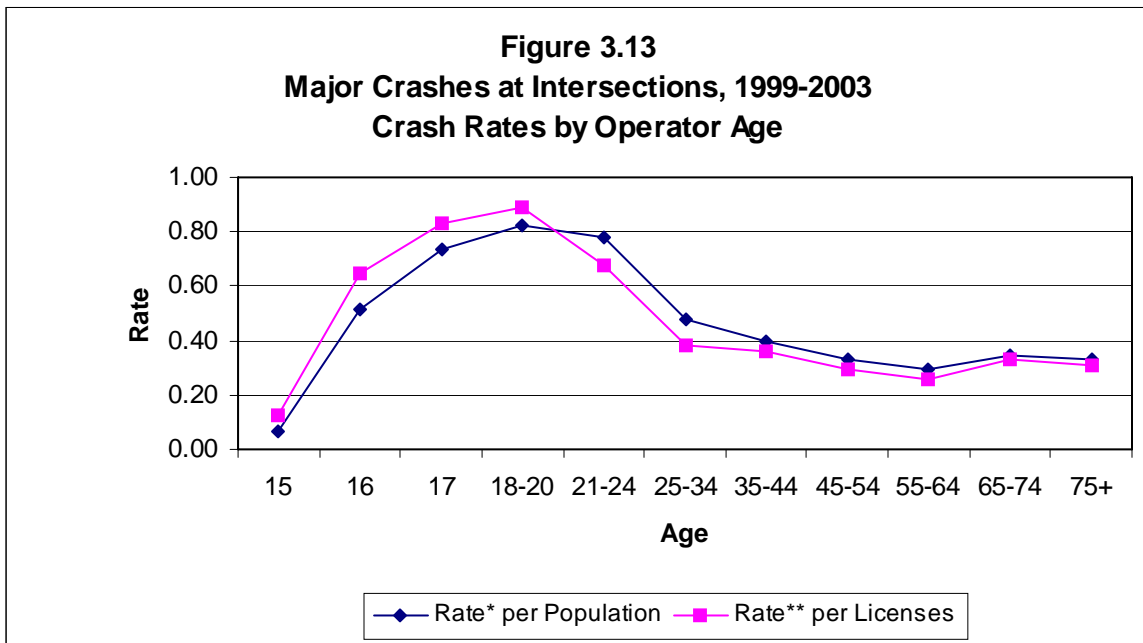


Table 3.16 below presents operator age by time of day for major crashes occurring at an intersection. Findings show that operators age 16 to 55-64 tended to crash most often during the afternoon hours between 2-6 pm, percentages for this time period ranged from 33.0% for 21-24 and 35-44 year olds to 43.5% for 16 year olds. For drivers age 65 and older proportionately more tended to crash during midday followed by afternoon. The next most likely time period to crash for 35-64 year olds was during the midday, while for 17-34 year olds the midday and evening hours had nearly the same proportions for crash operators. For 16 year olds the next most likely time to be involved in an intersection crash was during the evening.

**Table 3.16. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes at Intersections, Operator Age by Time of Day, 1999-2003**

Age Group	Time of Day												Total	
	Early Morning		Morning		Midday		Afternoon		Evening		Night			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15	0	0.0%	0	0.0%	1	33.3%	1	33.3%	1	33.3%	0	0.0%	3	100.0%
16	0	0.0%	2	8.7%	2	8.7%	10	43.5%	8	34.8%	1	4.3%	23	100.0%
17	1	3.0%	2	6.1%	8	24.2%	12	36.4%	7	21.2%	3	9.1%	33	100.0%
18 to 20	8	7.0%	12	10.4%	22	19.1%	40	34.8%	21	18.3%	12	10.4%	115	100.0%
21 to 24	1	0.8%	17	14.2%	26	21.7%	40	33.3%	27	22.5%	9	7.5%	120	100.0%
25 to 34	6	3.3%	29	16.1%	33	18.3%	68	37.8%	33	18.3%	11	6.1%	180	100.0%
35 to 44	4	2.0%	38	19.3%	53	26.9%	65	33.0%	23	11.7%	14	7.1%	197	100.0%
45 to 54	6	3.9%	21	13.6%	34	22.1%	62	40.3%	22	14.3%	9	5.8%	154	100.0%
55 to 64	3	3.5%	11	12.9%	20	23.5%	36	42.4%	12	14.1%	3	3.5%	85	100.0%
65 to 74	1	1.4%	10	14.5%	28	40.6%	20	29.0%	5	7.2%	5	7.2%	69	100.0%
75 and older	0	0.0%	6	9.8%	31	50.8%	18	29.5%	3	4.9%	3	4.9%	61	100.0%
Total	30	2.9%	148	14.2%	258	24.8%	372	35.8%	162	15.6%	70	6.7%	1,040	100.0%

Findings on the contributing circumstances of operators in major crashes occurring at an intersection are presented below in Table 3.17. Not surprisingly, 247 (27.6%) of the total 896 contributing circumstances were for failure to yield. Inattention (10.7%) and disregarded traffic signs, signals (9.2%) accounted for fairly large percentiles followed by driving too fast for conditions (5.8%), following too closely (5.8%), improper turn (5.1%) and under the influence of medication/drugs/alcohol (4.7%). Excessive speed, wrong side or wrong way and failure to keep in proper lane/off road all had percentages close in value, specifically, 3.1%, 2.9% and 2.8%, respectively. In comparison to the all crash-2003 distribution, some of the intersection major crash operator causes which were proportionately higher included failure to yield (27.6% vs. 12.7%), disregarded traffic signs, signals (9.2% vs. 1.6%), improper turn (5.1% vs. 2.3%) and under the influence of medication/drugs/alcohol (4.7% vs. 2.1%). Conversely, causes which were proportionally lower in the intersection crashes included driving too fast for conditions (5.8% vs. 16.7%), failure to keep in proper lane/off road (2.8% vs. 8.7%), following too closely (5.8% vs. 8.5%) and inattention (10.7% vs. 15.4%).

**Table 3.17. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by Contributing Circumstances, 1999-2003**

Contributing Circumstances	N	%	All Crashes 2003
			%
Driving too fast for conditions	52	5.8%	16.7%
Failure to keep in proper lane/off road	25	2.8%	8.7%
Operating vehicle recklessly	21	2.3%	1.2%
Visibility obstructed	10	1.1%	2.9%
Excessive speed	28	3.1%	1.3%
Following too closely	52	5.8%	8.5%
Improper turn	46	5.1%	2.3%
Disregarded traffic signs, signals	82	9.2%	1.6%
Failure to yield	247	27.6%	12.7%
Inattention	96	10.7%	15.4%
Wrong side or wrong way	26	2.9%	0.6%
Fell asleep	11	1.2%	1.3%
Under influence of medication/drugs/alcohol	42	4.7%	2.1%
Operating defective equipment	12	1.3%	0.7%
Distraction caused by technology	5	0.6%	0.2%
Distracted	5	0.6%	1.5%
Swerving due to wind, slippery surface, etc	7	0.8%	2.2%
Failure to maintain control	9	1.0%	0.0%
Other/Unknown operator cause	120	13.4%	20.1%
Total	896	100.0%	100.0%

An examination of the frequency distribution for citations issued in major crashes occurring at an intersection indicates that 63 (21.6%) citations were written for failure to yield and 38 (13.0%) for DUI. Other common citations written were for DLS (9.2%), operating without insurance (8.6%), speeding (7.5%) and turn prohibited (6.8%). This information is shown in Table 3.18 below.

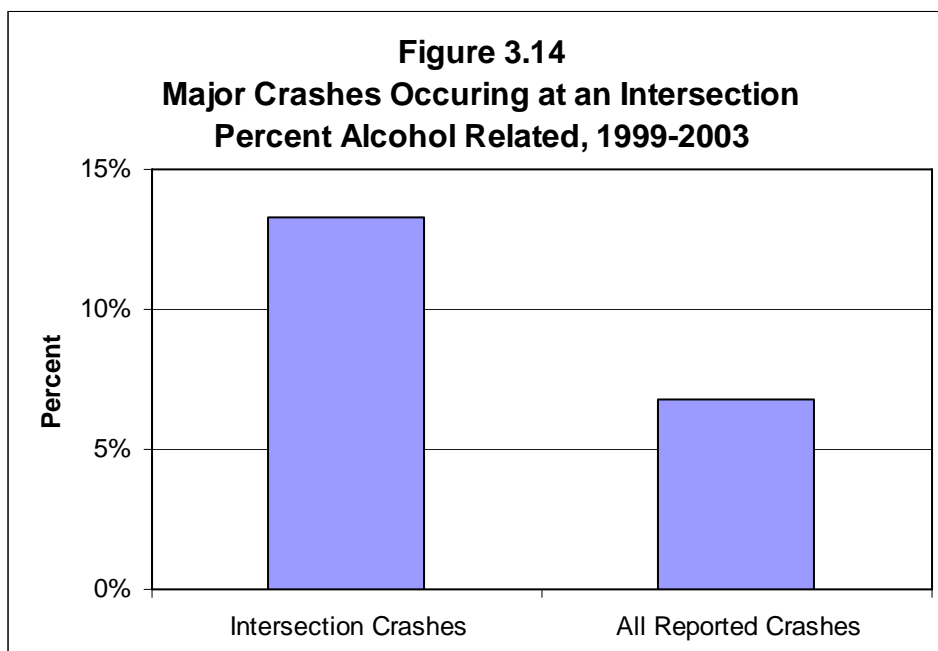
**Table 3.18. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Citations Issued in Major Crashes Occurring at an Intersection, 1999-2003**

Violation	N	%
DUI	38	13.0%
Speeding	22	7.5%
Operating without insurance	25	8.6%
DLS	27	9.2%
Leaving scene of accident	8	2.7%
Following too closely	8	2.7%
Operating without license	4	1.4%
Careless & negligent	9	3.1%
Fail to yield	63	21.6%
Not registered	5	1.7%
Defective equipment	5	1.7%
Driving in road laned for traffic	6	2.1%
Driving to right	6	2.1%
Vehicle not inspected	0	0.0%
Under 18 & .02% or more alc conc	0	0.0%
Minor (16+) consumption of alcohol	1	0.3%
Consuming alcohol while driving	2	0.7%
Traffic control signal/device	13	4.5%
Operating w/o owner consent	2	0.7%
Turn prohibited	20	6.8%
All other	28	9.6%
Total	292	100.0%

Results from the analysis show that 77 (13.3%) of the intersection major crashes were alcohol related. This is almost double the percentage that was found for all reported crashes from 1999-2003 where 6.8% were found to be alcohol related. [Table 3.19](#) and [Figure 3.14](#) below present these findings.

**Table 3.19. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection - Alcohol Related, 1999-2003**

	Number of Crashes	Alcohol Related Crashes	Percent Alcohol Related
Intersection Crashes	580	77	13.3%
All Reported Crashes	34,094	2,304	6.8%

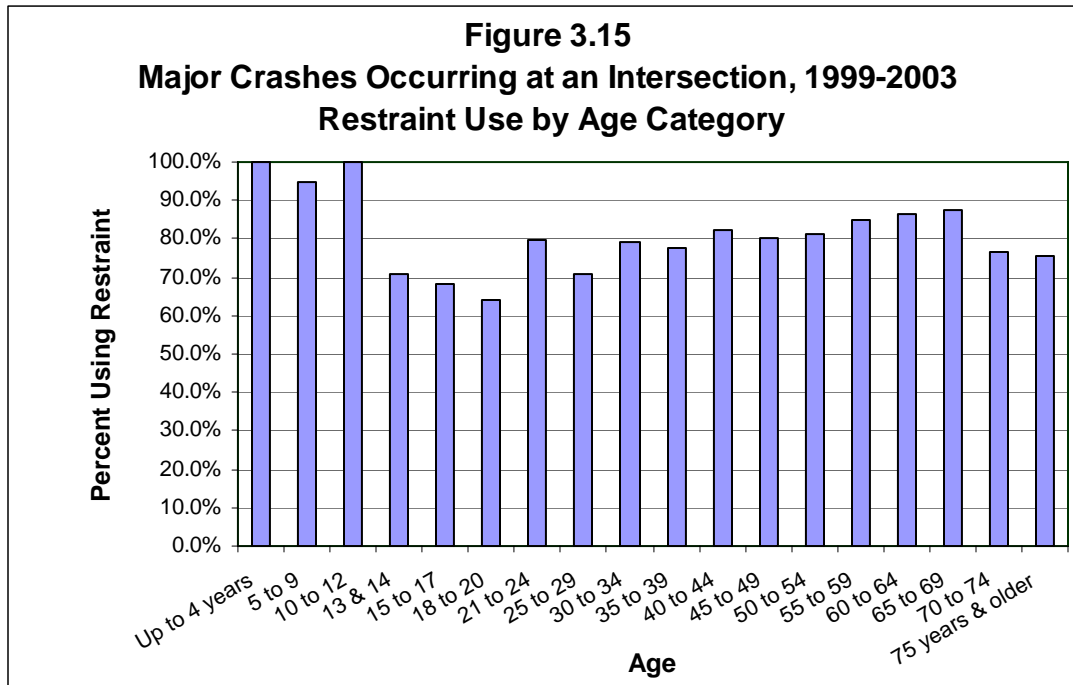


Restraint use for vehicle occupants, operators and passengers, by age group is presented in [Table 3.20](#) and [Figure 3.15](#) below. Vehicle types included in the analysis for restraint use were passenger cars, sport utility vehicles, pick-up trucks and large trucks. The findings indicate that for occupants with known age 77.5% were using a restraint, 15.5% were not using a restraint and for 7.0% restraint use was unknown. Children in the age categories of up to 4 years, 5-9 and 10-12 had the highest restraint use at 100%, 95% and 100%, respectively. Age groups with the lowest restraint use were the 15-17 and 18-20 year olds at 68.4% and 64.1%, respectively.

**Table 3.20. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection, Restraint Use of Vehicle Occupants by Age Group, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Up to 4 years	22	100.0%	0	0.0%	0	0.0%	22	100.0%
5 to 9	19	95.0%	0	0.0%	1	5.0%	20	100.0%
10 to 12	12	100.0%	0	0.0%	0	0.0%	12	100.0%
13 & 14	12	70.6%	3	17.6%	2	11.8%	17	100.0%
15 to 17	67	68.4%	21	21.4%	10	10.2%	98	100.0%
18 to 20	91	64.1%	38	26.8%	13	9.2%	142	100.0%
21 to 24	107	79.9%	15	11.2%	12	9.0%	134	100.0%
25 to 29	66	71.0%	19	20.4%	8	8.6%	93	100.0%
30 to 34	77	79.4%	16	16.5%	4	4.1%	97	100.0%
35 to 39	73	77.7%	14	14.9%	7	7.4%	94	100.0%
40 to 44	89	82.4%	14	13.0%	5	4.6%	108	100.0%
45 to 49	80	80.0%	13	13.0%	7	7.0%	100	100.0%
50 to 54	52	81.3%	10	15.6%	2	3.1%	64	100.0%
55 to 59	40	85.1%	5	10.6%	2	4.3%	47	100.0%
60 to 64	32	86.5%	3	8.1%	2	5.4%	37	100.0%
65 to 69	35	87.5%	5	12.5%	0	0.0%	40	100.0%
70 to 74	29	76.3%	6	15.8%	3	7.9%	38	100.0%
75 years & older	56	75.7%	10	13.5%	8	10.8%	74	100.0%
<b>Total</b>	<b>959</b>	<b>77.5%</b>	<b>192</b>	<b>15.5%</b>	<b>86</b>	<b>7.0%</b>	<b>1,237</b>	<b>100.0%</b>

Note: persons with unknown age were excluded from the analysis.



Findings on pedestrians and bicyclists that were fatally or severely injured in major crashes at intersections by traffic control are presented below in [Table 3.21](#). For the 42 pedestrians who were fatally or severely injured, 12 (28.6%) were at an intersection with no traffic control, 9 (21.4%) were at a stop sign, 5 (11.9%) were at a traffic signal and only 1 (2.4%) was at a yield sign. For 15 pedestrians 35.7% had other or unknown listed for traffic control. Of the 22 bicyclists who were killed or severely injured, 10 (29.7%) were at stop signs, 6 (27.3%) were at an intersection with no control and 6 (27.3%) had other or unknown listed for traffic control.

**Table 3.21. Emphasis Area - Improving the Design and Operation of Highway Intersections**  
**Major Crashes at Intersections, Pedestrians & Bicyclists Fatally/Severely Injured**  
**by Traffic Control, 1999-2003**

Traffic Control	Pedestrians		Bicyclists		Total	
	N	%	N	%	N	%
None	12	28.6%	6	27.3%	18	28.1%
Stop signs	9	21.4%	10	45.5%	19	29.7%
Yield signs	1	2.4%	0	0.0%	1	1.6%
Traffic Signal	5	11.9%	0	0.0%	5	7.8%
Other/Unknown	15	35.7%	6	27.3%	21	32.8%
<b>Total</b>	<b>42</b>	<b>100.0%</b>	<b>22</b>	<b>100.0%</b>	<b>64</b>	<b>100.0%</b>

## Vehicle Characteristics

The only analysis conducted on vehicles for major crashes occurring at intersections was to look at the vehicle types that were involved in these crashes. A distribution by vehicle type is listed below in Table 3.22. Vehicles used for passenger vehicles, i.e., passenger cars, sport utility vehicles and pickup trucks/vans, accounted for 89% of the total vehicle types found in the data. In addition, there were 54 (5.0%) motorcycles and 42 (3.8%) trucks and tractor trailers involved in major crashes occurring at intersections.

**Table 3.22. Emphasis Area - Improving the Design and Operation of Highway Intersections  
Major Crashes Occurring at an Intersection by Vehicle Type, 1999-2003**

<u>Vehicle Type</u>	<u>Number of Vehicles</u>	<u>Percent</u>
Passenger Car	708	66.2%
Sport Utility	100	9.3%
Pickup Truck/Van (noncommercial)	144	13.5%
Pickup Truck/Van (commercial)	0	0.0%
Truck	17	1.6%
Tractor Trailer	25	2.3%
Farm Vehicle	2	0.2%
Bus	5	0.5%
Motorcycle	54	5.0%
Ambulance	2	0.2%
Train	0	0.0%
Other/Unknown	13	1.2%
Total	1,070	100.0%

## V. Emphasis Area – Increasing Seat Belt Usage and Improving Airbag Effectiveness

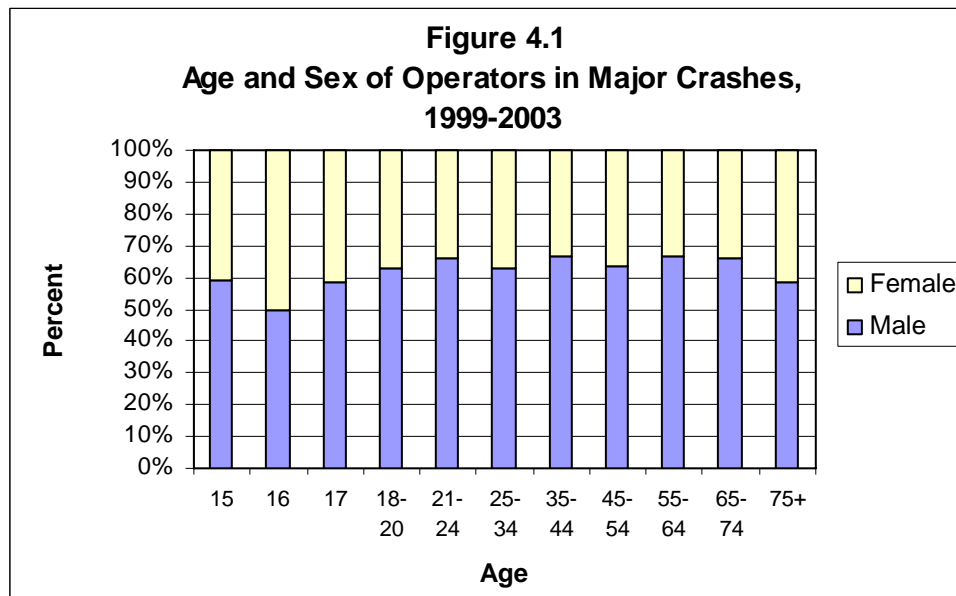
Data Analysis for emphasis area, Increasing Seat Belt Usage and Improving Airbag Effectiveness, was conducted on 2,354 major crashes in Vermont that occurred during the period 1999-2003. The analysis for this emphasis area mainly involved examining available driver and passenger demographic data and restraint usage for operators, passengers and the severely injured. In addition, restraint usage was examined for all occupants for various vehicle types including passenger cars, sport utility vehicle, pickup trucks and large trucks. The findings from the study are presented in this section of the report.

### Person Characteristics

Findings for age and sex of drivers in major crashes are presented in [Table 4.1](#) and [Figure 4.1](#) below. Of the 3,637 operators with known age and sex involved in major crashes in Vermont, 63.9% were male and 36.1% were female. Examining individual age groups indicates that for the 21-24, 35-44, 55-64 and 65-74 year olds, males accounted for slightly higher proportions than the overall percent, specifically, 66.1%, 66.8%, 66.5% and 65.9%, respectively. Hence, females in these age groups accounted for slightly lower proportions than the overall 36.1%, i.e., 33.9%, 33.2%, 33.5% and 34.1%, respectively. Age groups that had proportionally less male drivers and proportionally more female drivers than the overall distribution were the 17 year olds (58.3% male, 41.7% female), 15 year olds (59.1% male, 40.9% female) and those years 75 and older (58.6% male and 41.4% female). The 16 year old drivers were evenly split by sex with 50% for both males and females.

**Table 4.1. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness  
Age and Sex of Operators in Major Crashes, 1999-2003**

Age	Male		Female		Total	
	N	%	N	%	N	%
15	13	59.1%	9	40.9%	22	100.0%
16	44	50.0%	44	50.0%	88	100.0%
17	81	58.3%	58	41.7%	139	100.0%
18-20	273	63.2%	159	36.8%	432	100.0%
21-24	269	66.1%	138	33.9%	407	100.0%
25-34	409	63.0%	240	37.0%	649	100.0%
35-44	499	66.8%	248	33.2%	747	100.0%
45-54	344	63.5%	198	36.5%	542	100.0%
55-64	189	66.5%	95	33.5%	284	100.0%
65-74	112	65.9%	58	34.1%	170	100.0%
75+	92	58.6%	65	41.4%	157	100.0%
<b>Total</b>	<b>2,325</b>	<b>63.9%</b>	<b>1,312</b>	<b>36.1%</b>	<b>3,637</b>	<b>100.0%</b>
All Crash Involved Operators 2003		57.4%		42.6%		



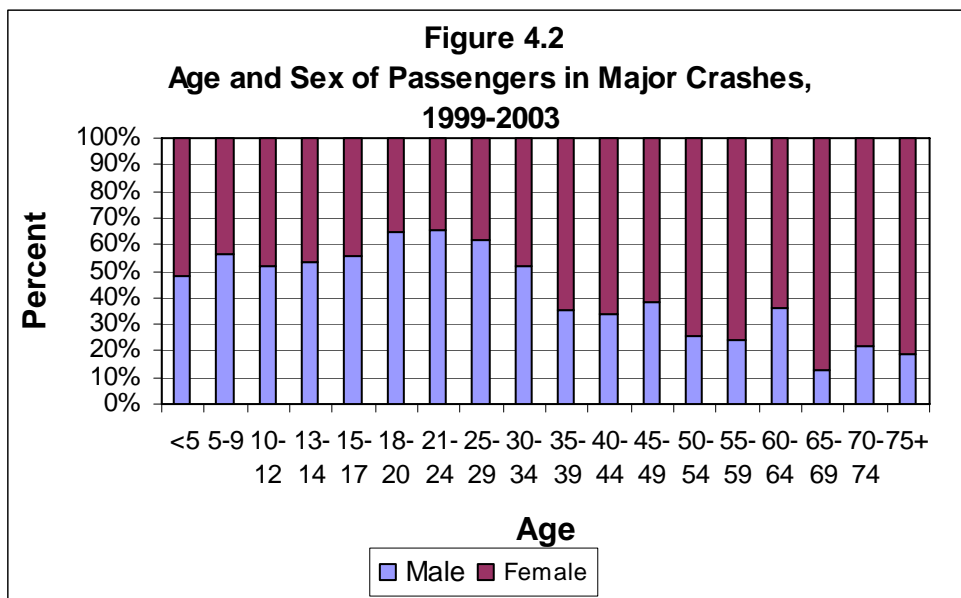
An examination of passengers in major crashes with known age and sex indicates that 50.4% were male and 49.6% were female. Looking at individual age groups indicates, however, that for passengers age 35 and older proportionately less were male and proportionately more were female. Percentages ranged from 12.5% males and 87.5% females for 65-69 year olds to 38.5% males and 61.5% females for 45-49 year olds. The 18-20, 21-24 and 25-29 year olds had the highest proportions that were male and hence, the lowest proportions that were female. Specifically, for 18-20 year olds 64.6% were male and 35.4% were female, for 21-24 year olds 65.5% were male and 34.5% female and for 25-29 year olds 62.0% were male and 38.0% were female. Passengers age 5 to 17 were slightly more than 50% male and slightly less than 50% female. This information is presented below in [Table 4.2](#) and [Figure 4.2](#).

Restraint use by age of operators in major crashes is presented in [Table 4.3](#) and [Figure 4.3](#) below. Vehicle types included in the analysis for restraint use were passenger cars, sport utility vehicles, pick-up trucks and large trucks. The findings indicate that 71.2% of the operators were using a restraint, 20.2% were not using a restraint, and for 8.6% of the operators restraint use was unknown. Restraint usage was the highest for the 55-64, 65-74 and 75+ age groups at 80.9%, 77.9% and 74.7%, respectively. Lower restraint use was found for the 18-20 and 21-24 year olds at 62.7% and 66.0%, respectively.

**Table 4.2. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness  
Age and Sex of Passengers in Major Crashes, 1999-2003**

Age	Male		Female		Total	
	N	%	N	%	N	%
Up to 4 years	33	47.8%	36	52.2%	69	100.0%
5 to 9	48	56.5%	37	43.5%	85	100.0%
10 to 12	32	51.6%	30	48.4%	62	100.0%
13 & 14	39	53.4%	34	46.6%	73	100.0%
15 to 17	115	55.6%	92	44.4%	207	100.0%
18 to 20	93	64.6%	51	35.4%	144	100.0%
21 to 24	72	65.5%	38	34.5%	110	100.0%
25 to 29	49	62.0%	30	38.0%	79	100.0%
30 to 34	32	51.6%	30	48.4%	62	100.0%
35 to 39	21	35.0%	39	65.0%	60	100.0%
40 to 44	16	34.0%	31	66.0%	47	100.0%
45 to 49	20	38.5%	32	61.5%	52	100.0%
50 to 54	8	25.8%	23	74.2%	31	100.0%
55 to 59	6	24.0%	19	76.0%	25	100.0%
60 to 64	5	35.7%	9	64.3%	14	100.0%
65 to 69	2	12.5%	14	87.5%	16	100.0%
70 to 74	5	21.7%	18	78.3%	23	100.0%
75 years & older	7	18.9%	30	81.1%	37	100.0%
<b>Total</b>	<b>603</b>	<b>50.4%</b>	<b>593</b>	<b>49.6%</b>	<b>1,196</b>	<b>100.0%</b>

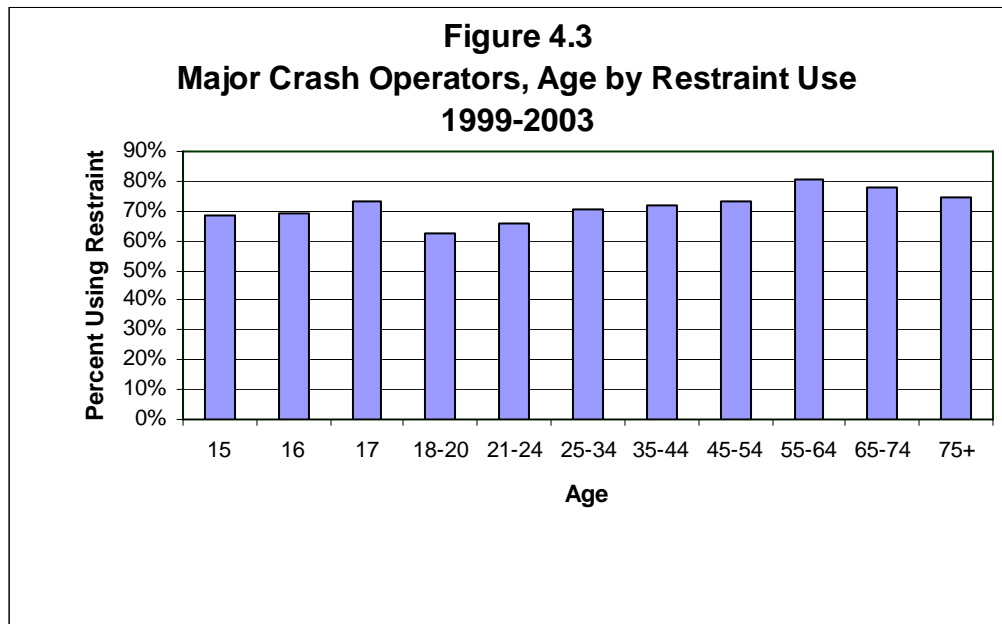
Note: persons with unknown age were excluded from the analysis.



**Table 4.3. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness Operators in Major Crashes, Age by Restraint Use, 1999-2003**

Age	Restraint Use						Total	
	Used		Not Used		Unknown Use			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
15	11	68.8%	4	25.0%	1	6.3%	16	100.0%
16	60	69.0%	19	21.8%	8	9.2%	87	100.0%
17	100	73.5%	23	16.9%	13	9.6%	136	100.0%
18-20	254	62.7%	117	28.9%	34	8.4%	405	100.0%
21-24	249	66.0%	82	21.8%	46	12.2%	377	100.0%
25-34	418	70.3%	126	21.2%	51	8.6%	595	100.0%
35-44	475	72.2%	127	19.3%	56	8.5%	658	100.0%
45-54	348	73.1%	87	18.3%	41	8.6%	476	100.0%
55-64	212	80.9%	34	13.0%	16	6.1%	262	100.0%
65-74	127	77.9%	28	17.2%	8	4.9%	163	100.0%
75+	115	74.7%	26	16.9%	13	8.4%	154	100.0%
<b>Total</b>	<b>2369</b>	<b>71.2%</b>	<b>673</b>	<b>20.2%</b>	<b>287</b>	<b>8.6%</b>	<b>3,329</b>	<b>100.0%</b>

Note: persons with unknown age were excluded from the analysis.

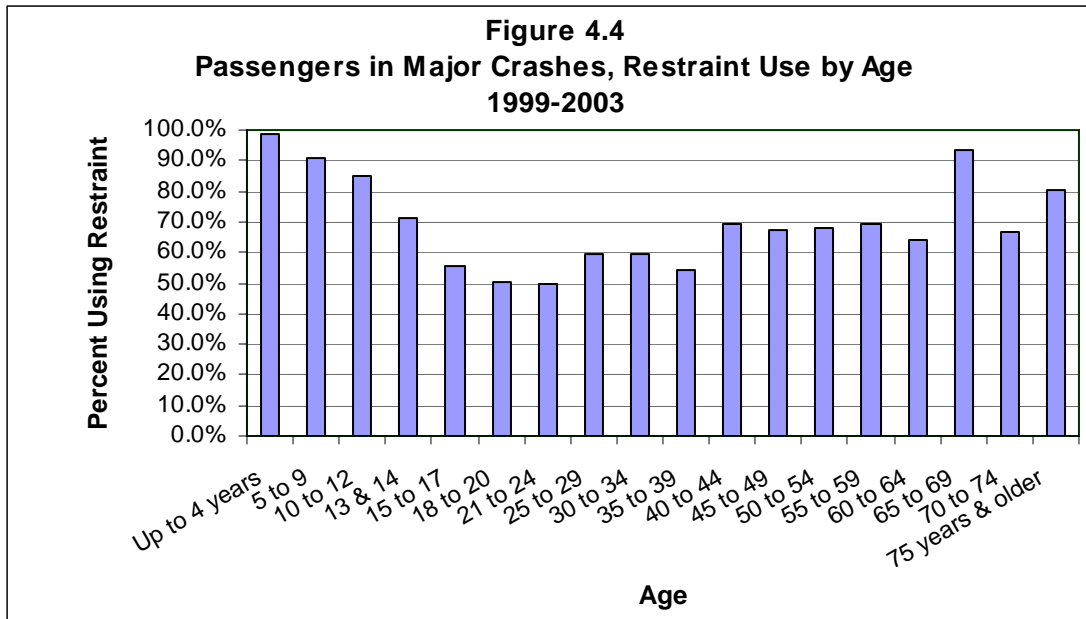


Next, restraint use for passengers in major crashes by age was examined, shown in [Table 4.4](#) and [Figure 4.4](#) below. Overall restraint use for passengers with known age indicates that 65.8% were using a restraint, 26.3% were not and for 7.9% restraint use was unknown. Restraint usage was the highest for the age categories 4 years and younger, 5-9 and 65-69 with percentage using restraints at 98.5%, 91.0% and 93.3%, respectively. The lowest percentages for restraint use were found for the age groups 15-17 (55.3%), 18-20 (50.4%), 21-24 (49.5%) and 35-39 year olds (54.3%).

**Table 4.4. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness  
Passengers in Major Crashes, Restraint Use by Age, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Up to 4 years	67	98.5%	0	0.0%	1	1.5%	68	100.0%
5 to 9	71	91.0%	5	6.4%	2	2.6%	78	100.0%
10 to 12	40	85.1%	6	12.8%	1	2.1%	47	100.0%
13 & 14	40	71.4%	11	19.6%	5	8.9%	56	100.0%
15 to 17	94	55.3%	64	37.6%	12	7.1%	170	100.0%
18 to 20	67	50.4%	48	36.1%	18	13.5%	133	100.0%
21 to 24	51	49.5%	37	35.9%	15	14.6%	103	100.0%
25 to 29	32	59.3%	17	31.5%	5	9.3%	54	100.0%
30 to 34	29	59.2%	19	38.8%	1	2.0%	49	100.0%
35 to 39	25	54.3%	13	28.3%	8	17.4%	46	100.0%
40 to 44	29	69.0%	11	26.2%	2	4.8%	42	100.0%
45 to 49	33	67.3%	13	26.5%	3	6.1%	49	100.0%
50 to 54	19	67.9%	6	21.4%	3	10.7%	28	100.0%
55 to 59	16	69.6%	5	21.7%	2	8.7%	23	100.0%
60 to 64	9	64.3%	5	35.7%	0	0.0%	14	100.0%
65 to 69	14	93.3%	1	6.7%	0	0.0%	15	100.0%
70 to 74	16	66.7%	7	29.2%	1	4.2%	24	100.0%
75 years & older	29	80.6%	4	11.1%	3	8.3%	36	100.0%
<b>Total</b>	<b>681</b>	<b>65.8%</b>	<b>272</b>	<b>26.3%</b>	<b>82</b>	<b>7.9%</b>	<b>1,035</b>	<b>100.0%</b>

Note: persons with unknown age were excluded from the analysis.



An analysis for restraint use for all occupants in passenger cars shows that overall 72.6% were using a restraint, 19.3% were not and for 8.1% restraint use was unknown. The highest restraint use was found for children in the age groups of infants to 4 years, 5-9 and 10-12 year olds with usage percentages at 98.2%, 92.0% and 88.6%, respectively. Other fairly high usage percentages were found in the age categories of 55-59, 60-64 and 65-69 at 82.5%, 83.3% and 83.1%, respectively. The lowest restraint use was found for the 13-14, 15-17 and 18-20 year olds at 64.1%, 65.5% and 62.2%, respectively. This is presented below in [Table 4.5](#) and [Figure 4.5](#).

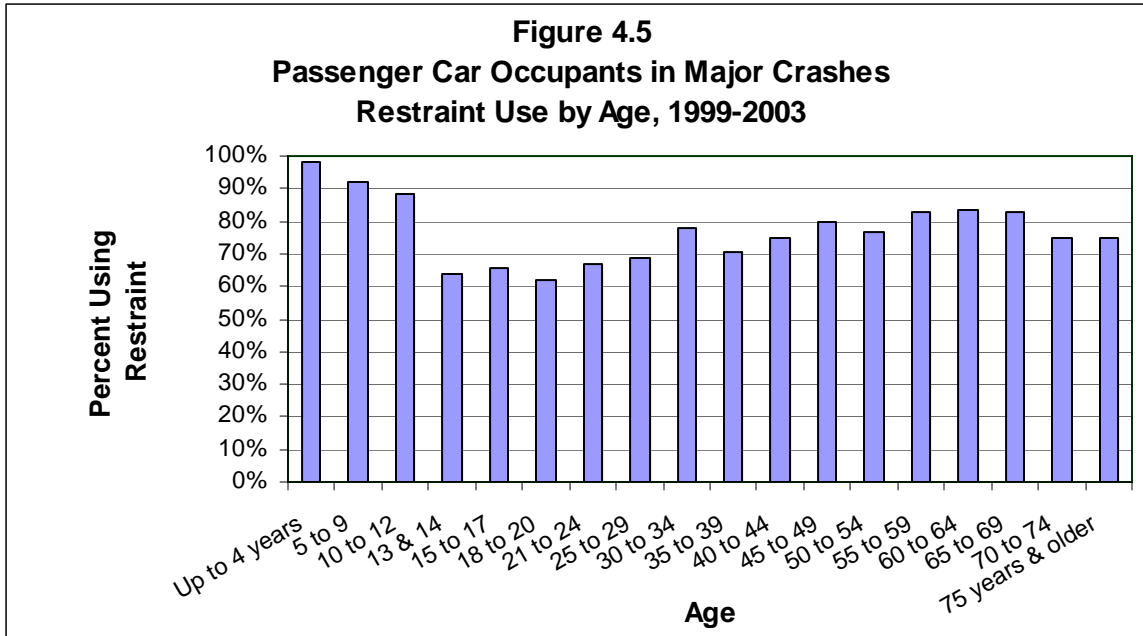
Next, restraint use for sport utility vehicle occupants by age was examined. The results are presented below in [Table 4.6](#) and [Figure 4.6](#). Overall, 68.7% of these occupants were using a restraint, 23.4% were not using one and for 7.9% restraint use was unknown. Children up through age 14 had the highest restraint usage with 100% using restraints for the age groups of up to 4 years, 10-12 and 13-14 year olds. Around 94% of the 5-9 year olds were using restraints. The age groups with the next highest percentages were the 70-74 and 40-44 year olds at 85.7% and 78.8%, respectively. The lowest restraint usage percentages were found for age groups 18-20 and 45-49 year olds at 46.9% and 56.6%, respectively.

Overall restraint usage for pickup truck vehicle occupants was lower than for the previous two vehicle types. Specifically, 58.8% were using a restraint, 30.8% were not and for 10.4% restraint use was unknown. This is shown below in [Table 4.7](#) and [Figure 4.7](#). A closer examination indicates that restraint usage was the highest for infants to 4 year olds (100%), 5-9 year olds (80%), 75 years & older (81.3%) and 55-59 year olds (80%). Lower restraint use was found for the age groups of 21-24 (38%), 25-29 (48.2%) and 18-20 year olds (53.8%). For the 4 13-14 year old passengers found in the data, only 1 (25%) was using a restraint.

**Table 4.5. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness  
Passenger Car Occupants in Major Crashes, Restraint Use by Age, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Up to 4 years	55	98.2%	0	0.0%	1	1.8%	56	100.0%
5 to 9	46	92.0%	3	6.0%	1	2.0%	50	100.0%
10 to 12	31	88.6%	3	8.6%	1	2.9%	35	100.0%
13 & 14	25	64.1%	9	23.1%	5	12.8%	39	100.0%
15 to 17	203	65.5%	80	25.8%	27	8.7%	310	100.0%
18 to 20	252	62.2%	113	27.9%	40	9.9%	405	100.0%
21 to 24	229	67.2%	75	22.0%	37	10.9%	341	100.0%
25 to 29	147	68.7%	44	20.6%	23	10.7%	214	100.0%
30 to 34	186	78.2%	40	16.8%	12	5.0%	238	100.0%
35 to 39	143	70.4%	36	17.7%	24	11.8%	203	100.0%
40 to 44	162	75.0%	42	19.4%	12	5.6%	216	100.0%
45 to 49	151	79.5%	30	15.8%	9	4.7%	190	100.0%
50 to 54	93	76.9%	16	13.2%	12	9.9%	121	100.0%
55 to 59	85	82.5%	12	11.7%	6	5.8%	103	100.0%
60 to 64	75	83.3%	10	11.1%	5	5.6%	90	100.0%
65 to 69	59	83.1%	9	12.7%	3	4.2%	71	100.0%
70 to 74	60	75.0%	16	20.0%	4	5.0%	80	100.0%
75 years & older	117	75.0%	24	15.4%	15	9.6%	156	100.0%
<b>Total</b>	<b>2119</b>	<b>72.6%</b>	<b>562</b>	<b>19.3%</b>	<b>237</b>	<b>8.1%</b>	<b>2,918</b>	<b>100.0%</b>

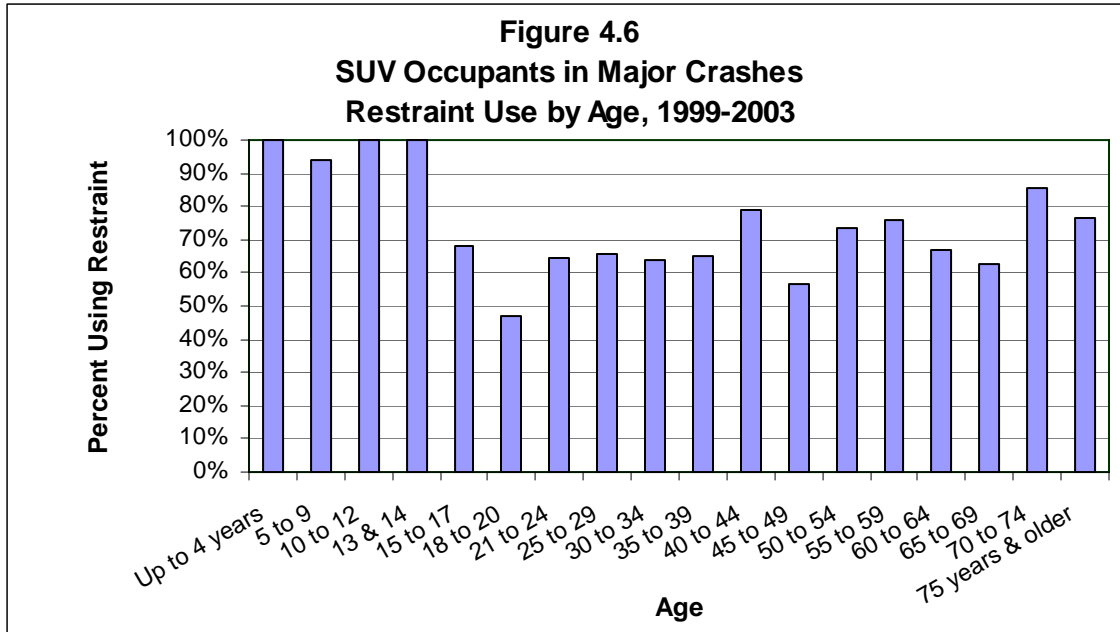
Note: persons with unknown age were excluded from the analysis.



**Table 4.6. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness**  
**SUV Occupants in Major Crashes, Restraint Use by Age, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use		Number	Percent
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Up to 4 years	10	100.0%	0	0.0%	0	0.0%	10	100.0%
5 to 9	16	94.1%	0	0.0%	1	5.9%	17	100.0%
10 to 12	7	100.0%	0	0.0%	0	0.0%	7	100.0%
13 & 14	13	100.0%	0	0.0%	0	0.0%	13	100.0%
15 to 17	38	67.9%	13	23.2%	5	8.9%	56	100.0%
18 to 20	23	46.9%	23	46.9%	3	6.1%	49	100.0%
21 to 24	33	64.7%	11	21.6%	7	13.7%	51	100.0%
25 to 29	29	65.9%	11	25.0%	4	9.1%	44	100.0%
30 to 34	28	63.6%	15	34.1%	1	2.3%	44	100.0%
35 to 39	35	64.8%	12	22.2%	7	13.0%	54	100.0%
40 to 44	41	78.8%	9	17.3%	2	3.8%	52	100.0%
45 to 49	30	56.6%	16	30.2%	7	13.2%	53	100.0%
50 to 54	25	73.5%	7	20.6%	2	5.9%	34	100.0%
55 to 59	16	76.2%	4	19.0%	1	4.8%	21	100.0%
60 to 64	10	66.7%	4	26.7%	1	6.7%	15	100.0%
65 to 69	5	62.5%	1	12.5%	2	25.0%	8	100.0%
70 to 74	12	85.7%	2	14.3%	0	0.0%	14	100.0%
75 years & older	13	76.5%	3	17.6%	1	5.9%	17	100.0%
<b>Total</b>	<b>384</b>	<b>68.7%</b>	<b>131</b>	<b>23.4%</b>	<b>44</b>	<b>7.9%</b>	<b>559</b>	<b>100.0%</b>

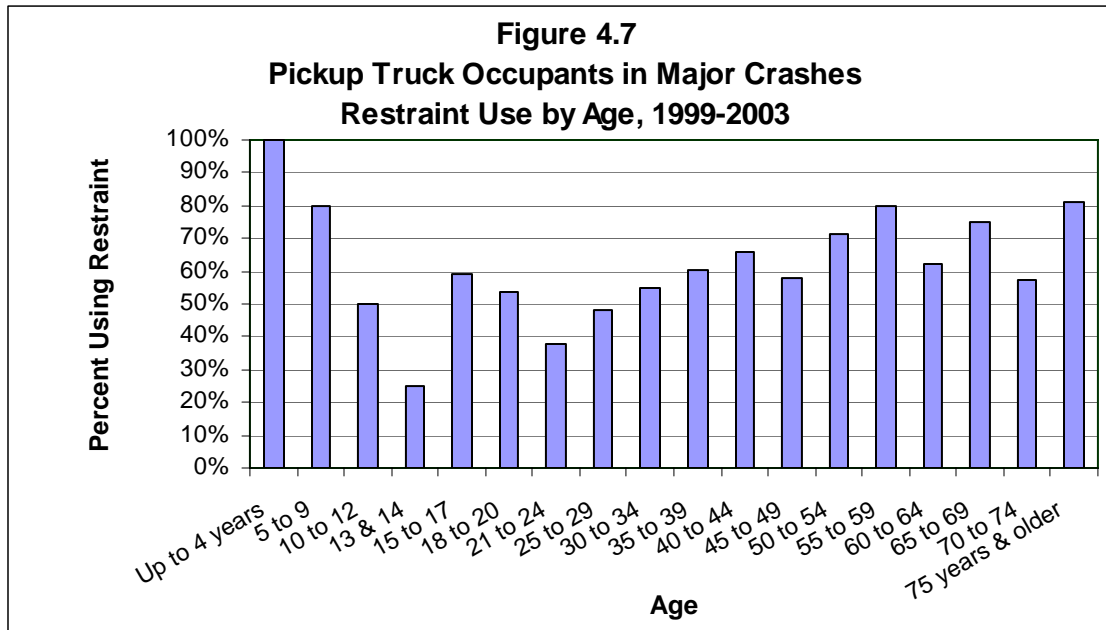
Note: persons with unknown age were excluded from the analysis.



**Table 4.7. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness**  
**Pickup Truck Occupants in Major Crashes, Restraint Use by Age, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Up to 4 years	3	100.0%	0	0.0%	0	0.0%	3	100.0%
5 to 9	8	80.0%	2	20.0%	0	0.0%	10	100.0%
10 to 12	2	50.0%	2	50.0%	0	0.0%	4	100.0%
13 & 14	1	25.0%	3	75.0%	0	0.0%	4	100.0%
15 to 17	26	59.1%	16	36.4%	2	4.5%	44	100.0%
18 to 20	43	53.8%	28	35.0%	9	11.3%	80	100.0%
21 to 24	30	38.0%	32	40.5%	17	21.5%	79	100.0%
25 to 29	27	48.2%	21	37.5%	8	14.3%	56	100.0%
30 to 34	33	55.0%	21	35.0%	6	10.0%	60	100.0%
35 to 39	46	60.5%	21	27.6%	9	11.8%	76	100.0%
40 to 44	60	65.9%	24	26.4%	7	7.7%	91	100.0%
45 to 49	36	58.1%	15	24.2%	11	17.7%	62	100.0%
50 to 54	37	71.2%	13	25.0%	2	3.8%	52	100.0%
55 to 59	24	80.0%	5	16.7%	1	3.3%	30	100.0%
60 to 64	13	61.9%	6	28.6%	2	9.5%	21	100.0%
65 to 69	12	75.0%	4	25.0%	0	0.0%	16	100.0%
70 to 74	4	57.1%	3	42.9%	0	0.0%	7	100.0%
75 years & older	13	81.3%	3	18.8%	0	0.0%	16	100.0%
<b>Total</b>	<b>418</b>	<b>58.8%</b>	<b>219</b>	<b>30.8%</b>	<b>74</b>	<b>10.4%</b>	<b>711</b>	<b>100.0%</b>

Note: persons with unknown age were excluded from the analysis.



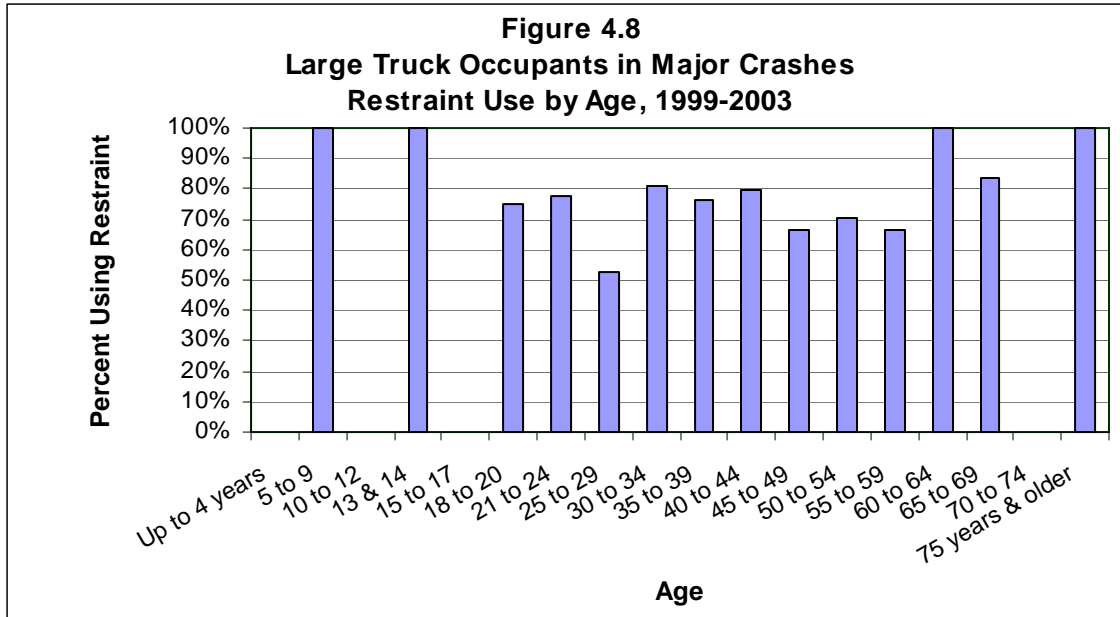
The last vehicle type examined for restraint use of vehicle occupants in major crashes was for large trucks. Findings are presented in [Table 4.8](#) and [Figure 4.8](#) below. The overall percent of large truck occupants using a restraint was 72.9%, those not using a restraint accounted for 19.3% of the total and for 7.7% restraint use was unknown. Restraint usage was fairly low for the age groups of 25-29 (52.9%), 45-49 (66.7%) and 55-59 year olds (66.7%). The occupants with relatively high restraint usage were found in the age groups of 30-34 (80.8%), 35-39 (76.0%), 40-44 (79.3%) and 21-24 year olds (77.8%). There were only 2 children in the age groups of 5-9 and 13-14, both of which were using a restraint. Also, there was only 1 child passenger in the age range of 10-12 year old and only 1 15-17 year old, neither one of these occupants were using a restraint.

Restraint use for severely injured vehicle occupants in major crashes by age was examined next. Again, vehicle types included in this analysis were passenger cars, sport utility vehicles, pickup trucks and large trucks. The findings indicate that for these occupants with known age overall 66% were using a restraint, 25.5% were not using a restraint and for 8.6% restraint use was unknown. Those with higher restraint usage include the age categories of infant to 4 years (100%), 10-12 (84.6%), 55-59 (82.7%) and 70-74 years of age (80.9%). A closer examination indicates that for ages 30 years and older, restraint usage was higher than the overall percent, however, for the younger age group from age 13 to 29 restraint usage was below the overall usage percent. Specifically, the percent using for 13-29 year olds ranged from a low of 53.8% for 18-20 year olds to 60.7% for 25-29 year olds. These results are presented in [Table 4.9](#) and [Figure 4.9](#) below.

**Table 4.8. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness  
Large Truck Occupants in Major Crashes, Restraint Use by Age, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Up to 4 years	0	n.a.	0	n.a.	0	n.a.	0	n.a.
5 to 9	1	100.0%	0	0.0%	0	0.0%	1	100.0%
10 to 12	0	0.0%	1	100.0%	0	0.0%	1	100.0%
13 & 14	1	100.0%	0	0.0%	0	0.0%	1	100.0%
15 to 17	0	0.0%	1	100.0%	0	0.0%	1	100.0%
18 to 20	3	75.0%	1	25.0%	0	0.0%	4	100.0%
21 to 24	7	77.8%	2	22.2%	0	0.0%	9	100.0%
25 to 29	9	52.9%	7	41.2%	1	5.9%	17	100.0%
30 to 34	21	80.8%	3	11.5%	2	7.7%	26	100.0%
35 to 39	19	76.0%	3	12.0%	3	12.0%	25	100.0%
40 to 44	23	79.3%	4	13.8%	2	6.9%	29	100.0%
45 to 49	16	66.7%	6	25.0%	2	8.3%	24	100.0%
50 to 54	12	70.6%	3	17.6%	2	11.8%	17	100.0%
55 to 59	10	66.7%	3	20.0%	2	13.3%	15	100.0%
60 to 64	4	100.0%	0	0.0%	0	0.0%	4	100.0%
65 to 69	5	83.3%	1	16.7%	0	0.0%	6	100.0%
70 to 74	0	n.a.	0	n.a.	0	n.a.	0	n.a.
75 years & older	1	100.0%	0	0.0%	0	0.0%	1	100.0%
<b>Total</b>	<b>132</b>	<b>72.9%</b>	<b>35</b>	<b>19.3%</b>	<b>14</b>	<b>7.7%</b>	<b>181</b>	<b>100.0%</b>

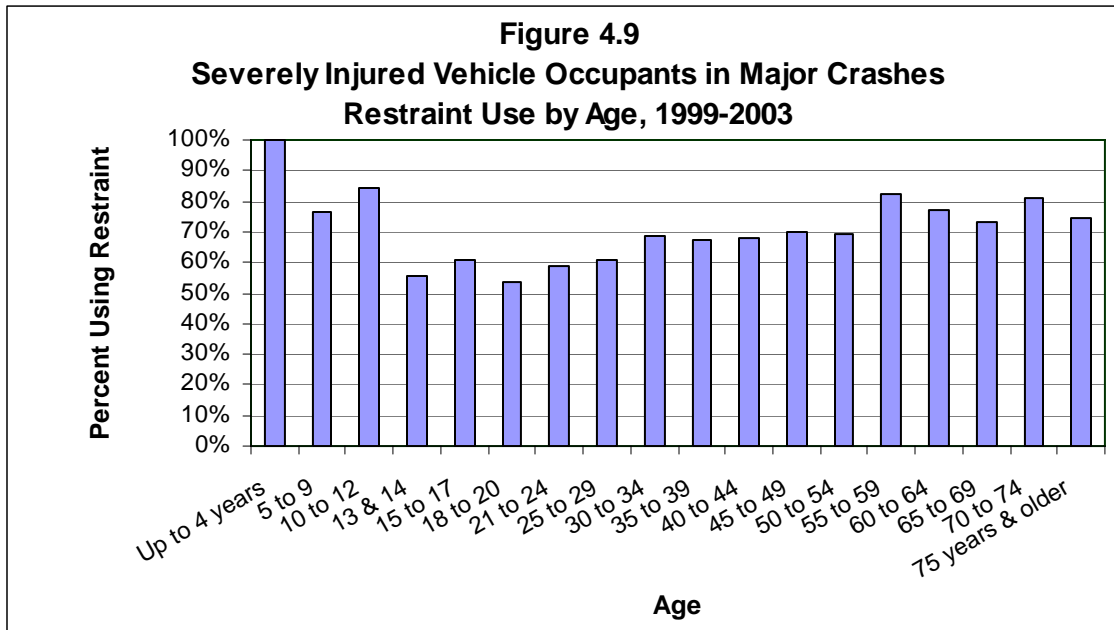
Note: persons with unknown age were excluded from the analysis.



**Table 4.9. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness Severely Injured Vehicle Occupants in Major Crashes, Restraint Use by Age, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Up to 4 years	18	100.0%	0	0.0%	0	0.0%	18	100.0%
5 to 9	13	76.5%	2	11.8%	2	11.8%	17	100.0%
10 to 12	11	84.6%	2	15.4%	0	0.0%	13	100.0%
13 & 14	10	55.6%	6	33.3%	2	11.1%	18	100.0%
15 to 17	98	60.5%	47	29.0%	17	10.5%	162	100.0%
18 to 20	134	53.8%	91	36.5%	24	9.6%	249	100.0%
21 to 24	123	58.9%	60	28.7%	26	12.4%	209	100.0%
25 to 29	91	60.7%	46	30.7%	13	8.7%	150	100.0%
30 to 34	106	68.4%	37	23.9%	12	7.7%	155	100.0%
35 to 39	91	67.4%	30	22.2%	14	10.4%	135	100.0%
40 to 44	105	68.2%	39	25.3%	10	6.5%	154	100.0%
45 to 49	95	69.9%	30	22.1%	11	8.1%	136	100.0%
50 to 54	69	69.0%	22	22.0%	9	9.0%	100	100.0%
55 to 59	62	82.7%	10	13.3%	3	4.0%	75	100.0%
60 to 64	44	77.2%	10	17.5%	3	5.3%	57	100.0%
65 to 69	33	73.3%	10	22.2%	2	4.4%	45	100.0%
70 to 74	38	80.9%	7	14.9%	2	4.3%	47	100.0%
75 years & older	59	74.7%	14	17.7%	6	7.6%	79	100.0%
<b>Total</b>	<b>1200</b>	<b>66.0%</b>	<b>463</b>	<b>25.5%</b>	<b>156</b>	<b>8.6%</b>	<b>1,819</b>	<b>100.0%</b>

Note: persons with unknown age were excluded from the analysis.



Last of all, injury by restraint in major crashes where air bags deployed was examined. Table 4.10 below presents the findings. The available data on air bag deployment shows that of the 34 fatalities where an air bag deployed 15 people (44.1 %) were using lap & shoulder belts, 13 (38.2%) were using no belts, 5 were using a lap belt only (14.7%) and only 1 person was using only a shoulder belt (2.9%). For the seriously injured 103 (59.9%) of the 172 were using lap and shoulder belts, 35 (20.3%) were using a lap belt only, 30 (17.4) were using no belts and only 4 (2.3%) were using only shoulder belts.

**Table 4.10. Emphasis Area - Increasing Seat Belt Usage and Improving Airbag Effectiveness**  
**Injury by Restraint in Major Crashes Where Airbags Deployed, 1999-2003**

Restraint	Fatal		Serious	
	N	%	N	%
Lap Belt Only	5	14.7%	35	20.3%
Shoulder Belt Only	1	2.9%	4	2.3%
Lap & Shoulder Belts	15	44.1%	103	59.9%
No Belts	13	38.2%	30	17.4%
Total	34	100.0%	172	100.0%

## VI. Emphasis Area – Reducing Impaired Driving

Data analyzed for the fifth emphasis area, Reducing Impaired Driving, included 439 major crashes in which alcohol was determined to play a role. These crashes occurred between 1999 and 2003.

### Environment and Roadways

Table 5.1 shows the distribution of alcohol-related crashes by county, as well as the average annual crash rate per 1,000 persons in each county's population and the average annual crash rate per 100 million vehicle miles traveled. The largest percentage of crashes occurred in Chittenden County (17.1%), the most densely populated county in Vermont. Close to ten percent of crashes occurred in each of the following counties: Windsor (9.8%); Windham (9.6%); Franklin (9.3%) and Rutland (9.1%). The lowest percentage of crashes took place in Grand Isle County (1.8%). The average annual rate per 1,000 persons in the population adjusts for differences between counties in population size. Essex County, a sparsely populated area where only 2.1% of alcohol-related crashes occurred, actually had the highest crash rate (.28 crashes per 1,000 persons in the county's population), followed by Grand Isle (.23), Lamoille and Orleans counties (both with .21). Washington County had the lowest rate (.09). Notably, Chittenden County's rate was also low, with .10 crashes per 1,000 persons in the population. Crash rates calculated per 100 millions vehicle miles traveled again show Essex County as having the highest crash rate (2.5 crashes per 100 million vehicle miles traveled), followed by Orleans (2.0), Franklin, Grand Isle, and Lamoille counties (each with 1.9). Differences in crash rates per 1,000 persons in the population are illustrated in Figure 5.1, and differences in crash rates calculated per 100 million vehicle miles traveled are illustrated in Figure 5.2.

The types of roadways on which major alcohol-related crashes took place are shown in Table 5.2 and Figure 5.3. More than half of these crashes (51.3%) occurred on state highways, and more than a quarter took place on city/village streets (26.9%). The remainder occurred on town (15.7%), interstate (5.0%) or some other type of classification of highway (1.1%). Table 5.2 and Figure 5.3 also show the distribution of all crashes by highway class for the year 2003. Relative to these crashes, alcohol-related crashes were more likely to occur on state highways and city/village roads, and less likely to occur on the three other types of roadways.

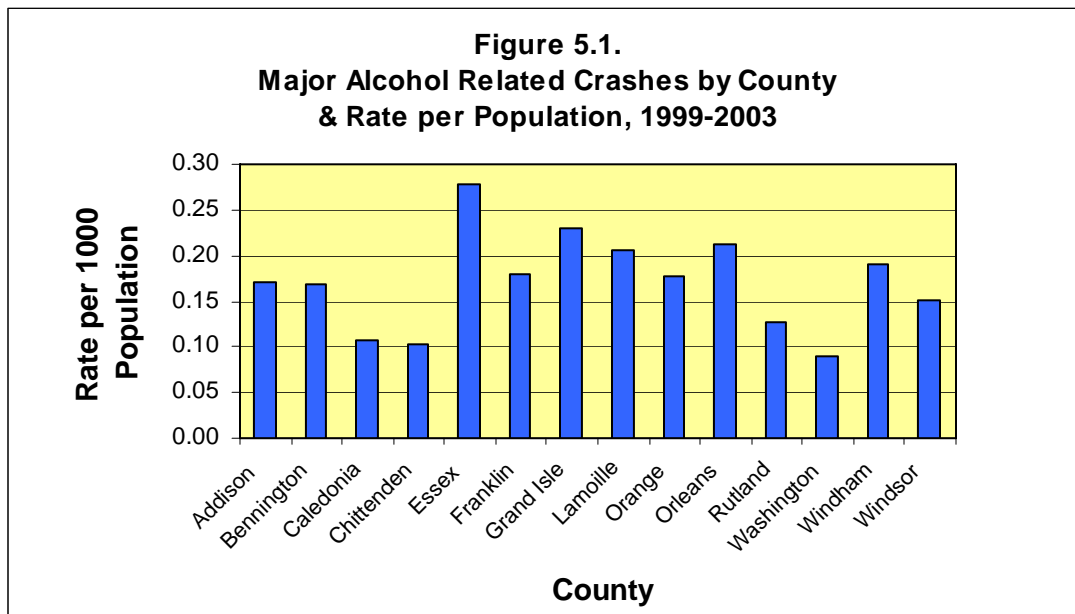
Table 5.3 and Figure 5.4 show the time of day that alcohol-related major crashes occurred. These crashes were most likely to occur at night between 10:00 p.m. and 2 a.m. (26.9% of crashes) and during the evening hours of 6:00 and 10 p.m. (24.4%). This is followed by afternoon (2:00-6:00 p.m.; 19.1%), early morning (2:00-6:00 a.m.; 13.9%), midday (10 a.m.-2 p.m.; 9.1%) and morning (6:00-10 a.m.; 6.6%). This distribution differs considerably from that for all crashes in 2003, also shown in Table 5.3. Crashes overall in 2003 were far more likely to occur in the daytime (afternoon, midday and morning hours), and far less likely to occur in the evening, night and early morning hours) than were alcohol-related crashes. For example, one-third of the crashes in 2003 occurred between 2:00 and 6:00 p.m., but only 19.1% of alcohol-related major crashes did, while only 6.5% of all crashes in 2003 took place between 10:00 p.m. and 2:00 a.m., when 26.9 percent of alcohol-related crashes occurred.

**Table 5.1. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes by County, 1999-2003  
Number, Rate per Population & Rate per Vehicle Miles Traveled**

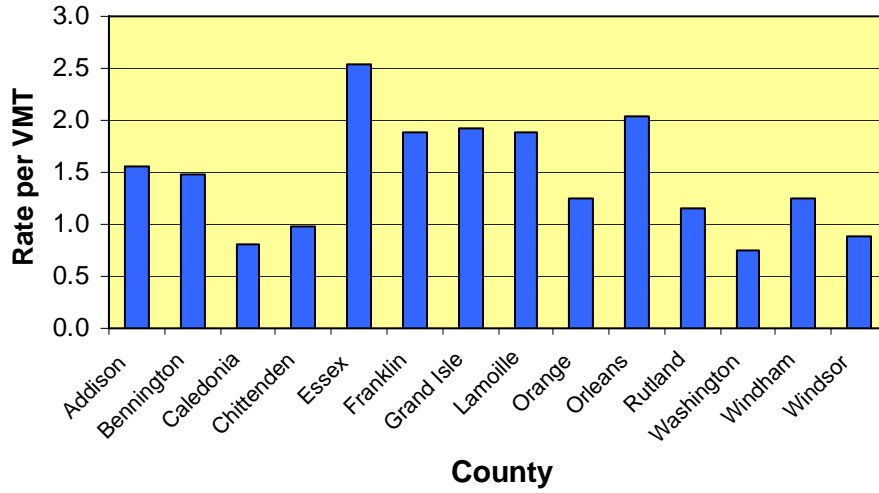
County	N	%	Average Annual Rate* per Population	Average Annual Rate** per Vehicle Miles Traveled
Addison	31	7.1%	0.17	1.6
Bennington	31	7.1%	0.17	1.5
Caledonia	16	3.6%	0.11	0.8
Chittenden	75	17.1%	0.10	1.0
Essex	9	2.1%	0.28	2.5
Franklin	41	9.3%	0.18	1.9
Grand Isle	8	1.8%	0.23	1.9
Lamoille	24	5.5%	0.21	1.9
Orange	25	5.7%	0.18	1.2
Orleans	28	6.4%	0.21	2.0
Rutland	40	9.1%	0.13	1.2
Washington	26	5.9%	0.09	0.8
Windham	42	9.6%	0.19	1.3
Windsor	43	9.8%	0.15	0.9
State Total	439	100.0%	0.14	1.2

\*Rate per 1,000 population.

\*\*Rate per 100 Million VMT



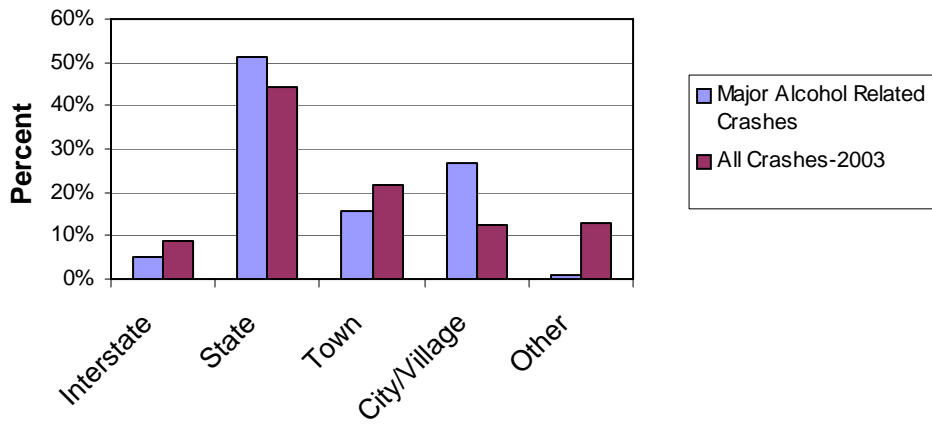
**Figure 5.2  
Major Alcohol Related Crashes by County  
& Rate per VMT, 1999-2003**



**Table 5.2. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes by Highway Class, 1999-2003**

Highway Class	N	%	All Crashes 2003
			%
Interstate	22	5.0%	8.7%
State	225	51.3%	44.3%
Town	69	15.7%	21.5%
City/Village	118	26.9%	12.5%
Other	5	1.1%	12.9%
<b>Total</b>	<b>439</b>	<b>100.0%</b>	<b>100.0%</b>

**Figure 5.3  
Major Alcohol Related Crashes  
by Highway Class, 1999-2003**



**Table 5.3. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes by Time of Day, 1999-2003**

Time of Day	N	All Crashes 2003	
		%	%
Early Morn (2-6 am)	61	13.9%	3.6%
Morning (6-10 am)	29	6.6%	17.8%
Midday (10 am-2 pm)	40	9.1%	25.6%
Afternoon (2-6 pm)	84	19.1%	32.7%
Evening (6-10 pm)	107	24.4%	13.9%
Night (10 pm - 2 am)	118	26.9%	6.5%
<b>Total</b>	<b>439</b>	<b>100.0%</b>	<b>100.0%</b>

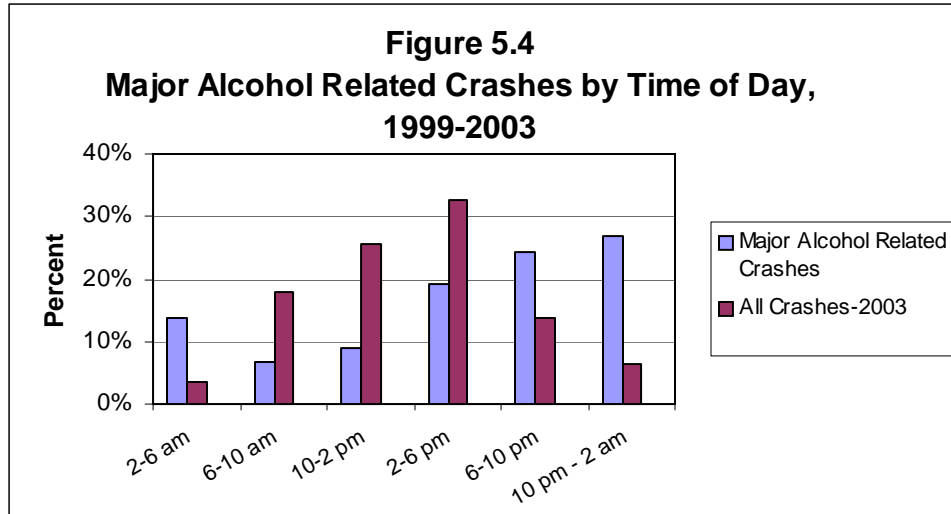
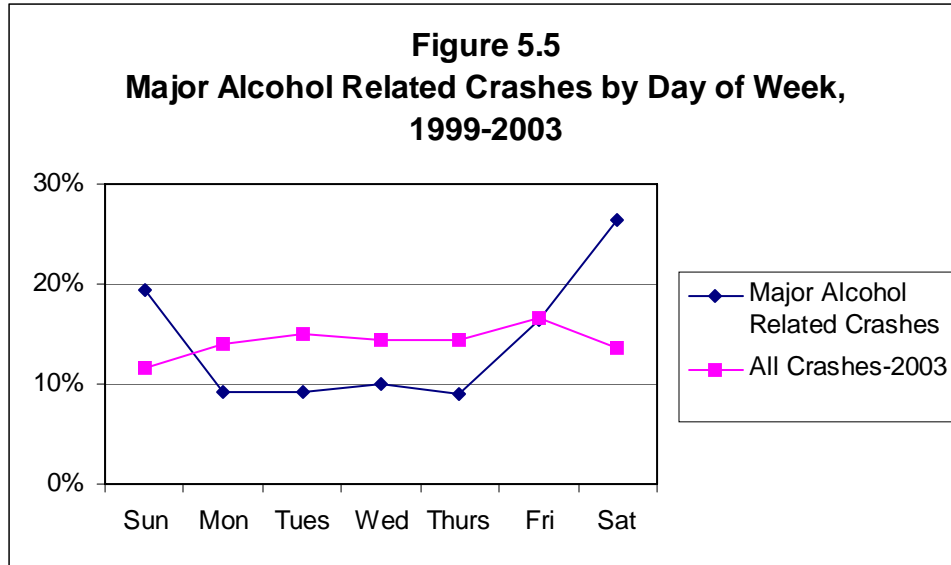


Table 5.4 and Figure 5.5 show the distribution of alcohol-related major crashes compared to all crashes in 2003. Not surprisingly, most alcohol-related major crashes occurred between Friday and Sunday. More than one quarter (26.4%) took place on Saturday, 19.4% on Sunday, and 16.4% on Friday. Additional crashes were about evenly distributed across the remaining days of the week. Much less variation is evident across days of the week for all crashes in 2003 than for alcohol-related crashes. Percentages range from a low of 11.6% of crashes on Sunday to a high of 16.7% on Friday. Forty-two percent of the 2003 crashes occurred between Friday and Sunday, compared to 62.2% of alcohol-related major crashes.

**Table 5.4. Emphasis Area - Reducing Impaired Driving**  
**Major Alcohol Related Crashes by Day of Week, 1999-2003**

Day of Week	N	%	All Crashes 2003
			%
Sunday	85	19.4%	11.6%
Monday	41	9.3%	14.1%
Tuesday	41	9.3%	15.0%
Wednesday	44	10.0%	14.5%
Thursday	40	9.1%	14.4%
Friday	72	16.4%	16.7%
Saturday	116	26.4%	13.7%
Total	439	100.0%	100.0%



Peak times for alcohol-related crashes are evident in [Table 5.5](#), which shows the number of crashes per hour by day of the week and time period. Friday, Saturday, and Sunday stand out, with an average of 3.0, 4.8, and 3.5 crashes per hour, respectively. Afternoon, evening, and night hours also stand out, with 21, 26.8, and 29.5 crashes per hour. Examining day and time information together shows that the greatest number of crashes occurred on Saturday night between 10:00 p.m. and 2:00 a.m., with an average of 8.8 crashes per hour. Friday evening and night, Saturday early morning, afternoon and evening, and Sunday early morning, afternoon, evening and night all averaged substantial numbers of hourly crashes (ranging from 4.3-6.5 crashes per hour). In addition, an average of 4.5 crashes per hour occurred on Monday evenings, considerably more than during any other time period that day, and an average of four crashes per hour occurred on Wednesday afternoons.

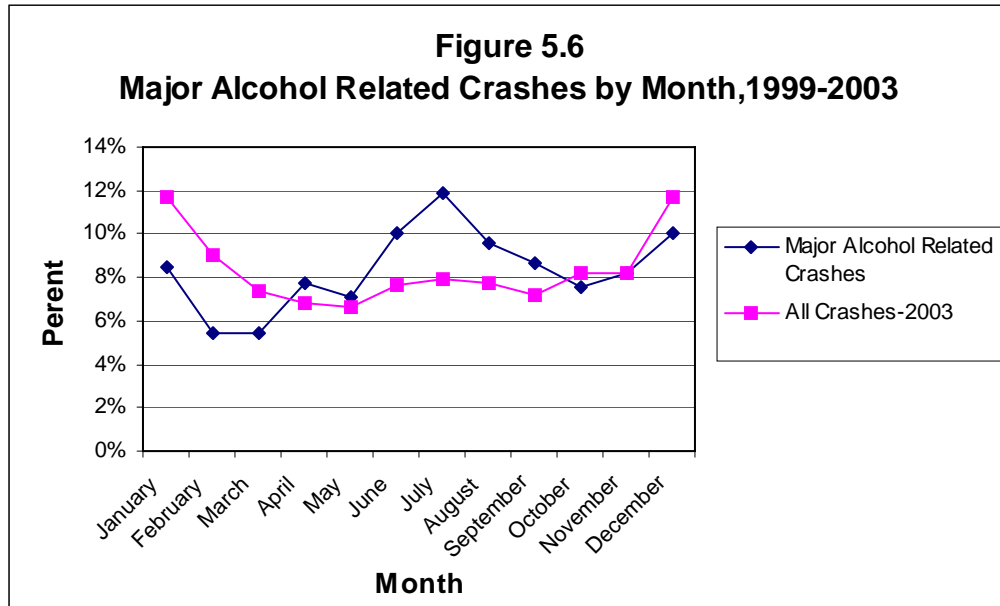
[Table 5.6](#) and [Figure 5.6](#) show the distribution of alcohol-related crashes across months of the year, compared to all crashes in 2003. Alcohol-related crashes peaked during the summer months (10% of alcohol-related crashes occurred in June, 11.8% in July, and 9.6% in August), although 10% of crashes occurred in December. The fewest crashes took place in February and March, with 5.5% of crashes taking place during each of these months. In contrast, all crashes in 2003 were more likely to occur in the winter months of December, January, and February (11.7%, 11.7%, and 9%, respectively). The percentage of crashes that took place during the remaining months ranged from 6.6% in May to 8.2% in October and November.

**Table 5.5. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes, Time of Day by Day of Week, 1999-2003**

Time of day	Day of Week															
	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Total	
	Crashes		Crashes		Crashes		Crashes		Crashes		Crashes		Crashes		Crashes	
	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.
Early morning (2-6 am)	2	0.5	6	1.5	7	1.8	2	0.5	8	2.0	19	4.8	17	4.3	61	15.3
Morning (6-10 am)	4	1.0	2	0.5	0	0.0	4	1.0	6	1.5	11	2.8	2	0.5	29	7.3
Midday (10 am-2 pm)	5	1.3	5	1.3	3	0.8	2	0.5	5	1.3	9	2.3	11	2.8	40	10.0
Afternoon (2-6 pm)	4	1.0	8	2.0	16	4.0	12	3.0	5	1.3	20	5.0	19	4.8	84	21.0
Evening (6-10 pm)	18	4.5	9	2.3	6	1.5	10	2.5	22	5.5	22	5.5	20	5.0	107	26.8
Night (10 pm-2 am)	8	2.0	11	2.8	12	3.0	10	2.5	26	6.5	35	8.8	16	4.0	118	29.5
Total	41	1.7	41	1.7	44	1.8	40	1.7	72	3.0	116	4.8	85	3.5	439	18.3

**Table 5.6. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes by Month, 1999-2003**

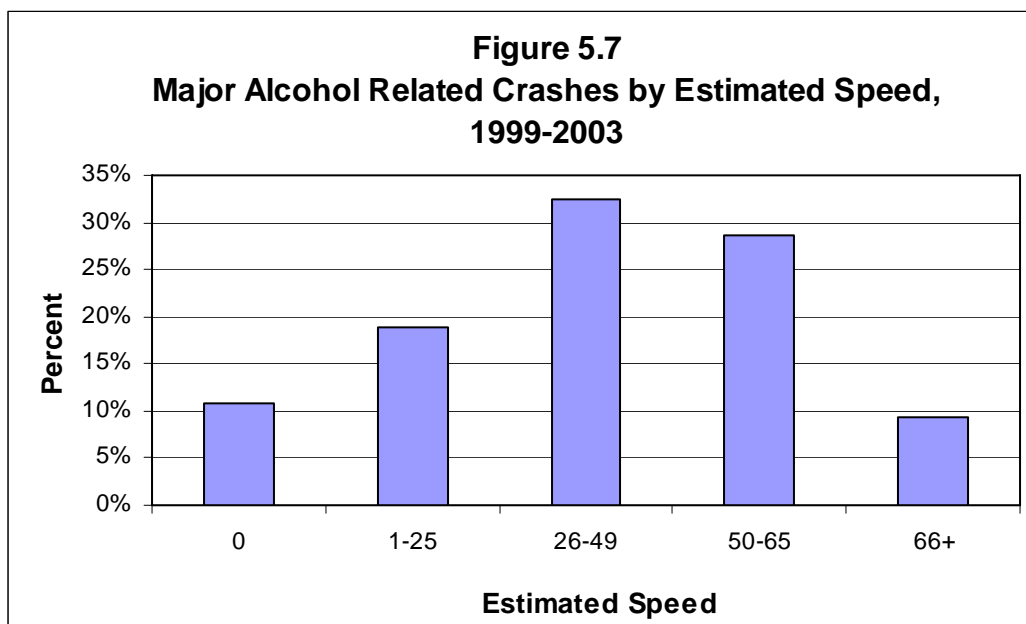
Month	N	All Crashes 2003	
		%	%
January	37	8.4%	11.7%
February	24	5.5%	9.0%
March	24	5.5%	7.4%
April	34	7.7%	6.8%
May	31	7.1%	6.6%
June	44	10.0%	7.6%
July	52	11.8%	7.9%
August	42	9.6%	7.7%
September	38	8.7%	7.2%
October	33	7.5%	8.2%
November	36	8.2%	8.2%
December	44	10.0%	11.7%
Average	37		
Total	439	100.0%	100.0%



The estimated speed of vehicles involved in alcohol-related crashes is shown in [Table 5.7](#) and [Figure 5.7](#) (data available for only 213 vehicles). Approximately 32% of the vehicles were traveling at 26-49 miles per hour and nearly 29% were traveling at 50-65 miles per hour. Fewer vehicles were traveling at lower rates of speed (1-25 miles per hour, 18.8%), or at higher rates of speed (66+ miles per hour, 9.4%).

**Table 5.7. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes by Estimated Speed, 1999-2003**

Estimated Speed	N	%
0	23	10.8%
1-25	40	18.8%
26-49	69	32.4%
50-65	61	28.6%
66+	20	9.4%
Total	213	100.0%



Data on the curvature of roadways at the scene of major alcohol-related accidents are presented in [Table 5.8](#) (information was available for only 106 crashes). Specifically, the table provides the distribution of crashes by curvature degrees and curve length in miles. Sixty-three alcohol-related crashes, or nearly 60 percent of alcohol-related crashes, occurred on roadways with curvatures of only 2.01-5 degrees. Another 35, or 33%, took place on roadways with curvatures of 5.01-10. Taken together, these figures indicate that nine out of ten alcohol-related accidents occurred on roadways with little curvature. In addition, [Table 5.8](#) shows that three quarters of alcohol-related crashes took place on curves of short duration—curve lengths of .01-.05 miles in 47 crashes (44.3%), and curve lengths of .051-.1 miles in 34 crashes (32.1%). Examining curvature degrees and curve length simultaneously, [Table 5.8](#) shows that 28 of 106 alcohol-related crashes (26.4%) occurred on roadways with curvatures of 2.01-5 degrees and curve lengths of .01-.05 miles. Another 23 crashes (21.7%) took place on roadways with curvatures of 2.01-5 degrees and curve lengths of .051-.1 miles. These figures again indicate that alcohol-related crashes are most likely to occur on roadways with little curvature, either in degree or length.

**Table 5.8. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes - Curvature Degrees by Curve Length in Miles, 1999-2003**

Curvature Degrees	Curve Length in Miles										Total	
	0.01-0.05		0.051 - 0.1		0.101-0.2		0.201-0.3		>0.3			
	N	%	N	%	N	%	N	%	N	%	N	%
2.01-5	28	44.4%	23	36.5%	10	15.9%	2	3.2%	0	0.0%	63	100.0%
5.01-10	14	40.0%	9	25.7%	11	31.4%	1	2.9%	0	0.0%	35	100.0%
10.01-14	4	66.7%	1	16.7%	1	16.7%	0	0.0%	0	0.0%	6	100.0%
14.01-20	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
20.01-30	0	n.a.	0	n.a.	0	n.a.	0	n.a.	0	n.a.	0	n.a.
>30	1	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
Total	47	44.3%	34	32.1%	22	20.8%	3	2.8%	0	0.0%	106	100.0%

Table 5.9 shows the number of alcohol-related crashes that occurred in travel lanes of various widths by curvature degrees. Forty-five of 104 crashes for which this information is available (43.3%) occurred on travel lanes 24 feet in width, and another 38 crashes (36.5%) took place on travel lanes 22 feet in width. Ten crashes (9.6%) occurred on travel lanes 20 feet in width, and ten crashes (9.6%) on travel lanes more than 24 feet in width. Looking at travel lane width and curvature degree together shows that crashes most commonly occurred on roadways with a lane width of 24 feet with curvature degrees of 2.01-5 (33 of 104 crashes, or 31.7%), and on roadways with a lane width of 22 feet and curvature degrees of 2.01-5 (20 of 104 crashes, or 19.2%). Another 15 (14.4%) crashes occurred on roadways with travel lane widths of 22 feet and curvatures of 5.01-10 degrees, and 12 (11.5%) crashes occurred on roadways with travel lane widths of 24 feet and curvatures of 5.01-10 degrees. Thus, 80 of 104 alcohol-related crashes (76.9%) took place on roadways with travel lane widths of 22 or 24 feet, and curvatures of not more than 10 degrees.

**Table 5.9. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes - Curvature Degrees by Travel Lane Width, 1999-2003**

Curvature Degrees	Travel Lane Width										Total	
	18		20		22		24		>24			
	N	%	N	%	N	%	N	%	N	%	N	%
2.01-5	0	0.0%	4	6.5%	20	32.3%	33	53.2%	5	8.1%	62	100.0%
5.01-10	0	0.0%	4	11.8%	15	44.1%	12	35.3%	3	8.8%	34	100.0%
10.01-14	1	16.7%	1	16.7%	3	50.0%	0	0.0%	1	16.7%	6	100.0%
14.01-20	0	0.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
20.01-30	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	1	100.0%
>30	0	n.a.	0	n.a.	0	n.a.	0	n.a.	0	n.a.	0	n.a.
<b>Total</b>	<b>1</b>	<b>1.0%</b>	<b>10</b>	<b>9.6%</b>	<b>38</b>	<b>36.5%</b>	<b>45</b>	<b>43.3%</b>	<b>10</b>	<b>9.6%</b>	<b>104</b>	<b>100.0%</b>

The number of alcohol-related crashes that occurred at various roadway widths by curvature degrees is shown in [Table 5.10](#). The greatest number of crashes took place on roadways wider than 35 feet (38 of 103 crashes for which this information is available, or 36.9%). Thirty-one crashes (30.1%) occurred on roadways 25-28 feet in width, and 17 crashes (16.5%) occurred both on roadways less than 25 feet in width and on those 29-35 feet in width. Examining roadway width and curvature degrees simultaneously shows that the greatest number of crashes occurred on roadways greater than 35 feet in width with curvatures of 2.01-5 degrees (33 crashes, or 32%). Roadways 25-28 feet in width with curvatures of 2.01-5 degrees and 5.01-10 degrees were the locations of 15 (14.6%) and 13 (12.6%) additional crashes, respectively.

**Table 5.10. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes - Curvature Degrees by Roadway Width, 1999-2003**

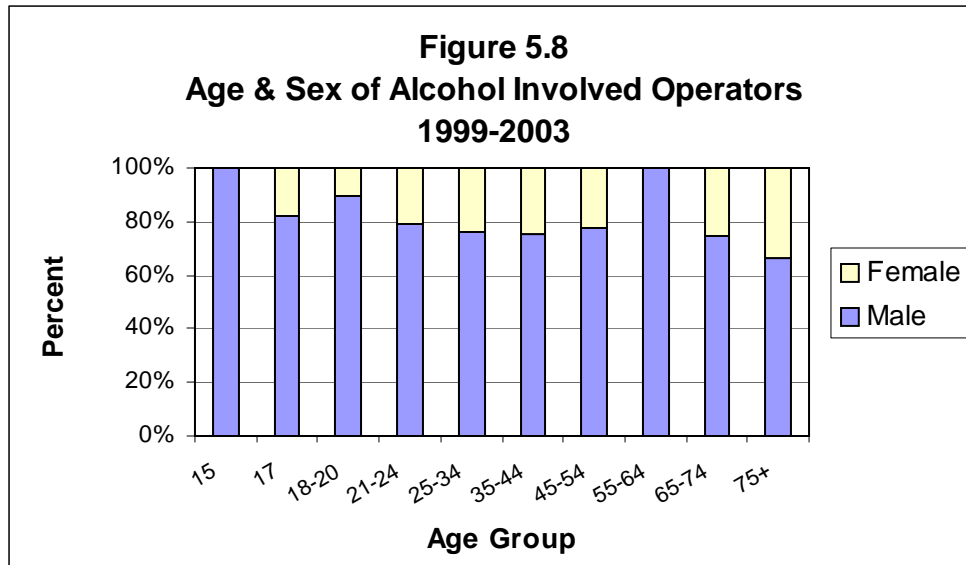
Curvature Degrees	Roadway Width								Total	
	<25		25-28		29-35		>35			
	N	%	N	%	N	%	N	%	N	%
2.01-5	7	11.3%	15	24.2%	7	11.3%	33	53.2%	62	100.0%
5.01-10	6	18.2%	13	39.4%	10	30.3%	4	12.1%	33	100.0%
10.01-14	3	50.0%	3	50.0%	0	0.0%	0	0.0%	6	100.0%
14.01-20	1	100.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
20.01-30	0	n.a.	0	n.a.	0	n.a.	0	n.a.	0	n.a.
>30	0	0.0%	0	0.0%	0	0.0%	1	100.0%	1	100.0%
Total	17	16.5%	31	30.1%	17	16.5%	38	36.9%	103	100.0%

Person Characteristics

Table 5.11 and Figure 5.8 show the age and sex distributions of vehicle operators involved in alcohol-related crashes. Seventy-nine percent of these operators were male, and 21% were female. In all crashes in 2003, only 57.4% of vehicle operators were male and 42.6% were female. Thus, males are disproportionately represented among operators involved in alcohol-related crashes. The disproportionate representation of males holds across all age categories. The percentage of females in different age categories ranges from 0-33%, while the percentage of males ranges from 66.7-100%.

**Table 5.11. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes, 1999-2003  
Age & Sex of Alcohol Involved Operators**

Age Group	Male		Female		Total	
	N	%	N	%	N	%
15	3	100.0%	0	0.0%	3	100.0%
16	0		0		0	
17	9	81.8%	2	18.2%	11	100.0%
18-20	50	89.3%	6	10.7%	56	100.0%
21-24	67	78.8%	18	21.2%	85	100.0%
25-34	74	76.3%	23	23.7%	97	100.0%
35-44	82	75.2%	27	24.8%	109	100.0%
45-54	41	77.4%	12	22.6%	53	100.0%
55-64	11	100.0%	0	0.0%	11	100.0%
65-74	6	75.0%	2	25.0%	8	100.0%
75+	4	66.7%	2	33.3%	6	100.0%
<b>Total</b>	<b>347</b>	<b>79.0%</b>	<b>92</b>	<b>21.0%</b>	<b>439</b>	<b>100.0%</b>
All Crash Involved Operators 2003		57.4%		42.6%		



Thirty-four children were passengers in alcohol related vehicles involved in 20 alcohol-related crashes. The age breakdown of child passengers is shown in [Table 5.12](#). Ten child passengers were 15 or 16 years of age (29.4%); eight were 5-9 (23.5%); seven were 13-14 (20.6%); six were 10-12 (17.6%); and three were four or younger (8.8%).

**Table 5.12. Emphasis Area - Reducing Impaired Driving**  
**Major Alcohol Related Crashes, 1999-2003**  
**Child Passengers in Alcohol Related Vehicles**

Age Category	Number	Percent
Up to 4 years	3	8.8%
5 to 9	8	23.5%
10 to 12	6	17.6%
13 & 14	7	20.6%
15 to 16	10	29.4%
<b>Total</b>	<b>34</b>	<b>100.0%</b>

Number of alcohol related crashes in which there were child passengers  
in alcohol related vehicle=20.

Note: persons with unknown age were excluded from the analysis.

The time of alcohol-related crashes involving vehicle operators of various ages is shown in [Table 5.13](#). As would be expected, younger operators (less than age 25) were most likely to be involved in crashes during nighttime and early morning hours. For example, 72.8% of the 17 year old alcohol related crash operators were involved in crashes during these time periods. Crashes involving operators in the middle-aged groups (25-54) are more evenly distributed across afternoon, evening, and nighttime hours, although there is a notable spike during evening hours for those aged 35-44, when 31.2% of crashes occurred for this age group. Operators aged 55-64 were also most likely to be involved in crashes during evening hours (54.5% of crashes). For those aged 65-74, however, midday was the most frequent time for alcohol-related crashes (37.5%), followed by morning (25%). Crashes involving operators aged 75 and older were most common during midday and afternoon hours (33.3% during each time period). Note that percentages are less reliable for the younger and older age categories because the number of crash operators in these age groups is small.

[Table 5.14](#) shows the days on which alcohol-related crashes occurred for vehicle operators of various ages. Although weekends were a common time for alcohol-related accidents, there is more variation across age groups than was evident for the time of day of crashes. Two of three crashes involving 15-year old operators occurred on Saturday (the other on Wednesday). No 16-year old operators were involved in alcohol-related crashes between 1999 and 2003. Sundays, followed by Friday and Saturday were the most common crash days for 17-year old operators (77.7% of crashes occurred on these three days combined). One quarter of crashes involving 18-20 year old operators occurred on Sunday, but only 8.7% on Saturday, and 15.2% on Friday (as well as on Monday and Tuesday). Friday, Saturday and Wednesday were the most prevalent crash days among 21-24 year old operators, with 19.2% of crashes on each day. Friday, Saturday and Sunday were the most common days of crashes for 25-34 and 35-44 year olds, although Friday was less common and Saturday more common for the younger age group (62.1% and 68% of crashes occurred on these three days for 25-34 and 35-44 year olds, respectively). Among 45-54 year old operators, 44.4% took place on Saturday, as did 59.1% of crashes among 55-64 year old operators. Crashes involving 65-74 year old operators were most likely to occur on Tuesday (37.5%), followed by Monday and Saturday (each with 25%). Finally, 50% of crashes occurred on Wednesday among operators aged 75 and older, followed by Sunday (33.3%). Again, percentages are less reliable for the younger and older age groups because numbers of crashes in these groups were relatively small.

The distribution of blood alcohol concentrations for operators of different age groups is shown in [Table 5.15](#). The far right column shows the percentage of operators within each group whose blood alcohol concentration was .08 or higher (the legal limit for vehicle operators). Percentages increase with age (peaking at age 25-29), fluctuate somewhat, and decrease among the upper age groups. Fewer than half of vehicle operators in the youngest two age groups (15-17 and 18-20) and in the oldest age group (50 and older) had blood alcohol levels of .12 or higher, while more than half of those in the remaining age groups did so. Thus, younger and older drivers involved in alcohol-related accidents are not likely to be as intoxicated as those in other age groups. Notably, among crashes involving operators aged 35-39, 42.3% had blood alcohol levels of .20 or higher, as did nearly 30% of those aged 30-34, 40-44, and 45-49. The bottom row of [Table 5.15](#), and [Figure 5.9](#), show the blood alcohol levels of operators for all age groups combined. Fully 20% of operators had blood alcohol levels of .20 and higher.

**Table 5.13. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes, 1999-2003  
Alcohol Involved Operators by Age & Time of Day**

Age Group	Time of Day												Total	
	Early Morning 2am-6am		Morning 6am-10am		Midday 10am-2pm		Afternoon 2pm-6pm		Evening 6pm-10pm		Night 10pm-2am			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15	0	0.0%	0	0.0%	0	0.0%	1	33.3%	0	0.0%	2	66.7%	3	100.0%
16	0		0		0		0		0		0		0	
17	4	36.4%	0	0.0%	0	0.0%	1	9.1%	2	18.2%	4	36.4%	11	100.0%
18 to 20	14	25.0%	4	7.1%	2	3.6%	8	14.3%	12	21.4%	16	28.6%	56	100.0%
21 to 24	18	21.2%	6	7.1%	6	7.1%	6	7.1%	16	18.8%	33	38.8%	85	100.0%
25 to 34	11	11.3%	3	3.1%	9	9.3%	25	25.8%	23	23.7%	26	26.8%	97	100.0%
35 to 44	9	8.3%	9	8.3%	9	8.3%	23	21.1%	34	31.2%	25	22.9%	109	100.0%
45 to 54	5	9.4%	4	7.5%	6	11.3%	13	24.5%	14	26.4%	11	20.8%	53	100.0%
55 to 64	0	0.0%	0	0.0%	2	18.2%	3	27.3%	6	54.5%	0	0.0%	11	100.0%
65 to 74	0	0.0%	2	25.0%	3	37.5%	1	12.5%	1	12.5%	1	12.5%	8	100.0%
75 and older	0	0.0%	1	16.7%	2	33.3%	2	33.3%	0	0.0%	1	16.7%	6	100.0%
<b>Total</b>	<b>61</b>	<b>13.9%</b>	<b>29</b>	<b>11.6%</b>	<b>39</b>	<b>8.9%</b>	<b>83</b>	<b>18.9%</b>	<b>108</b>	<b>24.6%</b>	<b>119</b>	<b>27.1%</b>	<b>439</b>	<b>100.0%</b>

**Table 5.14. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes, 1999-2003  
Alcohol Involved Operators by Age & Day of Week**

Age Group	Day of Week														Total	
	Sunday		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15	0	0.0%	0	0.0%	0	0.0%	1	33.3%	0	0.0%	0	0.0%	2	66.7%	3	100.0%
16	0		0		0		0		0		0		0		0	
17	3	33.3%	1	11.1%	1	11.1%	0	0.0%	0	0.0%	2	22.2%	2	22.2%	9	100.0%
18 to 20	12	26.1%	7	15.2%	7	15.2%	6	13.0%	3	6.5%	7	15.2%	4	8.7%	46	100.0%
21 to 24	10	13.7%	6	8.2%	10	13.7%	14	19.2%	5	6.8%	14	19.2%	14	19.2%	73	100.0%
25 to 34	23	22.3%	8	7.8%	10	9.7%	8	7.8%	13	12.6%	15	14.6%	26	25.2%	103	100.0%
35 to 44	23	23.7%	7	7.2%	8	8.2%	7	7.2%	9	9.3%	23	23.7%	20	20.6%	97	100.0%
45 to 54	7	9.7%	7	9.7%	5	6.9%	3	4.2%	6	8.3%	12	16.7%	32	44.4%	72	100.0%
55 to 64	2	9.1%	2	9.1%	1	4.5%	2	9.1%	2	9.1%	0	0.0%	13	59.1%	22	100.0%
65 to 74	0	0.0%	2	25.0%	3	37.5%	0	0.0%	1	12.5%	0	0.0%	2	25.0%	8	100.0%
75 and older	2	33.3%	1	16.7%	0	0.0%	3	50.0%	0	0.0%	0	0.0%	0	0.0%	6	100.0%
Total	82	18.7%	41	9.3%	45	10.3%	44	10.0%	39	8.9%	73	16.6%	115	26.2%	439	100.0%

**Table 5.15. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes, 1999-2003  
Operator Blood Alcohol Concentration by Age Group, Tested Operators**

Age Group	Blood Alcohol Concentration												Total N %	%-.08% or Above	
	.039 or less		.040-.079		.080-.119		.120-.159		.160-.199		.20 & above				
	N	%	N	%	N	%	N	%	N	%	N	%			
15 to 17 years	3	37.5%	0	0.0%	2	25.0%	2	25.0%	0	0.0%	1	12.5%	8	100.0%	62.5%
18 to 20	3	11.1%	7	25.9%	7	25.9%	3	11.1%	6	22.2%	1	3.7%	27	100.0%	63.0%
21 to 24	2	4.9%	11	26.8%	5	12.2%	11	26.8%	8	19.5%	4	9.8%	41	100.0%	68.3%
25 to 29	0	0.0%	3	16.7%	3	16.7%	5	27.8%	4	22.2%	3	16.7%	18	100.0%	83.3%
30 to 34	6	22.2%	0	0.0%	3	11.1%	7	25.9%	3	11.1%	8	29.6%	27	100.0%	77.8%
35 to 39	3	11.5%	3	11.5%	2	7.7%	2	7.7%	5	19.2%	11	42.3%	26	100.0%	76.9%
40 to 44	2	7.4%	3	11.1%	5	18.5%	5	18.5%	4	14.8%	8	29.6%	27	100.0%	81.5%
45 to 49	4	22.2%	1	5.6%	3	16.7%	2	11.1%	3	16.7%	5	27.8%	18	100.0%	72.2%
50 & older	11	42.3%	2	7.7%	3	11.5%	4	15.4%	3	11.5%	3	11.5%	26	100.0%	50.0%
Total	34	15.6%	30	13.8%	33	15.1%	41	18.8%	36	16.5%	44	20.2%	218	100.0%	70.6%

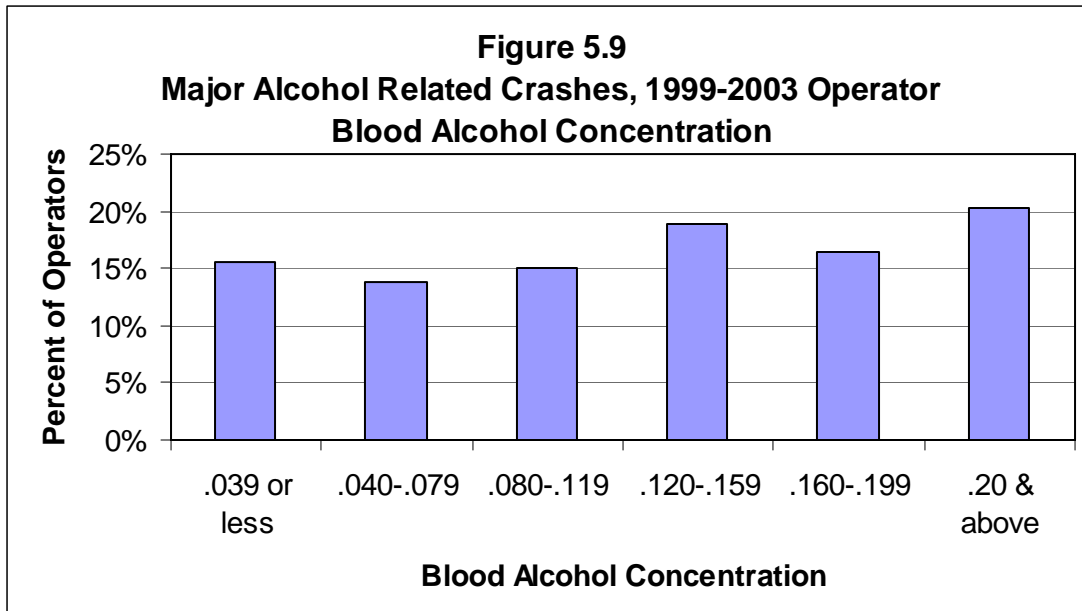
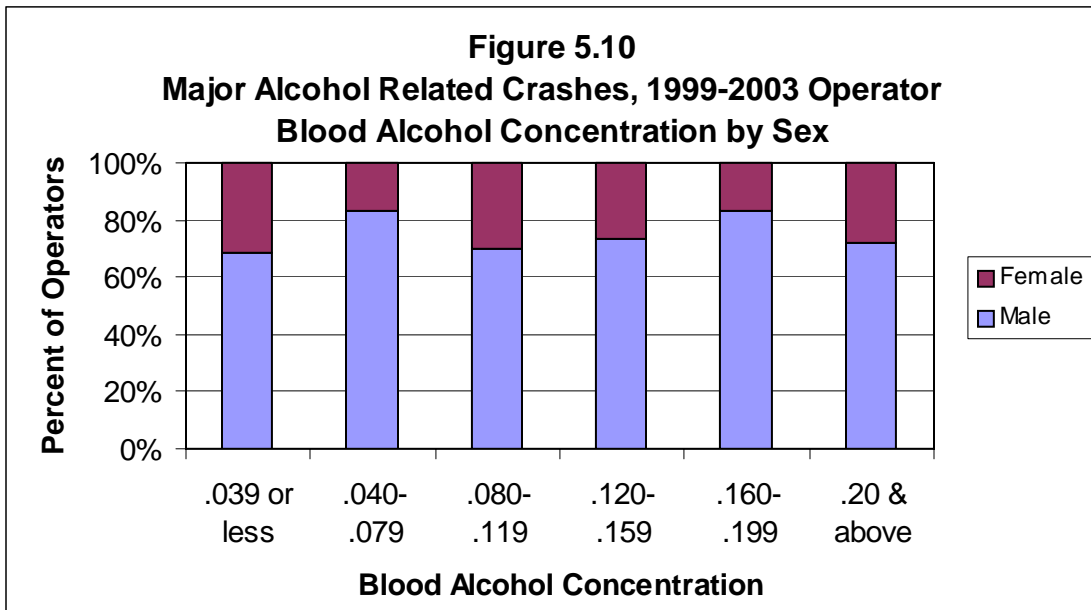


Table 5.16 and Figure 5.10 show the sex breakdown of vehicle operators by blood alcohol concentration categories. Males represent 79% of operators in alcohol-related crashes, and they are over-represented in these blood alcohol concentration categories too (74.8% of the 218 operators for whom blood alcohol concentrations are available were male). Males are most highly represented in the .04-.079 and .16-.199 blood alcohol concentrations (83.3% of operators in each category), while females are most highly represented in the .039 or less and .08-.119 categories.

**Table 5.16. Emphasis Area - Reducing Impaired Driving**  
**Major Alcohol Related Crashes, 1999-2003**  
**Operator Blood Alcohol Concentration by Sex, Tested Operators**

Sex	Blood Alcohol Concentration												Total	
	.039 or less		.040-.079		.080-.119		.120-.159		.160-.199		.20 & above			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Male	24	68.6%	25	83.3%	23	69.7%	30	73.2%	30	83.3%	31	72.1%	163	74.8%
Female	11	31.4%	5	16.7%	10	30.3%	11	26.8%	6	16.7%	12	27.9%	55	25.2%
Total	35	100.0%	30	100.0%	33	100.0%	41	100.0%	36	100.0%	43	100.0%	218	100.0%



The time of day alcohol-related crashes occurred for vehicle operators with various blood alcohol concentrations is shown in [Table 5.17](#). Nighttime was the most common crash time for most blood alcohol concentrations, although the percentage of crashes that occurred during evening hours was higher or the same as that for nighttime hours for the two highest blood alcohol concentration categories (.160-.199 and .20 and above). Percentages were very nearly the same for both time periods for operators with blood alcohol concentrations of .040-.079 and .080-.119. In addition, 25.8% of crashes involving operators with blood alcohol concentrations of .040-.079 and 21.2% of crashes for those with blood alcohol concentrations of .080-.119 occurred during early morning hours.

[Table 5.18](#) shows the day of the week on which alcohol-related crashes occurred for vehicle operators with various blood alcohol concentrations. Crashes involving operators with the lowest blood alcohol concentrations (.039 or less) appear more evenly distributed across days of the week than is the case for those with higher blood alcohol concentrations. The greatest number of crashes occurred on Wednesday, followed closely by Sunday, Thursday and Saturday (all with 17.1% of crashes). Crashes involving operators with blood alcohol concentrations of .040-.079 were most likely occur on Saturday (41.9%) and Sunday (22.6%), and for operators with blood alcohol concentrations of .080-.119, on Saturday (30.3%), Friday (24.2%) and Sunday (21.2%). Saturday is the most common day for crashes among operators with blood alcohol concentrations of .120-.159, but many crashes occurred on Tuesday-Friday as well. Crashes are also more evenly distributed across days for operators with blood alcohol concentrations of .160-.199, and .20 and above, although 34.1% of crashes for the latter group occurred on Saturday.

**Table 5.17. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes, 1999-2003  
Operator Blood Alcohol Concentration by Time of Day, Tested Operators**

Time of day	Blood Alcohol Concentration												Total	
	.039 or less		.040-.079		.080-.119		.120-.159		.160-.199		.20 & above			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Early morning (2-6 am)	4	11.4%	8	25.8%	7	21.2%	4	9.8%	3	8.3%	4	9.1%	30	13.6%
Morning (6-10 am)	3	8.6%	1	3.2%	1	3.0%	3	7.3%	0	0.0%	2	4.5%	10	4.5%
Midday (10 am-2 pm)	5	14.3%	3	9.7%	1	3.0%	0	0.0%	1	2.8%	3	6.8%	13	5.9%
Afternoon (2-6 pm)	7	20.0%	0	0.0%	5	15.2%	10	24.4%	4	11.1%	9	20.5%	35	15.9%
Evening (6-10 pm)	6	17.1%	9	29.0%	9	27.3%	8	19.5%	15	41.7%	13	29.5%	60	27.3%
Night (10 pm-2 am)	10	28.6%	10	32.3%	10	30.3%	16	39.0%	13	36.1%	13	29.5%	72	32.7%
Total	35	100.0%	31	100.0%	33	100.0%	41	100.0%	36	100.0%	44	100.0%	220	100.0%

**Table 5.18.Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes, 1999-2003  
Operator Blood Alcohol Concentration by Day of Week, Tested Operators**

Day of Week	Blood Alcohol Concentration												Total	
	.039 or less		.040-.079		.080-.119		.120-.159		.160-.199		.20 & above			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Sunday	6	17.1%	7	22.6%	7	21.2%	2	4.9%	8	22.2%	8	18.2%	38	17.3%
Monday	4	11.4%	1	3.2%	3	9.1%	1	2.4%	5	13.9%	4	9.1%	18	8.2%
Tuesday	2	5.7%	2	6.5%	1	3.0%	8	19.5%	5	13.9%	4	9.1%	22	10.0%
Wednesday	7	20.0%	2	6.5%	3	9.1%	6	14.6%	2	5.6%	2	4.5%	22	10.0%
Thursday	6	17.1%	3	9.7%	1	3.0%	7	17.1%	2	5.6%	5	11.4%	24	10.9%
Friday	4	11.4%	3	9.7%	8	24.2%	6	14.6%	7	19.4%	6	13.6%	34	15.5%
Saturday	6	17.1%	13	41.9%	10	30.3%	11	26.8%	7	19.4%	15	34.1%	62	28.2%
Total	35	100.0%	31	100.0%	33	100.0%	41	100.0%	36	100.0%	44	100.0%	220	100.0%

The contributing circumstances to alcohol-related crashes are listed in [Table 5.19](#). Not surprisingly, the most frequent contributing circumstance is an operator being “under the influence of medication/drugs/alcohol” (218 of 636 circumstances, or 34.3%; note that crashes can have more than one contributing circumstance). This is followed in prevalence by “other/unknown operator cause” (15.4%), “failure to keep in proper lane/off road” (11.3%), and “driving too fast for conditions” (10.1%). [Table 5.19](#) also shows the contributing circumstances for all crashes in 2003. For these crashes, the most common circumstances were “other/unknown operator cause” (20.1%), “driving too fast for conditions” (16.7%), “inattention” (15.4%), and “failure to yield” (12.7%).

**Table 5.19. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes, 1999-2003  
Contributing Circumstances of Alcohol Involved Operators**

Contributing Circumstances	N	All Crashes 2003	
		%	%
Driving too fast for conditions	64	10.1%	16.7%
Failure to keep in proper lane/off road	72	11.3%	8.7%
Operating vehicle recklessly	39	6.1%	1.2%
Visibility obstructed	0	0.0%	2.9%
Excessive speed	39	6.1%	1.3%
Following too closely	6	0.9%	8.5%
Improper turn	5	0.8%	2.3%
Disregarded traffic signs, signals	5	0.8%	1.6%
Failure to yield	19	3.0%	12.7%
Inattention	10	1.6%	15.4%
Wrong side or wrong way	21	3.3%	0.6%
Fell asleep	16	2.5%	1.3%
Under influence of medication/drugs/alcohol	218	34.3%	2.1%
Operating defective equipment	3	0.5%	0.7%
Distraction caused by technology	1	0.2%	0.2%
Distracted	2	0.3%	1.5%
Swerving due to wind, slippery surface, etc	2	0.3%	2.2%
Failure to maintain control	16	2.5%	0.0%
Other/Unknown operator cause	98	15.4%	20.1%
Total	636	100.0%	100.0%

Table 5.20 shows the types of citations given to operators in alcohol-related crashes. As one would expect, by far the most common type of citation was “DUI” (driving under the influence; 167 of 392 citations, or 42.6%). Next was “all other” (unspecified; 9.7%), and “DLS” (driving while license suspended; 8.4%). Other common citations written were “operating without insurance” (6.4%), “speeding” (4.6%), “careless & negligent” (4.8%), and “driving in road laned for traffic” (4.8%). Also, other alcohol related citations accounted for 7.4% of the total.

**Table 5.20. Emphasis Area - Reducing Impaired Driving  
Citations for Alcohol Involved Drivers in Major Crashes, 1999-2003**

Violation	N	%
DUI	167	42.6%
Speeding	18	4.6%
Operating without insurance	25	6.4%
DLS	33	8.4%
Leaving scene of accident	12	3.1%
Following too closely	0	0.0%
Operating without license	7	1.8%
Careless & negligent	19	4.8%
Fail to yield	7	1.8%
Not registered	7	1.8%
Defective equipment	5	1.3%
Driving in road laned for traffic	19	4.8%
Driving to right	4	1.0%
Vehicle not inspected	0	0.0%
Under 18/21 & .02% or more alc conc	4	1.0%
Minor (16+) cons/poss of alcohol	10	2.6%
Consuming alcohol while driving	15	3.8%
Traffic control signal/device	1	0.3%
Operating w/o owner consent	1	0.3%
All other	38	9.7%
Total	392	100.0%

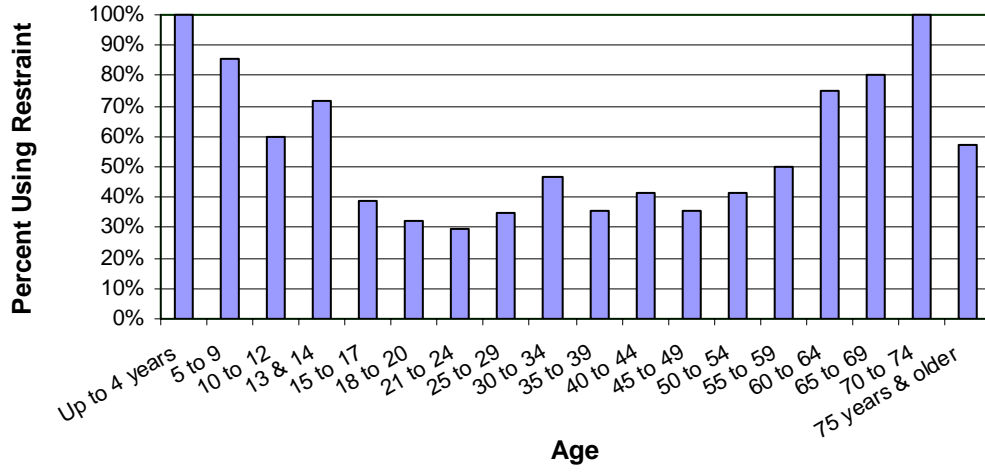
Restraint usage by occupants in alcohol related vehicles involved in alcohol-related major crashes is shown in Table 5.21 and Figure 5.11 by age category of occupant. Overall restraint usage was relatively low with only 39.7% of the vehicle occupants using a restraint. Looking at individual age groups, usage was highest among the four youngest and five oldest age categories (encompassing those aged 14 and younger, and aged 55 and older). For those in other age groups (15-54), restraint usage was less than 50%. Usage was lowest among 21-24 year olds, a group in which only 29.9 percent of occupants used restraints.

**Table 5.21. Emphasis Area - Reducing Impaired Driving  
Alcohol Related Vehicle Occupants in Major Crashes by Age Group & Restraint Use, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use		Number	Percent
	Number	Percent	Number	Percent	Number	Percent		
Up to 4 years	3	100.0%	0	0.0%	0	0.0%	3	100.0%
5 to 9	6	85.7%	1	14.3%	0	0.0%	7	100.0%
10 to 12	3	60.0%	2	40.0%	0	0.0%	5	100.0%
13 & 14	5	71.4%	2	28.6%	0	0.0%	7	100.0%
15 to 17	12	38.7%	11	35.5%	8	25.8%	31	100.0%
18 to 20	23	31.9%	31	43.1%	18	25.0%	72	100.0%
21 to 24	32	29.9%	50	46.7%	25	23.4%	107	100.0%
25 to 29	20	35.1%	28	49.1%	9	15.8%	57	100.0%
30 to 34	22	46.8%	20	42.6%	5	10.6%	47	100.0%
35 to 39	19	35.8%	21	39.6%	13	24.5%	53	100.0%
40 to 44	19	41.3%	20	43.5%	7	15.2%	46	100.0%
45 to 49	12	35.3%	14	41.2%	8	23.5%	34	100.0%
50 to 54	10	41.7%	7	29.2%	7	29.2%	24	100.0%
55 to 59	2	50.0%	0	0.0%	2	50.0%	4	100.0%
60 to 64	6	75.0%	2	25.0%	0	0.0%	8	100.0%
65 to 69	4	80.0%	1	20.0%	0	0.0%	5	100.0%
70 to 74	5	100.0%	0	0.0%	0	0.0%	5	100.0%
75 years & older	4	57.1%	3	42.9%	0	0.0%	7	100.0%
<b>Total</b>	<b>207</b>	<b>39.7%</b>	<b>213</b>	<b>40.8%</b>	<b>102</b>	<b>19.5%</b>	<b>522</b>	<b>100.0%</b>

Note: persons with unknown age were excluded from the analysis.

**Figure 5.11**  
**Alcohol Related Vehicle Crash Occupants in Major Crashes,**  
**1999-2003**



## Vehicle Characteristics

Finally, Table 5.22 shows what type of object, if anything, vehicles with alcohol involvement collided with in alcohol-related major crashes. The most frequent object was another vehicle in traffic (28.3%), followed by a tree (20.9%). Approximately 16% of vehicles overturned. Around 3.2% of vehicles hit a pedestrian.

**Table 5.22. Emphasis Area - Reducing Impaired Driving  
Major Alcohol Related Crashes, 1999-2003  
What Alcohol Involved Vehicles Collided With**

<u>Collided with</u>	<u>N</u>	<u>%</u>
Pedestrian	14	3.2%
Motor Vehicle in Traffic	123	28.3%
Motor Vehicle Parked	4	0.9%
Pedalcycle	4	0.9%
Deer	1	0.2%
Overtuned	69	15.9%
Non-collision	14	3.2%
Guard rail, curb	25	5.7%
Tree	91	20.9%
Pole, sign	40	9.2%
Ledge, boulder	17	3.9%
Motorcycle	2	0.5%
Other fixed object	24	5.5%
Unknown/other	7	1.6%
Total	435	100.0%

## VII. Emphasis Area – Curbing Aggressive Driving

Analyses for the sixth emphasis area, Curbing Aggressive Driving, examined data related to 347 major vehicle crashes that occurred between 1999 and 2003 and involved aggressive driving. Aggressive driving was defined from the data if the operator was speeding, following too closely or driving in an erratic, reckless or aggressive manner.

### Environment and Roadways

Table 6.1 shows that 25.9% of the 347 major crashes in which aggressive driving played a role occurred in Chittenden County, the most heavily populated county in Vermont. Windham and Bennington counties followed, with 11.2% and 11% of crashes, respectively. Grand Isle County, a sparsely populated area, had only one crash linked to aggressive driving, or .3% of the total. Table 6.1 also shows crash rates, first based on county population size (average annual rate per 1,000 population), then based on vehicle miles traveled (average annual rate per 100 million vehicle miles traveled). Rates adjusted for population size show that Bennington County had the highest crash rate with an average rate of .21 crashes per 1,000 persons in the county's population. Windham (.18) and Lamoille (.15) counties followed. Grand Isle County had the lowest rate, with only .03 crashes per 1,000 persons. These rates are illustrated in Figure 6.1. Bennington again had the highest crash rate when rates were calculated based on vehicle miles traveled (1.8 crashes per 100,000 vehicle miles traveled), followed by a cluster of five counties—Lamoille, Franklin, Chittenden, Windham, and Addison—with rates between 1.4 and 1.1 (see Figure 6.2).

The types of highways where major crashes involving aggressive drivers occurred are shown in Table 6.2 and Figure 6.3. This distribution is also compared to that for all crashes in 2003. More than half of crashes involving aggressive driving (57.3%) occurred on state highways. Far fewer occurred on town (16.4%), city/village (16.4%), interstate (8.1%) and “other” (1.7%) types of roadways. Crashes involving aggressive driving were more likely than all 2003 crashes to take place on state highways (57.3% vs. 44.3%) and city/village roadways (16.4% vs. 12.5%). They were less likely to occur on town roadways (16.4% vs. 21.5%) and “other” types of roadways (1.7% vs. 12.9%), and about equally likely to take place on interstates (8.1% vs. 8.7%).

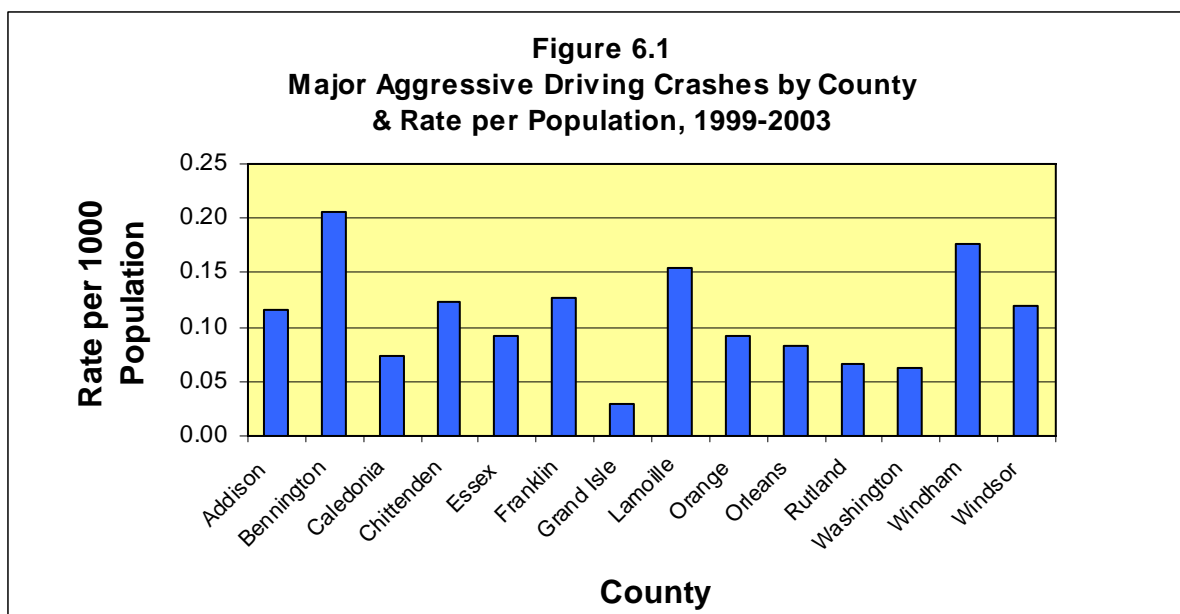
The average numbers of major crashes involving aggressive driving that occurred per hour are shown in Table 6.3 by day of the week and time of day. The bottom row of Table 6.3 shows that this type of crash occurred with greatest frequency on Saturdays (an average of 2.7 crashes per hour), and least often on Tuesdays (an average of 1.5 crashes per hour). The average number of crashes per hour ranged from 2.0 and 2.2 for the remaining days. Crashes involving aggressive driving were also most likely to occur during afternoon hours (2:00-6:00 p.m.), when an average of 24.5 crashes occurred per hour (see far right column of Table 6.3), and least likely to occur during early morning hours when fewer drivers are on the roads (2:00-6:00 a.m.; average of 5.0 crashes per hour). Examining day and time together shows that the highest average number of hourly crashes occurred on Sunday afternoons (4.5 crashes per hour between 2:00 and 6:00 p.m.). This was followed by an average of four crashes during midday and afternoon time periods on Saturday (10:00 a.m.-2:00 p.m., and 2:00-6:00 p.m.).

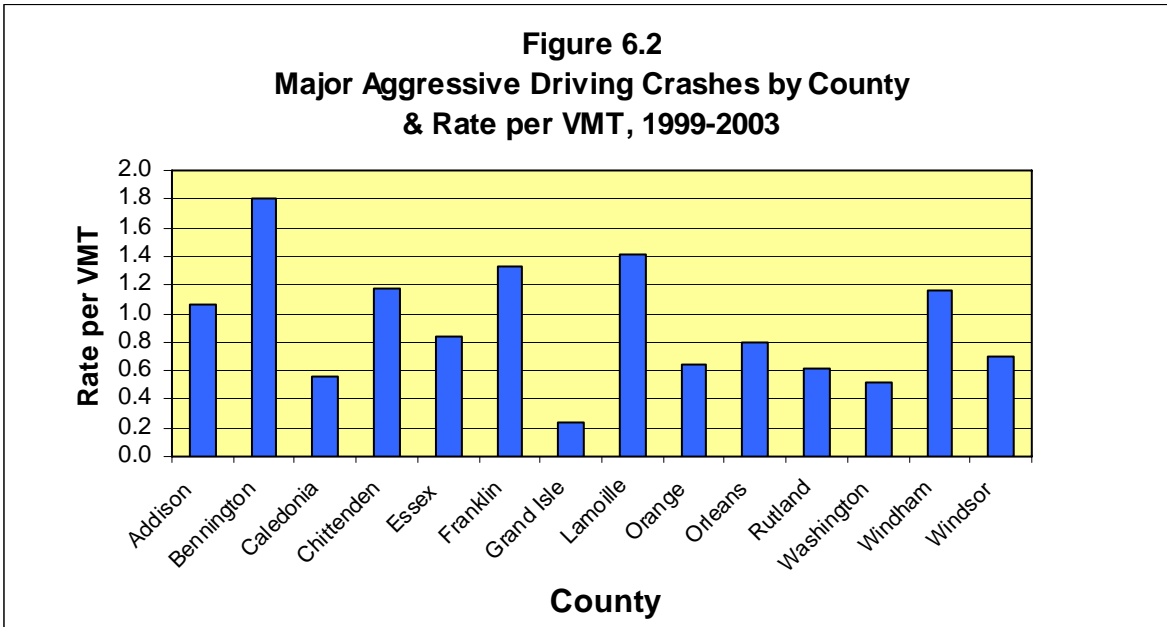
**Table 6.1. Emphasis Area - Curbing Aggressive Driving  
Major Crashes Involving Aggressive Driving by County, 1999-2003  
Number, Rate per Population & Rate per Vehicle Miles Traveled**

County	N	%	Average Annual Rate* per Population	Average Annual Rate** per Vehicle Miles Traveled
Addison	21	6.1%	0.12	1.1
Bennington	38	11.0%	0.21	1.8
Caledonia	11	3.2%	0.07	0.6
Chittenden	90	25.9%	0.12	1.2
Essex	3	0.9%	0.09	0.8
Franklin	29	8.4%	0.13	1.3
Grand Isle	1	0.3%	0.03	0.2
Lamoille	18	5.2%	0.15	1.4
Orange	13	3.7%	0.09	0.6
Orleans	11	3.2%	0.08	0.8
Rutland	21	6.1%	0.07	0.6
Washington	18	5.2%	0.06	0.5
Windham	39	11.2%	0.18	1.2
Windsor	34	9.8%	0.12	0.7
State Total	347	100.0%	0.11	1.0

\*Rate per 1,000 population.

\*\*Rate per 100 Million VMT

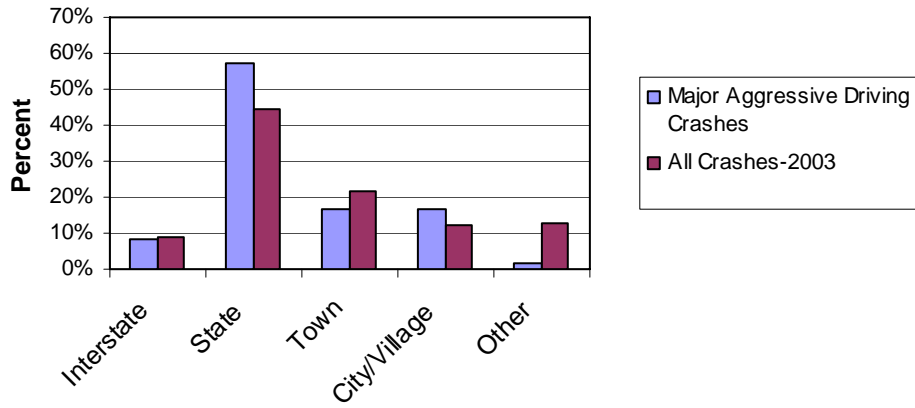




**Table 6.2. Emphasis Area - Curbing Aggressive Driving**  
**Major Crashes Involving Aggressive Driving by Highway Class, 1999-2003**

Highway Class	N	%	All Crashes 2003
			%
Interstate	28	8.1%	8.7%
State	199	57.3%	44.3%
Town	57	16.4%	21.5%
City/Village	57	16.4%	12.5%
Other	6	1.7%	12.9%
<b>Total</b>	<b>347</b>	<b>100.0%</b>	<b>100.0%</b>

**Figure 6.3**  
**Major Crashes Involving Aggressive Driving**  
**by Highway Class, 1999-2003**



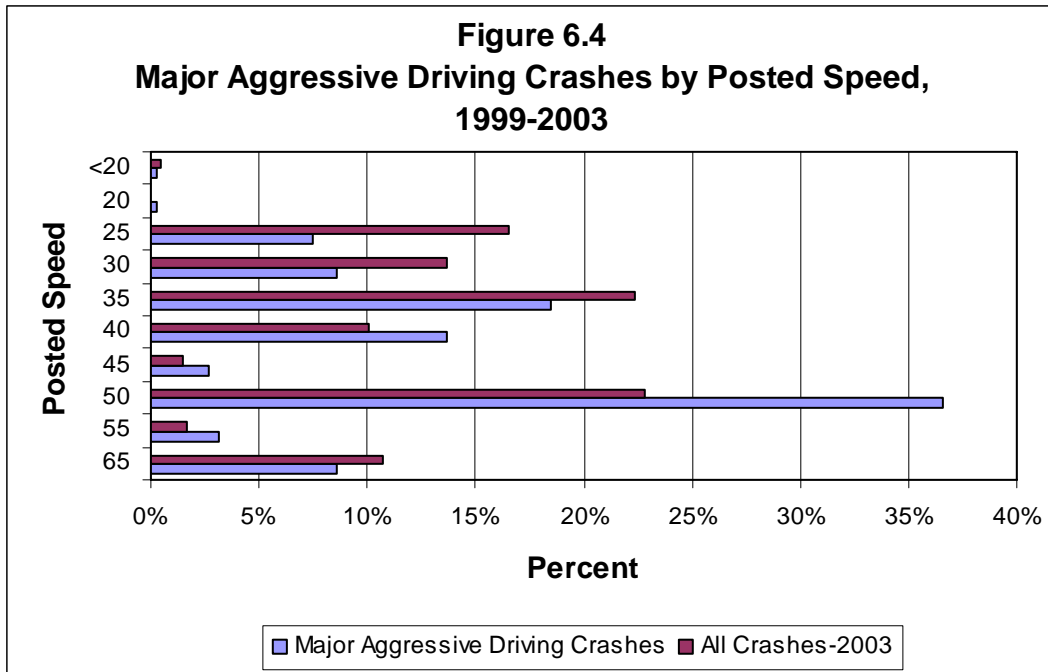
**Table 6.3. Emphasis Area - Curbing Aggressive Driving**  
**Major Crashes Involving Aggressive Driving, Time of Day by Day of Week, 1999-2003**

Time of day	Day of Week															
	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday		Total	
	Crashes		Crashes		Crashes		Crashes		Crashes		Crashes		Crashes		Crashes	
	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.	N	Per Hr.
Early morning (2-6 am)	1	0.3	0	0.0	2	0.5	1	0.3	3	0.8	6	1.5	7	1.8	20	5.0
Morning (6-10 am)	7	1.8	4	1.0	8	2.0	6	1.5	6	1.5	4	1.0	3	0.8	38	9.5
Midday (10 am-2 pm)	11	2.8	8	2.0	12	3.0	7	1.8	8	2.0	16	4.0	12	3.0	74	18.5
Afternoon (2-6 pm)	13	3.3	14	3.5	14	3.5	10	2.5	13	3.3	16	4.0	18	4.5	98	24.5
Evening (6-10 pm)	13	3.3	5	1.3	9	2.3	10	2.5	11	2.8	13	3.3	10	2.5	71	17.8
Night (10 pm-2 am)	3	0.8	5	1.3	7	1.8	8	2.0	9	2.3	10	2.5	3	0.8	45	11.3
Total	48	2.0	36	1.5	52	2.2	42	1.8	50	2.1	65	2.7	53	2.2	346	14.4

Table 6.4 and Figure 6.4 show the posted speed limits on roadways on which major crashes involving aggressive driving occurred, compared to the posted speed limit at which all crashes in 2003 occurred. More than one-third of crashes involving aggressive driving (36.6%) took place on roadways with posted speed limits of 50 miles per hour. This is consistent with the previously reported finding that this type of crash was most likely to occur on state roadways (where posted speed limits are often 50 miles per hour). Crashes took place on roadways with posted speed limits of 35 and 40 miles per hour 18.5% and 13.7% of the time, respectively. Looking at the distribution of all crashes in 2003, Table 6.4 and Figure 6.4 show that these crashes were also most likely to occur on roadways with posted speed limits of 50 miles per hour as well as those with posted speed limits of 35 miles per hour (22.8% and 22.4%, respectively).

**Table 6.4. Emphasis Area - Curbing Aggressive Driving  
Major Aggressive Driving Crashes by Posted Speed, 1999-2003**

Posted Speed	N	All Crashes 2003	
		%	%
<20	1	0.3%	0.5%
20	1	0.3%	0.1%
25	22	7.5%	16.5%
30	25	8.6%	13.7%
35	54	18.5%	22.4%
40	40	13.7%	10.1%
45	8	2.7%	1.5%
50	107	36.6%	22.8%
55	9	3.1%	1.7%
65	25	8.6%	10.7%
Total	292	100.0%	100.0%



Person Characteristics

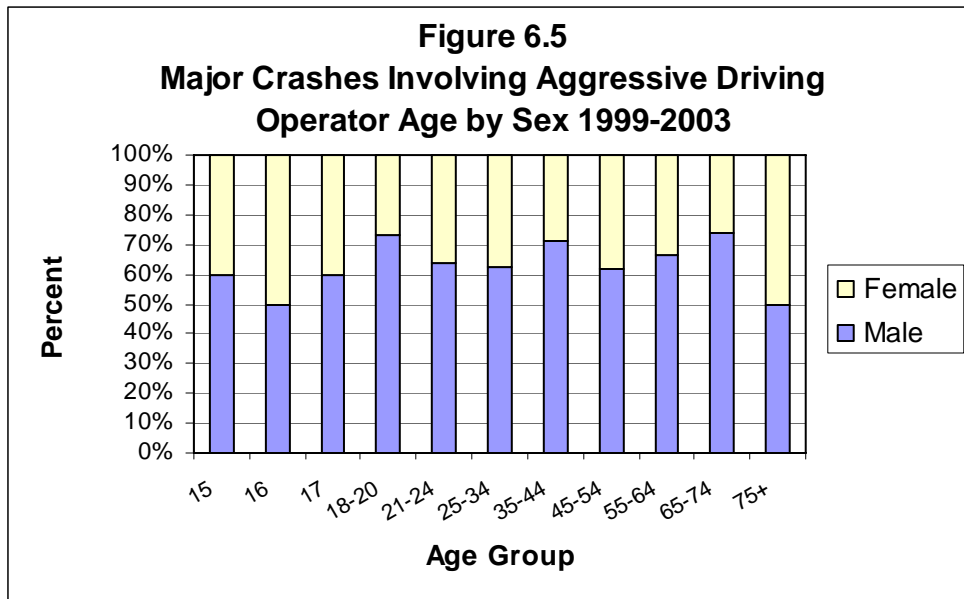
The sex and age distribution of vehicle operators in major crashes involving aggressive driving are shown in Table 6.5 and Figure 6.5. Approximately two-thirds (65.2%) of these operators were male, and one-third (34.8%), female. This compares to 57.4% and 42.6% of all operators involved in all crashes in 2003, respectively. Thus, males are disproportionately represented among major vehicle crashes involving aggressive driving. Males were most heavily represented within the 65-74, 18-20, and 35-44 age groups, where they made up 73.7%, 73%, and 70.9% of operators in major crashes involving aggressive driving. Males were under-represented among operators aged 16 and 75+, comprising 50% of drivers in these age groups.

The age distribution of operators in major crashes involving aggressive drivers are shown for both sexes combined in Table 6.6, along with the rate per 1,000 persons in the population and the rate per 1,000 licensed drivers in each age group (note that many crashes involved multiple vehicles, so the number of operators is considerably higher than the number of crashes). Operators involved in this type of crash are most highly represented in the 25-34 and 35-44 age groups, with 18% of operators in each group. Three other age groups also have sizable percentages of operators—18-20, 45-54, and 21-24—with 15.6%, 14.2%, and 13.5% of operators, respectively. Adjusting for the population size in each group, the average annual crash rate is highest among 18-20 year olds (.64 crashes per 1,000 population), followed by 21-24 year olds (.5), and 16 and 17 year olds (each with a rate of .45). Crash rates that adjust for the number of licenses in each age group are also highest for 18-20 year olds (.69), followed by rates for 16 year olds (.56), 17 year olds (.50), and 21-24 year olds (.43). As can be seen in Figure 6.6, both types of rates increase with age (though not in a perfectly linear fashion), peak

among 18-20 year olds, then decline rather precipitously for the 21-24 and 25-34 year old age groups before declining more slowly and leveling off among the older age groups.

**Table 6.5. Emphasis Area - Curbing Aggressive Driving  
Major Crashes Involving Aggressive Driving, Age & Sex of Operators, 1999-2003**

Age Group	Male		Female		Total	
	N	%	N	%	N	%
15	3	60.0%	2	40.0%	5	100.0%
16	10	50.0%	10	50.0%	20	100.0%
17	12	60.0%	8	40.0%	20	100.0%
18-20	65	73.0%	24	27.0%	89	100.0%
21-24	49	63.6%	28	36.4%	77	100.0%
25-34	64	62.1%	39	37.9%	103	100.0%
35-44	73	70.9%	30	29.1%	103	100.0%
45-54	50	61.7%	31	38.3%	81	100.0%
55-64	22	66.7%	11	33.3%	33	100.0%
65-74	14	73.7%	5	26.3%	19	100.0%
75+	11	50.0%	11	50.0%	22	100.0%
<b>Total</b>	<b>373</b>	<b>65.2%</b>	<b>199</b>	<b>34.8%</b>	<b>572</b>	<b>100.0%</b>
All Crash Involved Operators 2003		57.4%		42.6%		



**Table 6.6. Emphasis Area - Curbing Aggressive Driving  
Major Crashes Involving Aggressive Driving, Crash Rates by Operator Age, 1999-2003**

Age Group	Crash Operators		Average Annual Rate* per Population	Average Annual Rate** per Licenses
	N	%		
15	5	0.9%	0.11	0.21
16	20	3.5%	0.45	0.56
17	20	3.5%	0.45	0.50
18-20	89	15.6%	0.64	0.69
21-24	77	13.5%	0.50	0.43
25-34	103	18.0%	0.27	0.22
35-44	103	18.0%	0.21	0.19
45-54	81	14.2%	0.17	0.15
55-64	33	5.8%	0.11	0.10
65-74	19	3.3%	0.10	0.09
75+	22	3.8%	0.12	0.11
<b>Total</b>	<b>572</b>	<b>100.0%</b>	<b>0.23</b>	<b>0.21</b>

\*Rate per 1000 population.

\*\*Rate per 1000 licensed drivers.

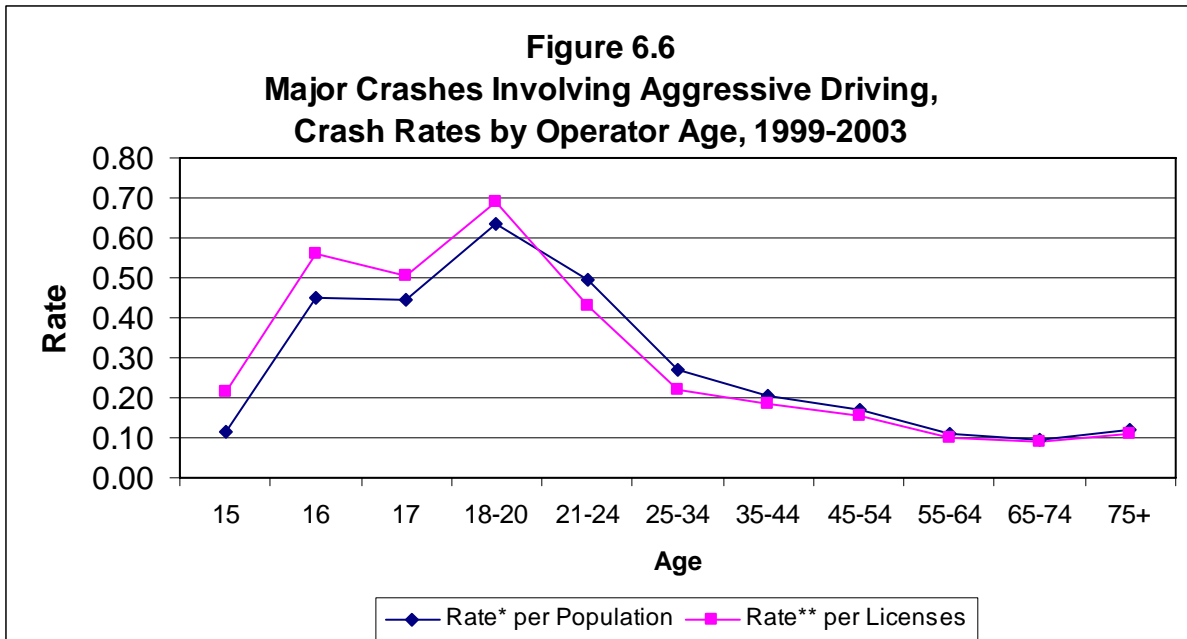


Table 6.7 shows age of operators by time of day of major crashes involving aggressive drivers. Afternoon was the most likely crash time for operators in about half of the age groups, but evening and/or afternoon crashes were also common. The pattern appears to shift from a majority of crashes during afternoon and evening hours among younger drivers (less than age 25) to most crashes occurring during afternoon and midday hours for older drivers (25 and older). More than half of aggressive driving crash operators aged 75 and older were involved in crashes during midday hours alone (54.5%). Midday was also the most frequent time for 15 year old operators to be involved in crashes (40%), but the number of crash operators in this age group was small.

**Table 6.7. Emphasis Area - Curbing Aggressive Driving  
Major Crashes Involving Aggressive Driving, Operator Age by Time of Day, 1999-2003**

Age Group	Time of Day												Total	
	Early Morning		Morning		Midday		Afternoon		Evening		Night			
	2am-6am	6am-10am	10am-2pm	2pm-6pm	6pm-10pm	10pm-2am	N	%	N	%	N	%	N	%
15	0	0.0%	0	0.0%	2	40.0%	1	20.0%	1	20.0%	1	20.0%	5	100.0%
16	1	5.0%	0	0.0%	3	15.0%	8	40.0%	6	30.0%	2	10.0%	20	100.0%
17	1	5.0%	0	0.0%	3	15.0%	5	25.0%	4	20.0%	7	35.0%	20	100.0%
18 to 20	9	10.2%	7	8.0%	12	13.6%	24	27.3%	23	26.1%	13	14.8%	88	100.0%
21 to 24	4	5.2%	8	10.4%	14	18.2%	17	22.1%	19	24.7%	15	19.5%	77	100.0%
25 to 34	1	1.0%	17	16.5%	27	26.2%	31	30.1%	17	16.5%	10	9.7%	103	100.0%
35 to 44	2	1.9%	24	23.3%	23	22.3%	32	31.1%	18	17.5%	4	3.9%	103	100.0%
45 to 54	3	3.7%	17	21.0%	19	23.5%	23	28.4%	17	21.0%	2	2.5%	81	100.0%
55 to 64	1	3.0%	4	12.1%	11	33.3%	10	30.3%	6	18.2%	1	3.0%	33	100.0%
65 to 74	1	5.3%	6	31.6%	3	15.8%	8	42.1%	1	5.3%	0	0.0%	19	100.0%
75 and older	0	0.0%	4	18.2%	12	54.5%	5	22.7%	1	4.5%	0	0.0%	22	100.0%
Total	23	4.0%	87	11.6%	129	22.6%	164	28.7%	113	19.8%	55	9.6%	571	100.0%

The contributing circumstances for major crashes involving aggressive drivers are shown in [Table 6.8](#), along with those for all crashes in 2003. Note that crashes can have more than one contributing circumstance, so the total number of circumstances is considerably higher than the number of crashes in this emphasis area. The most frequent contributing circumstances were “excessive speed” (27.2%), “following too closely” (20%), and operating vehicle recklessly (19.5%). Surprisingly, only 5.6% of the contributing circumstances involving aggressive driving included “under influence of medication/drugs/alcohol” as a contributing cause. The most frequent contributing causes to all crashes in 2003 differed from those for crashes involving aggressive driving, and included “other/unknown” (20.1%), “driving too fast for conditions” (16.7% of all crashes in 2003), “inattention” (15.4%), and “failure to yield” (12.7%).

**Table 6.8. Emphasis Area - Curbing Aggressive Driving  
Contributing Circumstances of Operators in Major Crashes Involving Aggressive Driving, 1999-2003**

Contributing Circumstances	N	All Crashes 2003	
		%	%
Driving too fast for conditions	29	4.8%	16.7%
Failure to keep in proper lane/off road	22	3.6%	8.7%
Operating vehicle recklessly	119	19.5%	1.2%
Visibility obstructed	3	0.5%	2.9%
Excessive speed	166	27.2%	1.3%
Following too closely	122	20.0%	8.5%
Improper turn	0	0.0%	2.3%
Disregarded traffic signs, signals	5	0.8%	1.6%
Failure to yield	14	2.3%	12.7%
Inattention	29	4.8%	15.4%
Wrong side or wrong way	10	1.6%	0.6%
Fell asleep	2	0.3%	1.3%
Under influence of medication/drugs/alcohol	34	5.6%	2.1%
Operating defective equipment	4	0.7%	0.7%
Distraction caused by technology	0	0.0%	0.2%
Distracted	2	0.3%	1.5%
Swerving due to wind, slippery surface, etc	1	0.2%	2.2%
Failure to maintain control	5	0.8%	0.0%
Other/Unknown operator cause	43	7.0%	20.1%
Total	610	100.0%	100.0%

Table 6.9 shows the types of citations issued in major crashes involving aggressive driving. Of the 199 citations issued, 16.1% were for speeding, 15.1% were for careless and negligent driving, and 14.6% were for “all other” (not specified) types. Nine percent of citations were for DUI (driving under the influence), operating without insurance, and following too closely. Percentages for other types of citations issued ranged from 7% (DLS, or driving while license suspended) to .5% (operating without owner consent).

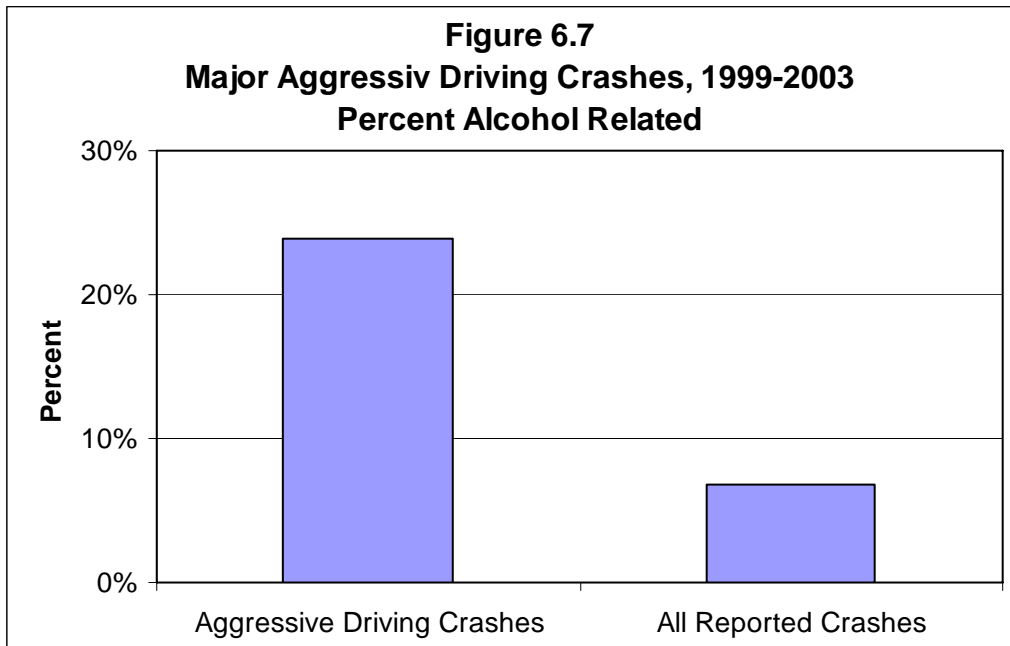
**Table 6.9. Emphasis Area - Curbing Aggressive Driving  
Citations Issued in Major Crashes Involving Aggressive Driving, 1999-2003**

Violation	N	%
DUI	18	9.0%
Speeding	32	16.1%
Operating without insurance	18	9.0%
DLS	14	7.0%
Leaving scene of accident	6	3.0%
Following too closely	18	9.0%
Operating without license	4	2.0%
Careless & negligent	30	15.1%
Fail to yield	2	1.0%
Not registered	6	3.0%
Defective equipment	3	1.5%
Driving in road laned for traffic	7	3.5%
Driving to right	2	1.0%
Vehicle not inspected	0	0.0%
Under 18/21 & .02% or more alc conc	2	1.0%
Minor (16+) consumption of alcohol	3	1.5%
Consuming alcohol while driving	4	2.0%
Traffic control signal/device	0	0.0%
Operating w/o owner consent	1	0.5%
All other	29	14.6%
Total	199	100.0%

Table 6.10 and Figure 6.7 below show, alcohol was a factor in 23.9% of these crashes. This contrasts with the 6.8% of all reported crashes during these years in which alcohol was determined to be a factor. Thus, alcohol does appear to play a significant role in major crashes involving aggressive driving.

**Table 6.10. Emphasis Area - Curbing Aggressive Driving  
Major Crashes Involving Aggressive Driving - Alcohol Related, 1999-2003**

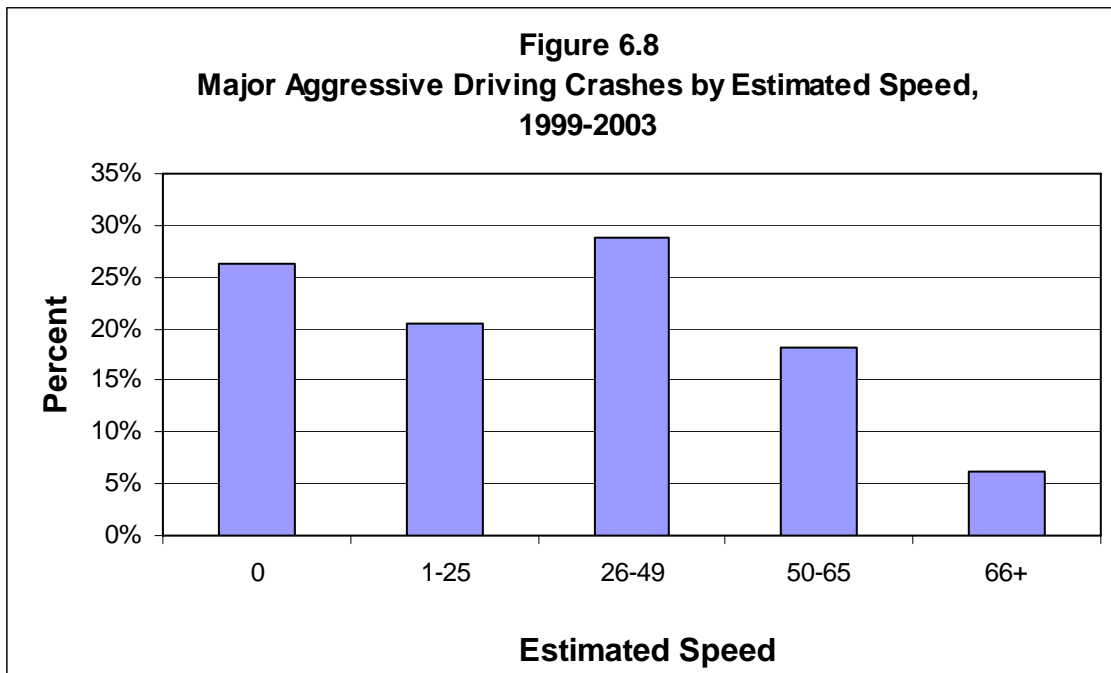
	Number of Crashes	Alcohol Related Crashes	Percent Alcohol Related
Aggressive Driving Crashes	347	83	23.9%
All Reported Crashes	34,094	2,304	6.8%



The estimated speed of vehicles involved in major aggressive driving crashes is shown in [Table 6.11](#) and [Figure 6.8](#). Most vehicles were estimated to be traveling at 26-49 miles per hour (28.7%) or 0 miles per hour (26.3%). Another 20.5% were estimated to be traveling at 1-25 miles per hour, 18.3% at 50-65 miles per hour, and 6.2% at 66+ miles per hour.

**Table 6.11. Emphasis Area - Curbing Aggressive Driving  
Major Aggressive Driving Crashes by Estimated Speed, 1999-2003**

Estimated Speed	N	%
0	118	26.3%
1-25	92	20.5%
26-49	129	28.7%
50-65	82	18.3%
66+	28	6.2%
Total	449	100.0%

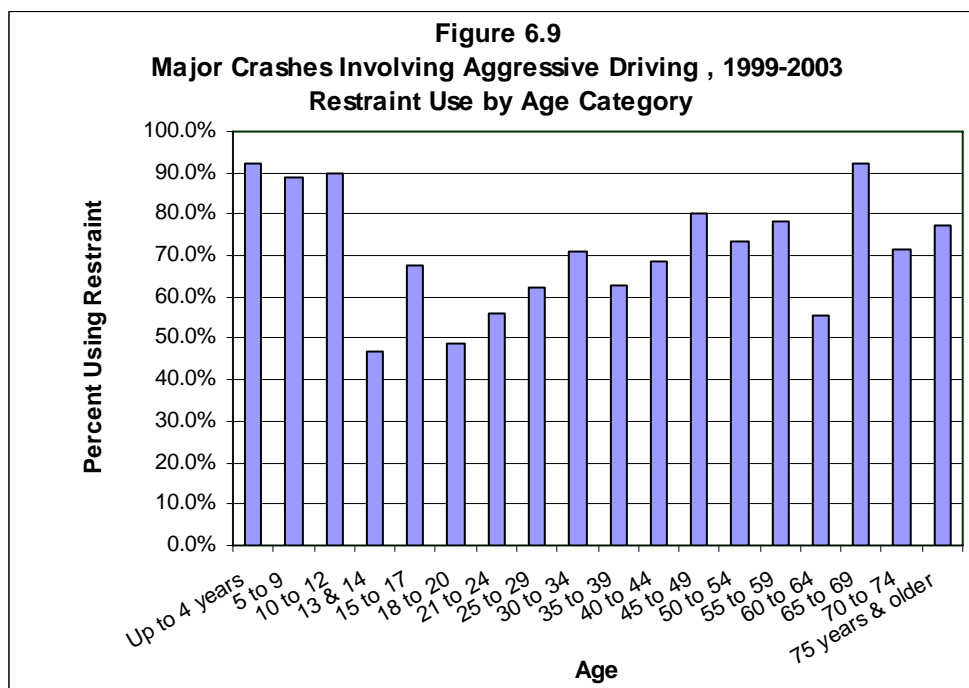


Restraint usage by vehicle occupants involved in aggressive driving crashes is shown in [Table 6.12](#) and [Figure 6.9](#) by age category of occupant. For all vehicle occupants in aggressive driving crashes with known age, restraint usage was 65.4%. Usage was highest among children aged 12 and younger, and among those aged 65-69 (approximately 90-92% of occupants in these ages used restraints). Usage was lowest among those aged 13 and 14 (46.7% used restraints) and those aged 18-20 (48.7% used restraints). Among the remaining age groups, usage ranged from 55.6% for those aged 60-64 to 80% among those aged 45-49, but clear patterns are not evident.

**Table 6.12. Emphasis Area - Curbing Aggressive Driving  
Major Crashes Involving Aggressive Driving  
Vehicle Occupants by Age Group & Restraint Use, 1999-2003**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use		N	Percent
	N	Percent	N	Percent	N	Percent		
Up to 4 years	12	92.3%	0	0.0%	1	7.7%	13	100.0%
5 to 9	8	88.9%	1	11.1%	0	0.0%	9	100.0%
10 to 12	9	90.0%	1	10.0%	0	0.0%	10	100.0%
13 & 14	7	46.7%	6	40.0%	2	13.3%	15	100.0%
15 to 17	56	67.5%	16	19.3%	11	13.3%	83	100.0%
18 to 20	55	48.7%	45	39.8%	13	11.5%	113	100.0%
21 to 24	48	55.8%	25	29.1%	13	15.1%	86	100.0%
25 to 29	33	62.3%	11	20.8%	9	17.0%	53	100.0%
30 to 34	42	71.2%	16	27.1%	1	1.7%	59	100.0%
35 to 39	32	62.7%	10	19.6%	9	17.6%	51	100.0%
40 to 44	39	68.4%	15	26.3%	3	5.3%	57	100.0%
45 to 49	36	80.0%	7	15.6%	2	4.4%	45	100.0%
50 to 54	25	73.5%	6	17.6%	3	8.8%	34	100.0%
55 to 59	18	78.3%	3	13.0%	2	8.7%	23	100.0%
60 to 64	5	55.6%	2	22.2%	2	22.2%	9	100.0%
65 to 69	12	92.3%	1	7.7%	0	0.0%	13	100.0%
70 to 74	10	71.4%	4	28.6%	0	0.0%	14	100.0%
75 years & older	17	77.3%	5	22.7%	0	0.0%	22	100.0%
Total	464	65.4%	174	24.5%	71	10.0%	709	100.0%

Note: persons with unknown age were excluded from the analysis.



### Vehicle Characteristics

Table 6.13 shows the contributing circumstance of major vehicle crashes involving aggressive driving by type of vehicle (only the first circumstance, if multiple ones were identified). Among passenger cars, the vast majority of vehicles involved in crashes, the three most frequent contributing circumstances were “following too closely” (38.3%), “excessive speed” (24.2%), and “operating vehicle recklessly” (19%). These were also the most frequent contributing circumstances for light trucks or vans, large trucks, “other” types of vehicles, and motorcycles, although for the motorcycles, the order differed. The most frequent circumstance was “excessive speed” (45.7%), followed by “operating vehicle recklessly” (23.9%) and “following too closely” (13%). For sport utility vehicles, “excessive speed” and “operating vehicle recklessly” each comprised 23.1% of contributing circumstances, along with driving on the “wrong side or wrong way.” That 23.1% of sport utility vehicles were on the wrong side of the road or going to the wrong way is important, since this was an uncommon occurrence with other types of vehicles (representing only three crashes for all other types of vehicles combined, compared to 12 for sports utility vehicles).

**Table 6.13. Emphasis Area - Curbing Aggressive Driving  
Major Crashes Involving Aggressive Driving, Contributing Circumstance 1 by Vehicle Type, 1999-2003**

Contributing Circumstances	Passenger Car		Sport Utility		Light Truck or Van		Large Truck		Motorcycle or Moped		Other	
	N	%	N	%	N	%	N	%	N	%	N	%
Driving too fast for conditions	13	4.0%	4	7.7%	2	2.7%	1	6.7%	3	6.5%	1	9.1%
Failure to keep in proper lane/off road	6	1.8%	1	1.9%	0	0.0%	0	0.0%	1	2.2%	0	0.0%
Operating vehicle recklessly	62	19.0%	12	23.1%	12	16.4%	3	20.0%	11	23.9%	3	27.3%
Visibility obstructed	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Excessive speed	79	24.2%	12	23.1%	19	26.0%	3	20.0%	21	45.7%	4	36.4%
Following too closely	125	38.3%	2	3.8%	31	42.5%	5	33.3%	6	13.0%	1	9.1%
Improper turn	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Disregarded traffic signs, signals	3	0.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Failure to yield	8	2.5%	0	0.0%	0	0.0%	0	0.0%	1	2.2%	0	0.0%
Inattention	6	1.8%	2	3.8%	0	0.0%	1	6.7%	0	0.0%	1	9.1%
Wrong side or wrong way	2	0.6%	12	23.1%	0	0.0%	0	0.0%	1	2.2%	0	0.0%
Fell asleep	0	0.0%	1	1.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Under influence of medication/drugs/alcohol	7	2.1%	2	3.8%	5	6.8%	0	0.0%	2	4.3%	0	0.0%
Operating defective equipment	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Distraction caused by technology	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Distracted	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Swerving due to wind, slippery surface, etc	0	0.0%	1	1.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Failure to maintain control	2	0.6%	0	0.0%	1	1.4%	0	0.0%	0	0.0%	0	0.0%
Other/Unknown operator cause	13	4.0%	3	5.8%	3	4.1%	2	13.3%	0	0.0%	1	9.1%
Total	326	100.0%	52	100.0%	73	100.0%	15	100.0%	46	100.0%	11	100.0%

## VIII. Emphasis Area – Keeping Drivers Alert

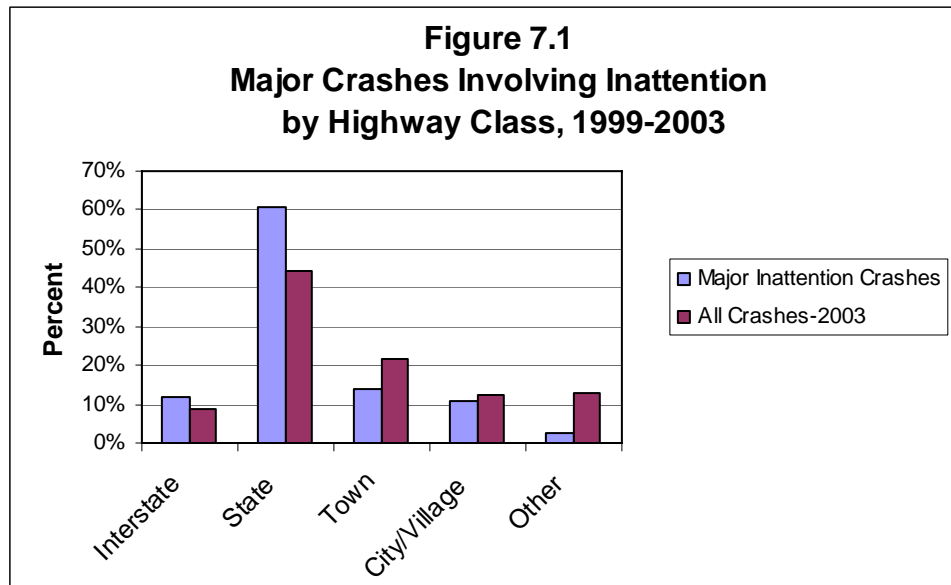
Data analysis for emphasis area, Keeping Drivers Alert, was conducted on 365 major crashes in Vermont from the period 1999-2003. These crashes were defined as inattention crashes if the operator contributing circumstances were inattention or fatigued/fell asleep or if the operator condition listed was fell asleep/fatigued. Findings from the analysis for these crashes are presented in this section of the report.

### Environment and roadways

An examination of what type of highway these major inattention crashes occurred on was the first step in the analysis. Findings on highway class are presented below in [Table 7.1](#) and [Figure 7.1](#) below. Of the 365 inattention crashes, 222 (60.8%) occurred on state highways. For the other highway classes the numbers were much lower, specifically, 50 (13.7%) happened on town highways, 43 (11.8%) on interstates and 40 (11.0%) on city/village roads. In comparison to the all crash-2003 distribution, proportionally more inattention crashes occurred on state highways (60.8% vs. 44.3%) and interstate highways (11.8% vs. 8.7%) while proportionately less happened on town highways (13.7% vs. 21.5%) and city/village roadways (11.0% vs. 12.5%).

**Table 7.1. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention by Highway Class, 1999-2003**

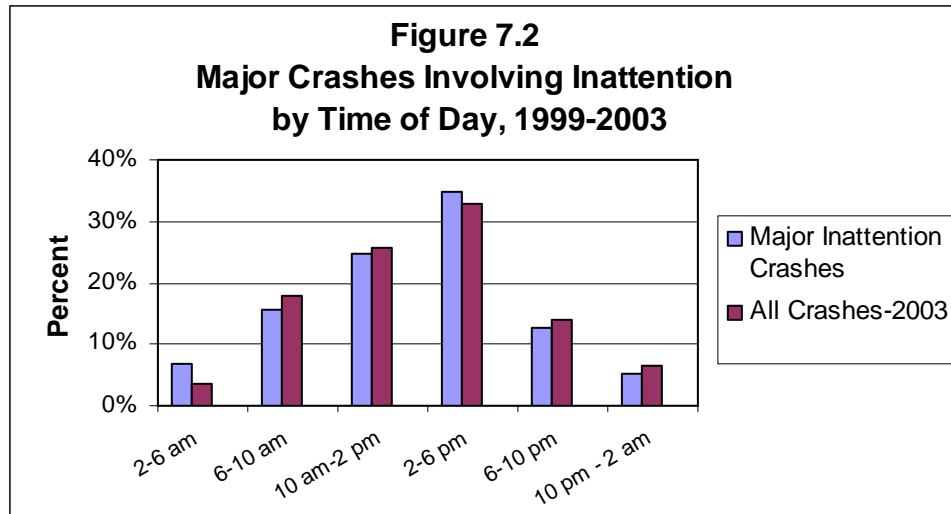
Highway Class	N	%	All Crashes 2003
			%
Interstate	43	11.8%	8.7%
State	222	60.8%	44.3%
Town	50	13.7%	21.5%
City/Village	40	11.0%	12.5%
Other	10	2.7%	12.9%
Total	365	100.0%	100.0%



Next, an analysis for major inattention crashes by time of day is presented below in [Table 7.2](#) and [Figure 7.2](#). Results show that 126 (34.8%) of the 362 crashes with available data occurred during the afternoon hours from 2-6 pm and 90 (24.9%) happened during midday (10 am-2 pm). Fewer of these inattention crashes occurred during the morning (56 or 15.5%) and evening (46 or 12.7%) hours. Only 25 (6.9%) inattention crashes occurred in the early morning hours and 19 (5.2%) happened at night. In comparison to the all crashes-2003 distribution, proportionally more inattention major crashes occurred in the afternoon (34.8% vs. 32.7%) and early morning (6.9% vs. 3.6%) while slightly lower proportions happened for all other time periods. Note that 3 crashes had missing data on time of day.

**Table 7.2. Emphasis Area - Keeping Drivers Alert**  
**Major Crashes Involving Inattention by Time of Day, 1999-2003**

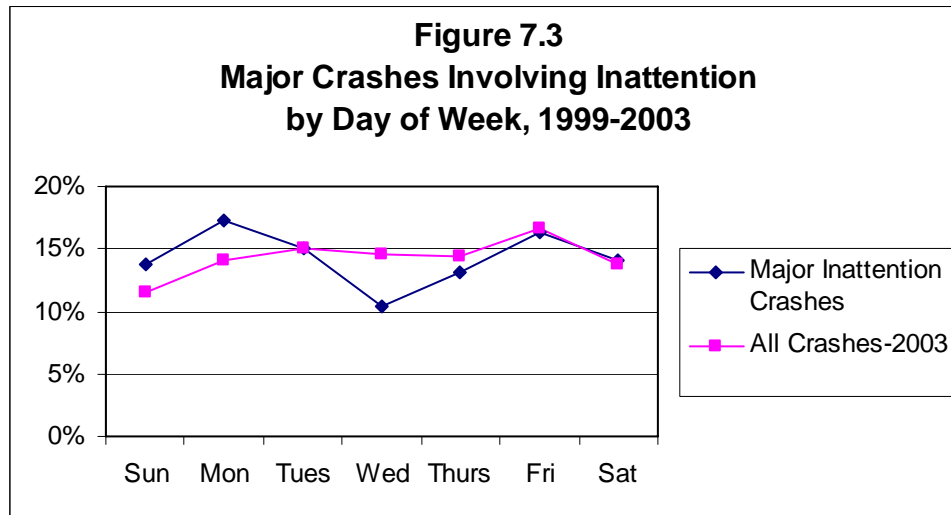
Time of Day	N	%	All Crashes 2003
			%
Early Morn (2-6 am)	25	6.9%	3.6%
Morning (6-10 am)	56	15.5%	17.8%
Midday (10 am-2 pm)	90	24.9%	25.6%
Afternoon (2-6 pm)	126	34.8%	32.7%
Evening (6-10 pm)	46	12.7%	13.9%
Night (10 pm - 2 am)	19	5.2%	6.5%
Total	362	100.0%	100.0%



Findings for major inattention crashes by day of week are presented in [Table 7.3](#) and [Figure 7.3](#) below. Above average numbers for these crashes were found on Monday, Tuesday, and Friday, specifically, 63 (17.3%), 55 (15.1%) and 60 (16.4%), respectively. The lowest numbers were found on Wednesday (38 or 10.4%) or Thursday (48 or 13.2%). In comparing major inattention crashes by day of week to the all crashes-2003 distribution shows that proportionally more inattention crashes occurred on Monday (17.3% vs. 14.1%) and Sunday (13.7% vs. 11.6%) while proportionally fewer occurred on Wednesday (10.4% vs. 14.5%). Proportions for other days were nearly the same.

**Table 7.3. Emphasis Area - Keeping Drivers Alert**  
**Major Crashes Involving Inattention by Day of Week, 1999-2003**

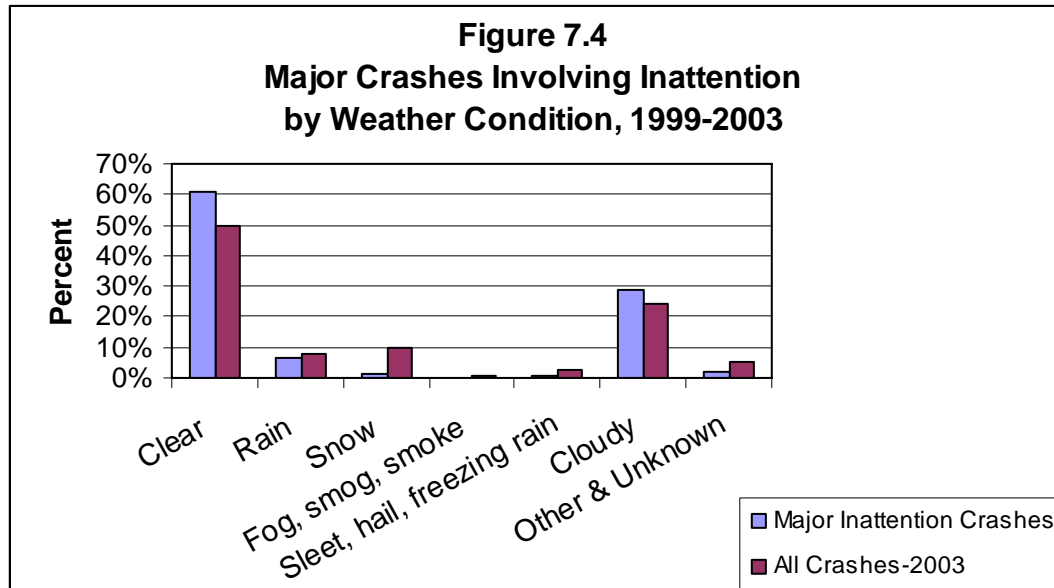
Day of Week	N	All Crashes 2003	
		%	%
Sunday	50	13.7%	11.6%
Monday	63	17.3%	14.1%
Tuesday	55	15.1%	15.0%
Wednesday	38	10.4%	14.5%
Thursday	48	13.2%	14.4%
Friday	60	16.4%	16.7%
Saturday	51	14.0%	13.7%
Total	365	100.0%	100.0%



Most inattention major crashes occurred under clear (222 crashes or 60.8%) or cloudy (105 or 28.8%) weather conditions. Not many happened when it was raining (23 or 6.3%) or snowing (5 or 1.4%) and even less occurred under fog, smog, smoke (1 or .3%) and sleet, hail, freezing rain (2 or .5%). Distributions for weather conditions are presented below in [Table 7.4](#) and [Figure 7.4](#). Comparatively, proportionately more inattention major crashes occurred when weather conditions were clear (60.8% vs. 49.7%) or cloudy (28.8% vs. 24.4%) than in the all crashes-2003 distribution. Proportionally more of the 2003 crashes occurred when it was snowing (10.0% vs. 1.4%). In all other weather conditions the all crashes-2003 had slightly higher proportions.

**Table 7.4. Emphasis Area - Keeping Drivers Alert**  
**Weather Conditions in Major Crashes Involving Inattention, 1999-2003**

Weather	N	%	All Crashes 2003
			%
Clear	222	60.8%	49.7%
Rain	23	6.3%	8.0%
Snow	5	1.4%	10.0%
Fog, smog, smoke	1	0.3%	0.7%
Sleet, hail, freezing rain	2	0.5%	2.4%
Cloudy	105	28.8%	24.4%
Other & Unknown	7	1.9%	5.0%
Total	365	100.0%	100.0%

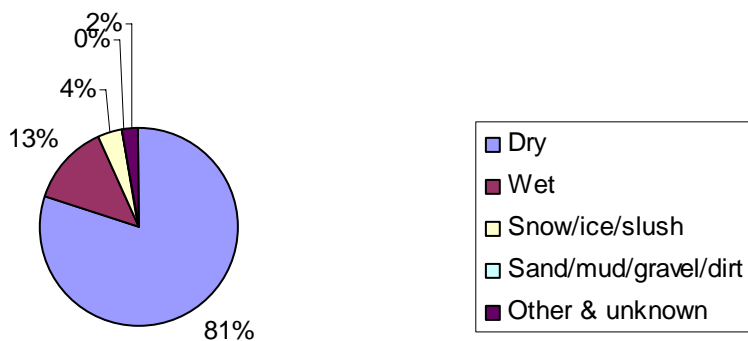


There were 292 (80.0%) inattention major crashes that occurred on dry road surfaces, 49 (13.4%) on wet surfaces and 15 (4.1%) on snow/ice/slush. Looking at all crashes for 2003 proportionally fewer occurred on dry road surfaces (55.9%) than for inattention crashes while proportionally more occurred on wet roads (17.0% vs. 13.4%) and on snow/ice/slush road surfaces (21.9% vs. 4.1%). Table 7.5, Figure 7.5 and Figure 7.6 present these findings.

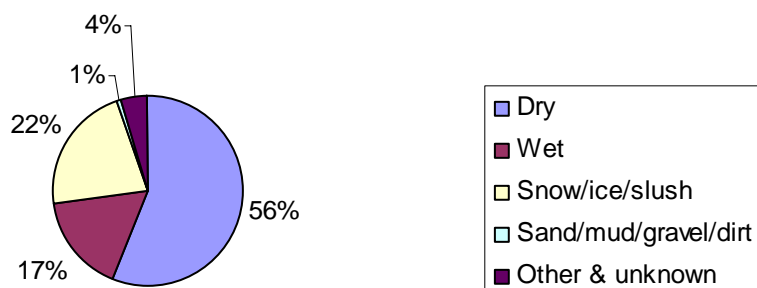
**Table 7.5. Emphasis Area - Keeping Drivers Alert**  
**Road Surface Condition for Major Crashes Involving Inattention, 1999-2003**

Surface Condition	N	All Crashes 2003	
		%	%
Dry	292	80.0%	55.9%
Wet	49	13.4%	17.0%
Snow/ice/slush	15	4.1%	21.9%
Sand/mud/gravel/dirt	0	0.0%	0.9%
Other & unknown	9	2.5%	4.4%
<b>Total</b>	<b>365</b>	<b>100.0%</b>	<b>100.0%</b>

**Figure 7.5**  
**Major Crashes Involving Inattention, 1999-2003**  
**Road Surface Condition**



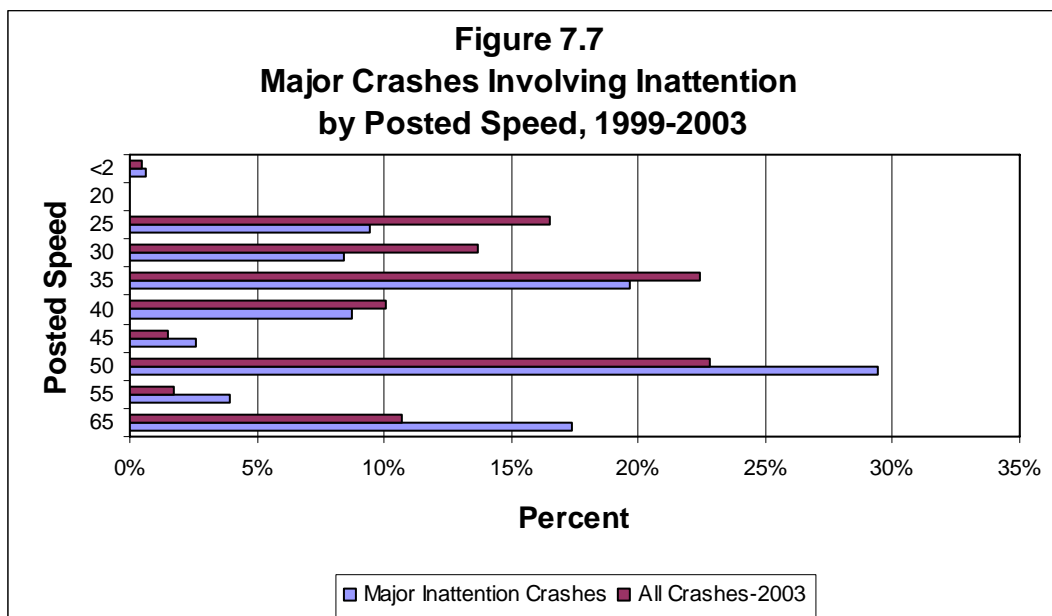
**Figure 7.6**  
**All Crashes, 2003**  
**Road Surface Condition**



Available data for 310 of the major inattention crashes shows that 50.7% of these crashes happened in the higher posted speed ranges of 50-65 miles per hour and nearly an equal proportion (48.8%) occurred in the lower speed ranges of 25-45 miles per hour. The posted speed limit with the largest number of inattention crashes was 50 miles per hour with 91 (29.4%) occurring. A fairly large number also occurred in the 35 and 65 miles per hour speed limits at 61 (19.7%) and 54 (17.4%) crashes, respectively. A comparative analysis shows that proportionally more of these inattention crashes occurred in the higher posted speed limits than did the all crashes-2003, (50.7% vs. 35.2%) while proportionally fewer happened for the lower speed limits (48.8% vs. 64.2%). Note that there were 55 inattention major crashes with missing data on posted speed. Findings on posted speed are presented below in [Table 7.6](#) and [Figure 7.7](#).

**Table 7.6. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention by Posted speed, 1999-2003**

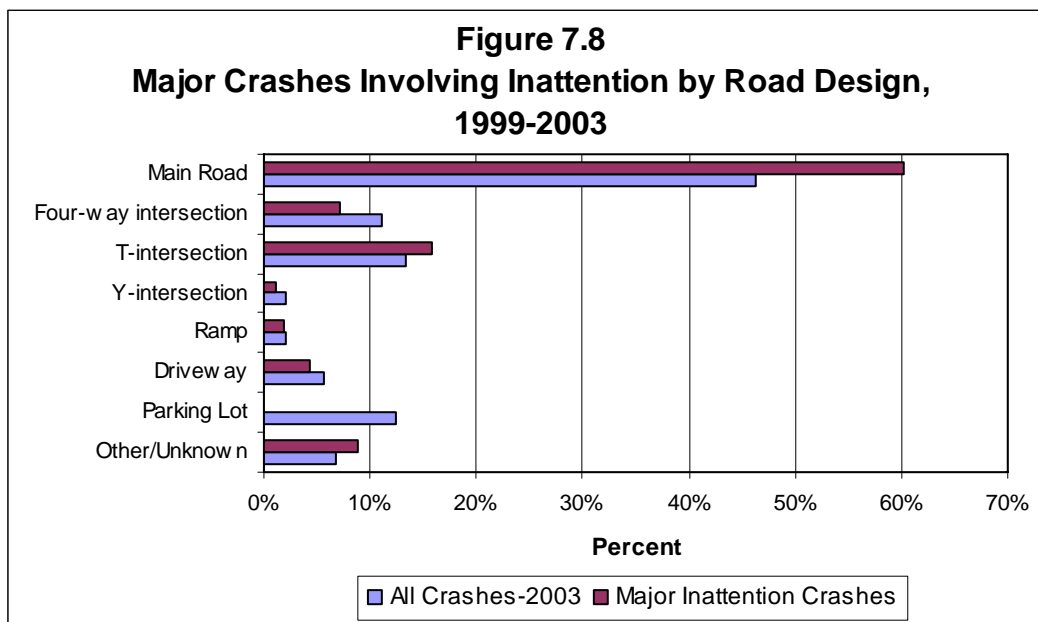
Posted Speed	N	All Crashes 2003	
		%	%
<20	2	0.6%	0.5%
20	0	0.0%	0.1%
25	29	9.4%	16.5%
30	26	8.4%	13.7%
35	61	19.7%	22.4%
40	27	8.7%	10.1%
45	8	2.6%	1.5%
50	91	29.4%	22.8%
55	12	3.9%	1.7%
65	54	17.4%	10.7%
Total	310	100.0%	100.0%



Road design in major crashes involving inattention is presented below in [Table 7.7](#) and [Figure 7.8](#). Findings from the study indicate that many of these crashes (220 or 60.3%) occurred on a main road or at intersection (88 or 24.1%). More inattention crashes took place at T-intersections (15.9%) than at four-way intersections (7.1%) or Y-intersections (1.1%). Relatively few inattention crashes (4.4%) occurred at a driveway, on a ramp (1.9%) or in a parking lot (.5%). Comparatively, proportionally more major crashes involving inattention happened on main roads and at T-intersections than in the all crash-2003 distributions, specifically, 60.3% vs. 46.2% and 15.9% vs. 13.3%, respectively. In all other road design categories all crashes in 2003 had higher proportions.

**Table 7.7. Emphasis Area - Keeping Drivers Alert  
Road Design in Major Crashes Involving Inattention, 1999-2003**

Road Design	N	All Crashes 2003	
		N	%
Main Road	220	60.3%	46.2%
Four-way intersection	26	7.1%	11.1%
T-intersection	58	15.9%	13.3%
Y-intersection	4	1.1%	2.0%
Traffic circle/roundabout	0	0.0%	0.2%
Five-point, or more	0	0.0%	0.2%
Ramp	7	1.9%	2.0%
Driveway	16	4.4%	5.6%
RR Crossing	0	0.0%	0.2%
Parking Lot	2	0.5%	12.4%
Other/Unknown	32	8.8%	6.8%
Total	365	100.0%	100.0%



Findings for road characteristics of rural and urban crash locations for major inattention crashes are presented below in [Table 7.8](#). Proportionally more of these crashes occurred in rural locations (62%) than in urban locations (37.8%). In comparing rural vs. urban road characteristics, proportionally more rural crashes occurred on a main road (70.0% vs. 44.2%) while proportionally more urban crashes occurred at an intersection (32.5% vs. 18.9%) or at a driveway (7.2% vs. 2.6%).

**Table 7.8. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention, 1999-2003  
Road Characteristics of Rural vs. Urban Crash Locations**

Road Design	Rural		Urban		Total	
	N	%	N	%	N	%
Main Road	159	70.0%	61	44.2%	220	60.3%
Four-way intersection	13	5.7%	13	9.4%	26	7.1%
T-intersection	28	12.3%	30	21.7%	58	15.9%
Y-intersection	2	0.9%	2	1.4%	4	1.1%
Traffic circle/roundabout	0	0.0%	0	0.0%	0	0.0%
Five-point, or more	0	0.0%	0	0.0%	0	0.0%
Ramp	2	0.9%	5	3.6%	7	1.9%
Driveway	6	2.6%	10	7.2%	16	4.4%
RR Crossing	0	0.0%	0	0.0%	0	0.0%
Parking Lot	1	0.4%	1	0.7%	2	0.5%
Other/Unknown	16	7.0%	16	11.6%	32	8.8%
Total	227	100.0%	138	100.0%	365	100.0%
		62.2%		37.8%		

An examination of traffic control for major inattention crashes indicates that 193 (53.0%) of these crashes happened where there was no traffic control and 23 (6.3%) happened at stop signs on cross street only. Only 6 crashes (1.6%) occurred at a traffic signal (normal operation). A large number of these crashes (140) were coded either other or unknown in the data. [Table 7.9](#) below shows the distribution for traffic control.

**Table 7.9. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention by Traffic Control, 1999-2003**

Traffic Control	N	%
None	193	53.0%
Stop signs on cross street only	23	6.3%
Stop signs on mainline only	1	0.3%
All-way stop signs	0	0.0%
All-way flasher (red on cross street)	0	0.0%
All-way flasher (red on mainline)	0	0.0%
All-way flasher (red on all)	0	0.0%
Yield signs on cross street only	0	0.0%
Yield signs on mainline only	1	0.3%
Traffic Signal (normal operation)	6	1.6%
Traffic signal (flashing)	0	0.0%
Officer	0	0.0%
Flagman	0	0.0%
Other/Unknown	140	38.5%
Total	364	100.0%

Contributing circumstances by highway class for major crashes involving inattention are presented in [Table 7.10](#) below. Not surprisingly, inattention accounted for the largest percentile of all contributing circumstances for state, town and city/village roadways at 44.6%, 48.4% and 46.3%, respectively. Falling asleep was the next most common cause for these roadways followed by failure to yield and failure to keep in proper lane/off road. For interstate highways falling asleep accounted for the largest percentage of contributing circumstances (43.2%) followed by inattention (25.0%) and failure to keep in proper lane/off road (13.6%).

**Table 7.10. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention, Contributing Circumstance<sup>1</sup> by Highway Class, 1999-2003**

Contributing Circumstances	Interstate		State		Town		City/Village		Other	
	N	%	N	%	N	%	N	%	N	%
Driving too fast for conditions	0	0.0%	10	3.7%	0	0.0%	3	7.3%	1	9.1%
Failure to keep in proper lane/off road	6	13.6%	26	9.7%	2	3.1%	4	9.8%	0	0.0%
Operating vehicle recklessly	1	2.3%	1	0.4%	1	1.6%	0	0.0%	0	0.0%
Visibility obstructed	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Excessive speed	1	2.3%	4	1.5%	1	1.6%	2	4.9%	1	9.1%
Following too closely	2	4.5%	12	4.5%	0	0.0%	1	2.4%	0	0.0%
Improper turn	0	0.0%	1	0.4%	0	0.0%	0	0.0%	0	0.0%
Disregarded traffic signs, signals	0	0.0%	2	0.7%	0	0.0%	0	0.0%	0	0.0%
Failure to yield	0	0.0%	24	9.0%	7	10.9%	3	7.3%	0	0.0%
Inattention	11	25.0%	119	44.6%	31	48.4%	19	46.3%	8	72.7%
Wrong side or wrong way	0	0.0%	7	2.6%	1	1.6%	2	4.9%	0	0.0%
Fell asleep	19	43.2%	41	15.4%	14	21.9%	5	12.2%	0	0.0%
Under influence of medication/drugs/alcohol	1	2.3%	1	0.4%	3	4.7%	0	0.0%	0	0.0%
Operating defective equipment	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	9.1%
Distraction caused by technology	1	2.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Distracted	0	0.0%	0	0.0%	1	1.6%	0	0.0%	0	0.0%
Swerving due to wind, slippery surface, etc	0	0.0%	2	0.7%	0	0.0%	0	0.0%	0	0.0%
Failure to maintain control	2	4.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other/Unknown operator cause	0	0.0%	17	6.4%	3	4.7%	2	4.9%	0	0.0%
Total	44	100.0%	267	100.0%	64	100.0%	41	100.0%	11	100.0%

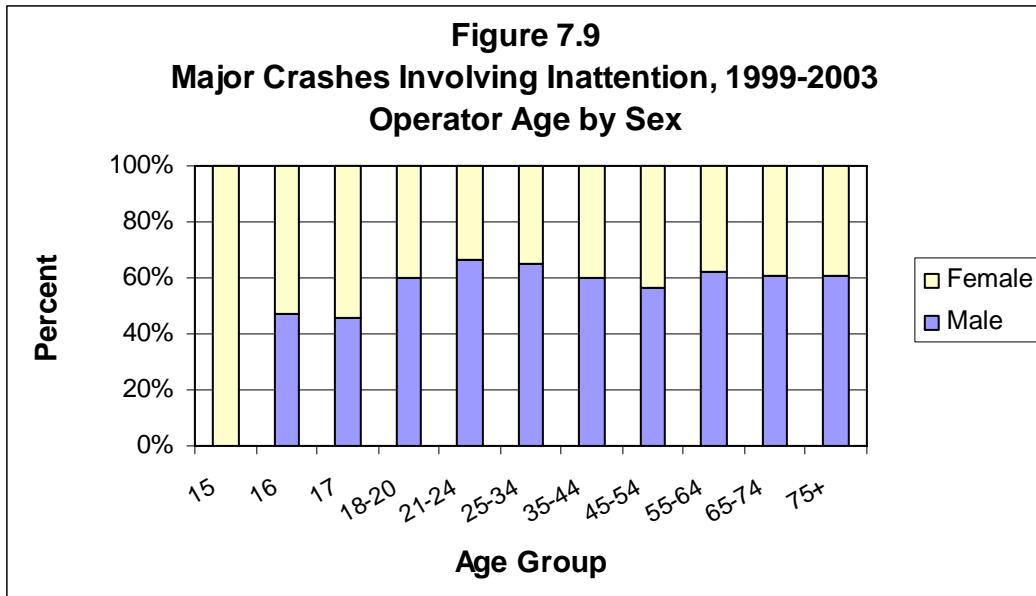
## Person Characteristics

Findings from the study regarding people are presented in this section of the report on inattention major crashes. Most of the analysis conducted related to operator involvement in the crash, however, some analysis was conducted for pedestrians, bicyclists and child passengers. Available demographic data on drivers was examined as well as key crash contributing factors attributed to the driver.

First in this part of the analysis, a cross tabulation was examined for age of operators by sex for all operators with known age and sex in major inattention crashes. The results indicate that of the 582 operators, 351 (60.3%) were male and 231 (39.7%) were female. A closer examination by particular age groups shows that in the 21-24 and 25-34 age groups, males accounted for slightly higher proportions than the overall percent at 66.2% and 65.2%, respectively. For ages 16 (47.4% male vs. 52.6% female) and 17 (45.5% vs. 54.5%), males accounted for slightly less than half and females accounted for slightly more than half of the total. In comparison to all crashes in 2003 distribution, major inattention crash operators had a slightly higher proportion that were males (60.3% vs. 57.4%) and, hence, slightly lower proportion which were females (39.7% vs. 42.6%). Findings are presented below in [Table 7.11](#) and [Figure 7.9](#).

**Table 7.11. Emphasis Area - Keeping Drivers Alert  
Age & Sex of Operators Involved in Major Crashes Involving Inattention, 1999-2003**

Age Group	Male		Female		Total	
	N	%	N	%	N	%
15	0	0.0%	1	100.0%	1	100.0%
16	9	47.4%	10	52.6%	19	100.0%
17	10	45.5%	12	54.5%	22	100.0%
18-20	39	60.0%	26	40.0%	65	100.0%
21-24	47	66.2%	24	33.8%	71	100.0%
25-34	58	65.2%	31	34.8%	89	100.0%
35-44	69	60.0%	46	40.0%	115	100.0%
45-54	43	56.6%	33	43.4%	76	100.0%
55-64	34	61.8%	21	38.2%	55	100.0%
65-74	25	61.0%	16	39.0%	41	100.0%
75+	17	60.7%	11	39.3%	28	100.0%
<b>Total</b>	<b>351</b>	<b>60.3%</b>	<b>231</b>	<b>39.7%</b>	<b>582</b>	<b>100.0%</b>
All Crash Involved Operators 2003		57.4%		42.6%		



Examination of operators by age group shows that 35-44 (19.8%) and 25-34 (15.3%) year olds had the largest number of crash operators followed by the 45-54 (13.1%) and 21-24 (12.2%) age categories. However, the rate per 1,000 population was the largest for young crash operators in the age categories of 16 (.43), 17 (.49), 18-20 (.46) and 21-24 (.46). Likewise, the rate per 1,000 licensed drivers was also the highest for these same age groups at .53, .55, .50 and .40, respectively. Both the rate per population and rate per licenses drop significantly past 24 years of age. The number of crash operators, average annual rate per population, and average annual rate per licenses are presented below in [Table 7.12](#). Crash rates are depicted graphically in [Figure 7.12](#).

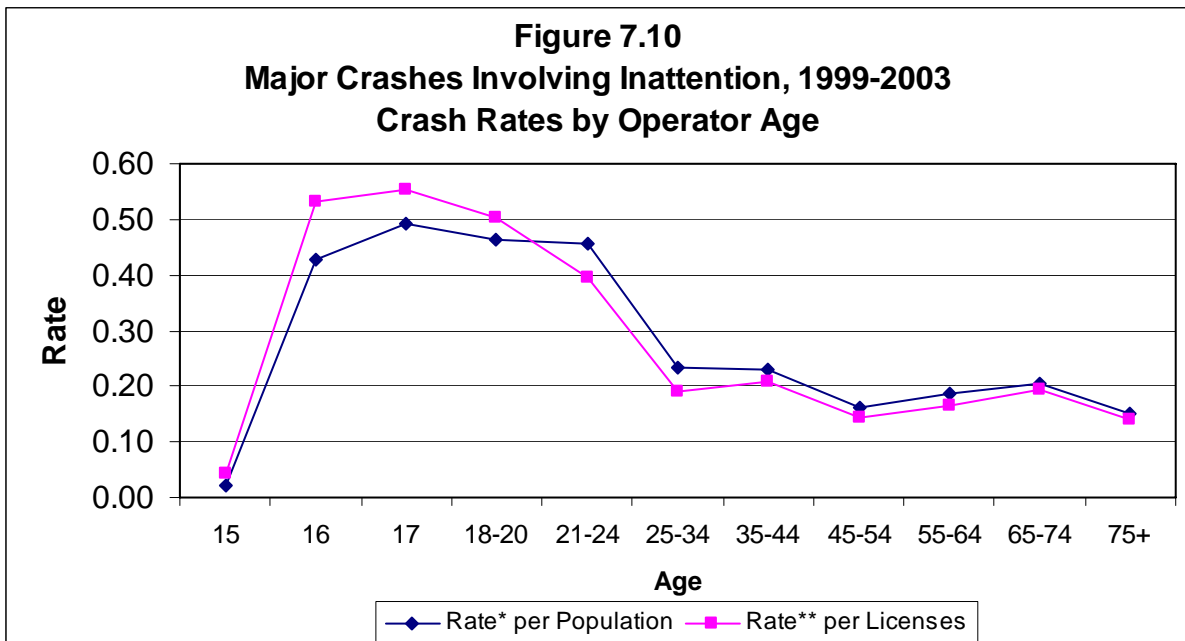
[Table 7.13](#) below presents for major crashes involving inattention, operator age by time of day. Results from the analysis show that drivers age 17 to 75 and older were involved in crashes most often during the afternoon hours between 2-6 pm. Specifically, the percentages for operators involved in crashes in the afternoon ranged from 31.4% for 21-24 year olds to 46.3 for 65-74 year olds. The next most likely time period for operators to be involved crashes was during the midday hours between 10 am-2 pm. For the 16 year old drivers, the proportion of drivers that were involved in crashes in the afternoon was equal to the proportion found for midday, i.e., 31.6%.

**Table 7.12. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention by Operator Age, 1999-2003  
Number, Rate per Population & Rate per Licenses**

Age Group	Crash Operators		Average Annual Rate* per Population	Average Annual Rate** per Licenses
	N	%		
15	1	0.2%	0.02	0.04
16	19	3.3%	0.43	0.53
17	22	3.8%	0.49	0.55
18-20	65	11.2%	0.46	0.50
21-24	71	12.2%	0.46	0.40
25-34	89	15.3%	0.24	0.19
35-44	115	19.8%	0.23	0.21
45-54	76	13.1%	0.16	0.14
55-64	55	9.5%	0.19	0.17
65-74	41	7.0%	0.21	0.19
75+	28	4.8%	0.15	0.14
<b>Total</b>	<b>582</b>	<b>100.0%</b>	<b>0.24</b>	<b>0.22</b>

\*Rate per 1000 population.

\*\*Rate per 1000 licensed drivers.



**Table 7.13. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention, Operator Age by Time of Day, 1999-2003**

Age Group	Time of Day												Total	
	Early Morning 2am-6am		Morning 6am-10am		Midday 10am-2pm		Afternoon 2pm-6pm		Evening 6pm-10pm		Night 10pm-2am			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	1	100.0%
16	0	0.0%	3	15.8%	6	31.6%	6	31.6%	3	15.8%	1	5.3%	19	100.0%
17	1	4.5%	1	4.5%	6	27.3%	10	45.5%	1	4.5%	3	13.6%	22	100.0%
18 to 20	4	6.3%	8	12.5%	15	23.4%	23	35.9%	12	18.8%	2	3.1%	64	100.0%
21 to 24	7	10.0%	9	12.9%	16	22.9%	22	31.4%	13	18.6%	3	4.3%	70	100.0%
25 to 34	4	4.4%	17	18.9%	23	25.6%	30	33.3%	9	10.0%	7	7.8%	90	100.0%
35 to 44	2	1.8%	19	16.8%	34	30.1%	40	35.4%	15	13.3%	3	2.7%	113	100.0%
45 to 54	4	5.3%	13	17.3%	21	28.0%	29	38.7%	6	8.0%	2	2.7%	75	100.0%
55 to 64	5	9.3%	9	16.7%	14	25.9%	19	35.2%	6	11.1%	1	1.9%	54	100.0%
65 to 74	1	2.4%	4	9.8%	14	34.1%	19	46.3%	3	7.3%	0	0.0%	41	100.0%
75 and older	0	0.0%	5	17.9%	10	35.7%	12	42.9%	1	3.6%	0	0.0%	28	100.0%
<b>Total</b>	<b>28</b>	<b>4.9%</b>	<b>88</b>	<b>11.6%</b>	<b>159</b>	<b>27.6%</b>	<b>211</b>	<b>36.6%</b>	<b>69</b>	<b>12.0%</b>	<b>22</b>	<b>3.8%</b>	<b>577</b>	<b>100.0%</b>

Contributing circumstances of operators involved in major inattention crashes are presented below in Table 7.14. Not surprisingly, inattention (45.6%) and falling asleep (19.1%) accounted for the largest proportions of the total 607 contributing circumstances listed. Other causes that contributed to the crashes were failure to keep in proper lane/off road (8.2%), failure to yield (5.8%), driving too fast for conditions (3.1%), following too closely (3.0%), excessive speed (1.8%), wrong side or wrong way (1.6%) and under the influence of medication/drugs/alcohol (1.5%). Comparing operator causes for major inattention crashes to the all crash 2003 distribution shows, proportionally more inattention and falling asleep causes for inattention crashes, again, not surprising. All other proportions for causes in the inattention distribution were either less or nearly equal to the proportions in the all crashes 2003 distribution.

**Table 7.14. Emphasis Area - Keeping Drivers Alert  
Contributing Circumstances of Operators in Major Crashes Involving Inattention, 1999-2003**

Contributing Circumstances	N	All Crashes 2003	
		%	%
Driving too fast for conditions	19	3.1%	16.7%
Failure to keep in proper lane/off road	50	8.2%	8.7%
Operating vehicle recklessly	6	1.0%	1.2%
Visibility obstructed	0	0.0%	2.9%
Excessive speed	11	1.8%	1.3%
Following too closely	18	3.0%	8.5%
Improper turn	2	0.3%	2.3%
Disregarded traffic signs, signals	2	0.3%	1.6%
Failure to yield	35	5.8%	12.7%
Inattention	277	45.6%	15.4%
Wrong side or wrong way	10	1.6%	0.6%
Fell asleep	116	19.1%	1.3%
Under influence of medication/drugs/alcohol	9	1.5%	2.1%
Operating defective equipment	4	0.7%	0.7%
Distraction caused by technology	1	0.2%	0.2%
Distracted	3	0.5%	1.5%
Swerving due to wind, slippery surface, etc	3	0.5%	2.2%
Failure to maintain control	3	0.5%	0.0%
Other/Unknown operator cause	38	6.3%	20.1%
<b>Total</b>	<b>607</b>	<b>100.0%</b>	<b>100.0%</b>

\*There can be a maximum of 2 contributing circumstances per operator.

The frequency distribution for citations written in major inattention crashes shows that 18 (13.4%) were written for operating without insurance, 17 (12.7%) for driving in road laned for traffic and 14 (10.4%) for driving with license suspended. Other common citations included failure to yield (9.0%), careless & negligent (6.7%), DUI (6.7%) and speeding (6.0%). This information is presented below in Table 7.15.

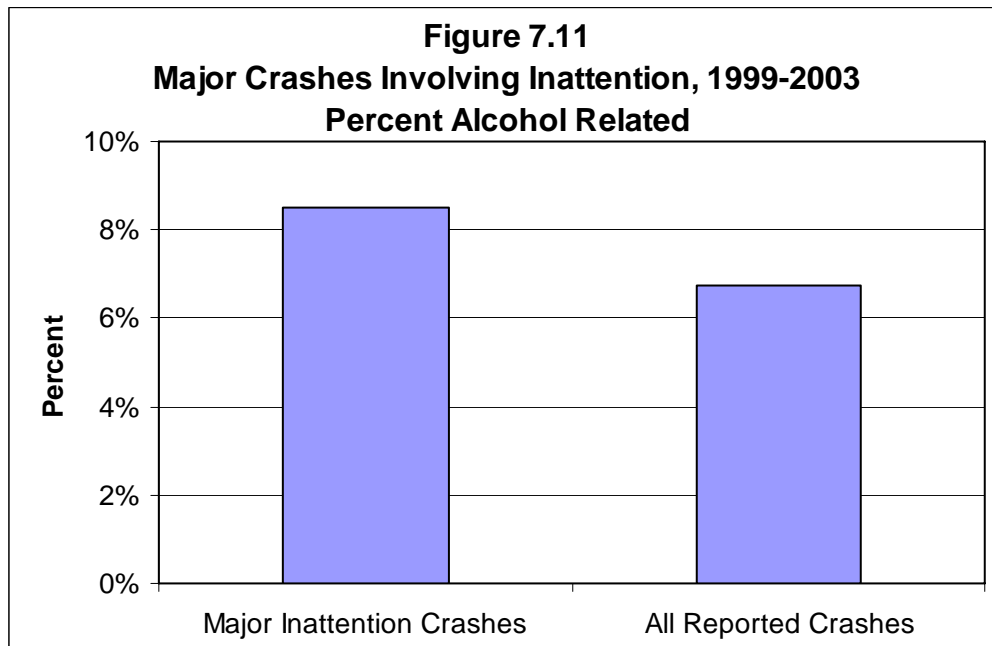
**Table 7.15. Emphasis Area - Keeping Drivers Alert  
Citations Issued in Major Crashes Involving Inattention, 1999-2003**

Violation	N	%
DUI	9	6.7%
Speeding	8	6.0%
Operating without insurance	18	13.4%
DLS	14	10.4%
Leaving scene of accident	3	2.2%
Following too closely	6	4.5%
Operating without license	2	1.5%
Careless & negligent	9	6.7%
Fail to yield	12	9.0%
Not registered	5	3.7%
Defective equipment	3	2.2%
Driving in road laned for traffic	17	12.7%
Driving to right	6	4.5%
Vehicle not inspected	1	0.7%
Under 18 & .02% or more alc conc	0	0.0%
Minor (16+) consumption of alcohol	1	0.7%
Consuming alcohol while driving	0	0.0%
Traffic control signal/device	2	1.5%
Operating w/o owner consent	0	0.0%
All other	18	13.4%
Total	134	100.0%

Results from the analysis on the number of alcohol related crashes for major inattention crashes, presented below in Table 7.16 and Figure 7.11, shows that only 31 (8.5%) of the 365 inattention crashes were alcohol related. The percentage for the inattention crashes was only slightly higher than the percentage (6.8%) for all reported crashes from 1999-2003.

**Table 7.16. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention - Alcohol Related, 1999-2003**

	Number of Crashes	Alcohol Related Crashes	Percent Alcohol Related
Major Inattention Crashes	365	31	8.5%
All Reported Crashes	34,094	2,304	6.8%

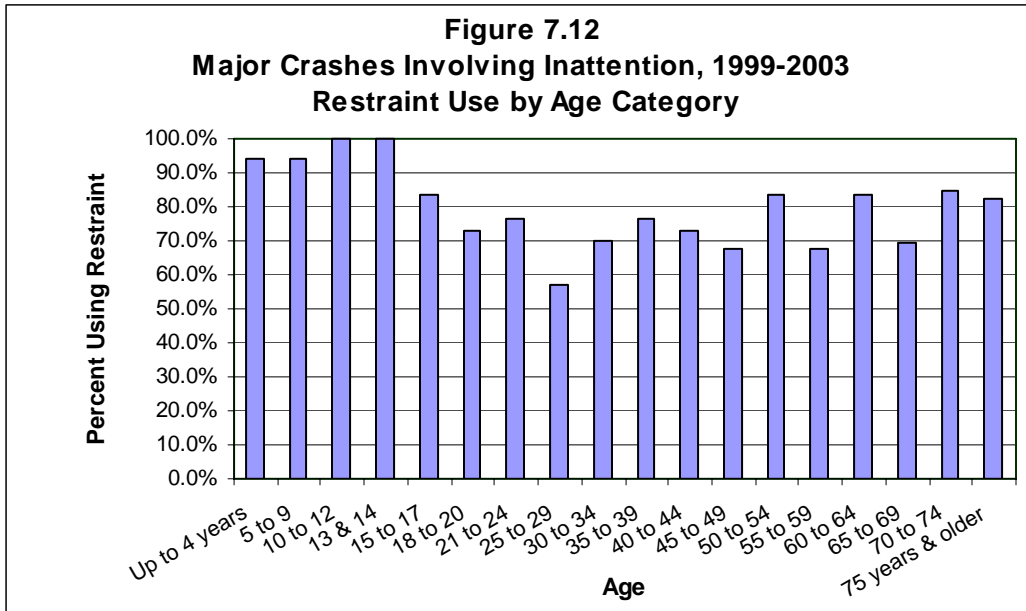


An examination of restraint use for vehicle occupants involved in major inattention crashes by age group shows that overall 76.0% were using a restraint, 17.3% were not using one and for 6.7% restraint use was unknown. An examination of the individual age categories indicates that children 14 years old and younger had the highest restraint use, specifically, for infants to 4 years and 5-9 year olds, 94.1% were using restraints and for 10-12 and 13-14 year olds, 100% were using a restraint. The lowest restraint use was found for the 25-29 year olds with only 57.1% using a restraint. These results are presented below in [Table 7.17](#) and [Figure 7.12](#).

**Table 7.17. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention, 1999-2003  
Vehicle Occupants by Age Group & Restraint Use**

Age Category	Restraint Use						Total	
	Used		Not Used		Unknown Use		N	%
	N	%	N	%	N	%		
Up to 4 years	16	94.1%	0	0.0%	1	5.9%	17	100.0%
5 to 9	16	94.1%	1	5.9%	0	0.0%	17	100.0%
10 to 12	9	100.0%	0	0.0%	0	0.0%	9	100.0%
13 & 14	8	100.0%	0	0.0%	0	0.0%	8	100.0%
15 to 17	51	83.6%	5	8.2%	5	8.2%	61	100.0%
18 to 20	54	73.0%	16	21.6%	4	5.4%	74	100.0%
21 to 24	65	76.5%	10	11.8%	10	11.8%	85	100.0%
25 to 29	24	57.1%	15	35.7%	3	7.1%	42	100.0%
30 to 34	44	69.8%	16	25.4%	3	4.8%	63	100.0%
35 to 39	48	76.2%	14	22.2%	1	1.6%	63	100.0%
40 to 44	51	72.9%	15	21.4%	4	5.7%	70	100.0%
45 to 49	31	67.4%	7	15.2%	8	17.4%	46	100.0%
50 to 54	30	83.3%	2	5.6%	4	11.1%	36	100.0%
55 to 59	21	67.7%	7	22.6%	3	9.7%	31	100.0%
60 to 64	20	83.3%	4	16.7%	0	0.0%	24	100.0%
65 to 69	16	69.6%	5	21.7%	2	8.7%	23	100.0%
70 to 74	22	84.6%	4	15.4%	0	0.0%	26	100.0%
75 years & older	28	82.4%	5	14.7%	1	2.9%	34	100.0%
<b>Total</b>	<b>554</b>	<b>76.0%</b>	<b>126</b>	<b>17.3%</b>	<b>49</b>	<b>6.7%</b>	<b>729</b>	<b>100.0%</b>

Note: persons with unknown age were excluded from the analysis.



Pedestrians and bicyclists involved in major inattention crashes by injury severity are presented below in Table 7.18. Of the 23 pedestrians involved, 19 (82.6%) had an incapacitating injury, 3 (13.0%) were killed and 1 (4.3%) had a non-incapacitating injury. For the 4 bicyclists involved, 3 (75%) were severely injured and 1 (25%) was killed.

**Table 7.18. Emphasis Area - Keeping Drivers Alert**  
**Major Crashes Involving Inattention, 1999-2003**  
**Pedestrians & Bicyclists by Injury Severity**

Injury Severity	Pedestrians		Bicyclists		Total	
	Number	Percent	Number	Percent	Number	Percent
Fatal	3	13.0%	1	25.0%	4	14.8%
Incapacitating	19	82.6%	3	75.0%	22	81.5%
Non-incapacitating	1	4.3%	0	0.0%	1	3.7%
<b>Total</b>	<b>23</b>	<b>100.0%</b>	<b>4</b>	<b>100.0%</b>	<b>27</b>	<b>100.0%</b>

An examination of child passengers in major crashes involving inattention shows that there were 63 passengers age 16 and younger for which age was known. There were 17 (27.0%) 5-9 year olds, 16 (25.4%) infants to 4 year olds, and 13 (20.6%) 15-16 year olds. The 10-12 and 13-14 year olds together accounted for 27% of the total. Looking at the number of child passengers in vehicles shows that in 29 vehicles there was 1 passenger, in 11 vehicles there were 2 child passengers and in 4 vehicles there were 3 passengers age 16 or younger. The total number of crashes with child passengers was 41. These findings are presented below in Table 7.19.

**Table 7.19. Emphasis Area - Keeping Drivers Alert  
Child Passengers in Major Crashes Involving Inattention, 1999-2003**

<u>Age Category</u>	<u>Number</u>	<u>Percent</u>
Up to 4 years	16	25.4%
5 to 9	17	27.0%
10 to 12	9	14.3%
13 & 14	8	12.7%
15 to 16	13	20.6%
Total	63	100.0%

Note: persons with unknown age were excluded from the analysis.

<u>Number of child passengers in vehicle</u>	<u>Number of vehicles</u>
1	29
2	11
3	4
Total	44

Number of crashes with child passengers=41.

## Vehicle Characteristics

The only analysis conducted on vehicles for major crashes involving inattention was to examine a distribution for what the vehicles collided with. Over half (65.8%) of the vehicles hit another motor vehicle in traffic. Other objects that the vehicles collided with were trees (8.0%), pole or sign (3.2%), a ledge or boulder (3.1%), a pedestrian (3.4%), guard rail or curb (2.9%) or other fixed object (3.9%). Thirty-four vehicles (5.8%) overturned. Table 7.20 provides this information.

**Table 7.20. Emphasis Area - Keeping Drivers Alert  
Major Crashes Involving Inattention - Vehicle Collided With, 1999-2003**

<u>Collided with</u>	<u>N</u>	<u>%</u>
Pedestrian	20	3.4%
Motor Vehicle in Traffic	385	65.8%
Motor Vehicle Parked	7	1.2%
Pedalcycle	4	0.7%
Deer	1	0.2%
Overturned	34	5.8%
Non-collision	6	1.0%
Guard rail, curb	17	2.9%
Tree	47	8.0%
Pole, sign	19	3.2%
Ledge, boulder	18	3.1%
Motorcycle	1	0.2%
Other fixed object	23	3.9%
<u>Unknown/other</u>	<u>3</u>	<u>0.5%</u>
Total	585	100.0%

## **IX. Fatality Reports**

Between May 31, 2004 and May 31, 2005, 64 fatal accidents occurred in Vermont. A total of 75 persons died in these accidents. Of the deceased, 47 were vehicle operators, 22 were passengers, five were pedestrians, and one was a bicyclist. One dog riding in a vehicle was also killed. The highest prevalence of fatal accidents was in Rutland County (11 of 64 accidents), followed by Chittenden (nine accidents), and Franklin and Washington Counties (both with seven accidents). Eighty percent of those designated as “Operator #1” (the at-fault driver when fault could be determined) were Vermont residents. Sixty percent of the accidents occurred in the same county in which Operator #1 resided. Seventy percent of those identified as Operator #1 were male. For the most part, those involved in accidents were going about their daily lives—traveling to or from work, or to visit family or friends. Some of those who were under the influence of alcohol had been drinking with friends and were either going home or going to another party.

Thirty-five fatal accidents involved a single vehicle (54.7 percent), 25 involved two vehicles (39.1 percent), and four involved three vehicles (6.3 percent). More than half of the accidents (33 or 51.6 percent) occurred during the months of May-August, 23 (35.9 percent) took place between September and December, and eight (12.5 percent) occurred between January and April. Most accidents took place between 6:00 p.m. and 10 p.m. (25.0 percent), 23.4 percent between 2 p.m. and 6:00 p.m., 20.3 percent between 10 p.m. and 2 a.m., 17.2 percent between 10:00 a.m. and 2 p.m. and 10.9 percent between 6:00 a.m. and 10 a.m. Only 3.1 percent took place between 2 a.m. and 6 a.m. In three-quarters of the accidents, roads were clear and dry. In the remainder, roads were wet or “damp,” but in only a handful of cases were they considered slippery. Whether operators attempted to brake to avoid an accident was not indicated in many of the fatality reports, but in 17 cases braking was thought to have occur, and in 15 cases it was thought not to have occurred.

### 1) Keeping Vehicles on the Roadway (and Minimizing the Consequences of Leaving the Road)

Vehicles left the roadway in 44 of 64 fatal accidents. In most cases, this was attributed to losing control because of excessive speed (often on a curve), and/or crossing the center line and hitting another vehicle before leaving the roadway. Guardrails were present in four accidents where vehicles left the roadway (in another case, the railing had fallen away). In one of these cases, a guardrail prevented a car from leaving the roadway, but caused the death of a passenger and injury of the operator when part of the railing entered the vehicle. After leaving the roadway, vehicles typically collided with an object, most often a tree or trees (15 accidents). In two cases, a vehicle hit a telephone pole; in six cases, a ditch or embankment; in two cases, a rock ledge; and in two cases the vehicle hit a pedestrian. Two vehicles went into a river.

### 2) Instituting Graduated Licensing for Young Drivers

Nine of 64 individuals identified as Operator #1 were under age 21. One driver was aged 14 and one, 15. The unlicensed 14-year old was driving a dirt bike on a roadway at night without a headlight, and was hit by a pickup truck. The 15-year old, a Maryland resident, did not have an operator’s license. He was speeding, lost control and left the roadway, killing his two passengers. One individual (age 16) had a learner’s permit, but was driving without an adult in the vehicle. She was speeding and lost control of the vehicle, left the roadway and hit a tree,

killing her passenger (one other operator also had a learner's permit, but was aged 21). The remaining young drivers had a valid license. In one case, an inebriated passenger fell out of a truck bed and died. In another case, an inebriated ATV operator and passenger driving on a roadway hit a guardrail and were thrown into a ravine and died. In the remaining accidents, losing control because of speeding was determined to be the cause, and alcohol was involved in two of these cases.

### 3) Improving the Design and Operation of Highway Intersections

Collisions between vehicles occurred at intersections in 10 of 64 fatal accidents. (One other accident occurred at an intersection, but did not involve a collision in the intersection per se. A motorcyclist hit a curb and lost control, hitting a stopped vehicle). In one case, an operator braked, then continued because she thought an oncoming truck was going to stop (intersection of Pleasant Valley Road and Upper Pleasant Valley Road in Cambridge). The truck, which had the right of way, hit the back of the car, killing the operator's daughter. In five accidents, cars were stopped at stop signs, but then pulled out into the path of oncoming vehicles (E. Cobble Hill Road and Route 302 in E. Barre; Route 4 at Fair Haven rest area access road; Blakeville Road and Route 100 in Eden; Lakeview Drive and Route 100 in Eden; and Pond Brook Road and Richmond Road in Hinesburg). In all accidents, law enforcement officers determined that visibility was not obstructed on the part of the stopped vehicle. In one case, the adult daughter of the vehicle operator told her mother the road was clear. An oncoming truck hit their car, and the daughter died. Three other collisions involved an operator making a left hand turn who did not yield to oncoming traffic (Ryder Brook Road and Laporte Road in Morristown; Route 4 and Route 100 in Killington; and Troy and Liberty Streets in Richford). In one other accident, which occurred after dark, a bicyclist rode through a red light into an intersection and the path of an oncoming car (Manhattan Drive and Route 127 in Burlington).

### 4) Increasing Seat Belt Usage and Improving Airbag Effectiveness

Twenty-seven of the 75 persons killed were not wearing a seat belt (this information was missing for four individuals). For another 17, seat belts were not applicable because they were riding a motorcycle or a bicycle, or because they were a pedestrian. Therefore, of the 54 persons killed who could have been wearing a seat belt and where restraint usage was noted, one half were not wearing a seat belt. Conversely, one half of those killed were wearing a seat belt. Thirteen of those who died were ejected from their vehicle, and three others were partially ejected (these numbers do not include motorcyclists and the one bicyclist who were killed—all who were thrown from their vehicle).

Airbags are less likely to be present in vehicles than seatbelts, and this is reflected in the number and percentage of deceased individuals who were riding in seats without airbags. After subtracting the 17 individuals for whom restraint devices were not applicable and those for whom restraint information was not noted, 38 individuals did not have airbags, representing 70.1 percent of the remaining 54 fatalities.

It should also be noted that of the eight motorcyclists who died (seven operators, and one passenger) all but one were wearing helmets, as was the lone bicyclist. Two motorcyclists wearing helmets survived an accident in which a passenger died. The three individuals riding on roadways with a dirt bike or an ATV were not wearing helmets.

## 5) Reducing Impaired Driving

According to fatality reports, alcohol may have played a role in 24 of the 64 fatal accidents. Blood alcohol levels were obtained in only 15 of these accidents, however, and levels ranged from .005 to .476. In all but one case, the operator had been drinking, and typically lost control and ran off the road. However, the individual with a blood alcohol level of .476 was hanging onto a pickup truck while the operator moved it at their home. She fell off, was run over and killed. In another case, previously mentioned, an inebriated passenger was standing up in the icy bed of a pickup truck, fell out and was killed (the driver had also been drinking). In one other unusual accident, a car had stopped at a rest area when a passenger decided to move the car and ran over the operator who was in front of the vehicle (the operator and passengers had been drinking). In only three cases were illicit drugs thought to be involved (quinine, marijuana, and cocaine). In two accidents, the driver had been using drugs and the other involved the severely inebriated woman hanging onto the truck.

## 6) Curbing Aggressive Driving

Speeds exceeding the posted limits were blamed for 20 of 64 accidents. This typically resulted in an operator losing control of their vehicle and crashing. At times, curves in the road contributed to a driver losing control while traveling faster than the posted speed limit, and in a few cases, a driver crossed the center line and hit an oncoming vehicle. Aggressive driving led to a crash that occurred on River Street in Montpelier. Operator #1 was traveling well over the posted 35 mph speed limit, passed several cars, then lost control around a curve, hitting an oncoming vehicle and killing its driver. In another case, two acquaintances were playing a game of “chicken”—speeding toward each other in the same lane. The driver traveling on the wrong side of the road died in the resulting head on collision.

## 7) Keeping Drivers Alert

Only one operator—a 77-year old man—fell asleep while driving. His vehicle then crossed the center line, and hit another car head on, killing that vehicle’s driver. Another driver may have been fatigued, having just having finished working the night shift, and two others may also have been fatigued according to fatality reports. Distractions may also have kept some drivers from focusing on the road—in one case, a large animal was thought to be on the interstate so the driver swerved, hitting the guard railing and crashing, which caused the death of his passenger. In another case, a cup of coffee fell on the floor. While the driver was trying to retrieve it, he did not maintain control of his car, which crossed into the other lane and went up on a sidewalk, killing a pedestrian (this driver had a learner’s permit, but was driving alone). Another driver may have lost control because of a cell phone (he talked to his wife on the phone a few moments before he crashed). A woman may have been distracted by two young children riding in her car. She lost control of her car and hit an oncoming vehicle. This resulted in her death. The sun was thought to have caused another woman’s vehicle to cross the center line and hit another vehicle. Note that the extent to which distractions played a role in accidents may be difficult to determine in cases when the sole occupant did not survive. No other distractions were indicated in the fatality reports, although in three other accidents “inattention” by an operator (resulting in failure to yield to another vehicle) was cited as a contributing cause.

## **X. Summary**

Key findings from the study include the following:

### **Keeping Vehicles on the Roadway**

- The largest number of crashes occurred in the afternoon (244; 27%), however many took place at night between the hours of 6 pm and 6 am (387; 43%).
- Almost 70% of the crash drivers were male.
- Major causes for the run-off the road crashes were driving too fast for conditions, failure to keep in proper lane/off road, excessive speed and under the influence of medications/drugs/alcohol.
- The largest number of citations were written for DUI (24%) and speeding (20%).
- The proportion of run-off the road crashes that were alcohol related (30%) was over 4 times the proportion for all reported crashes for 1999-2003.
- Overall restraint usage (53%) was relatively low.
- Over half occurred from Friday through Sunday.
- Higher percentage of run-off the road crashes (16%) occurred on snow/ice/slush than the intersection (6%) or inattention (4%) crashes.
- 61% of the crashes in the alcohol emphasis area were also in this emphasis area.

### **Instituting Graduated Licensing for Young Drivers**

- Over half of the young driver crashes occurred between the hours of 2 pm-10 pm.
- 60% of the crash operators were male.
- Major causes included driving too fast for conditions, failure to yield, inattention, speeding and failure to keep in proper lane/off road.
- Many citations were written for speeding (20%), alcohol related violations (14%), and operating without insurance (9%).
- Many happened in Chittenden County (22%) and on state roads (55%).
- Overall restraint usage was low for passengers (50%) for young drivers.
- Almost half occurred from Friday through Sunday.

### **Improving the Design and Operation of Highway Intersections**

- 66% of the crashes happened at t-intersections.
- 26% occurred where there was no traffic control & 29% happened at stop signs.
- Major causes for the intersection crashes were for failure to yield, inattention and disregarded traffic signs & signals.
- Almost 60% occurred from 10am-6pm & almost 70% took place on state roads.
- Half occurred in 35 and 50 mph posted speeds.
- The alcohol related crash proportion (13.3%) was almost double the proportion for all crashes for 1999-2003.
- Chittenden County had the highest number of crashes (160) followed by Bennington (74) and Rutland (56) counties.

## **Seat Belt Usage and Improving Airbag Effectiveness**

- 64% of the crash operators in the major crashes were male; 36% were female.
- Younger drivers 18-24 had the lowest restraint usage (64%) while older drivers age 55-74 had the highest restraint usage (79%).
- Passengers age 18-24 had relatively low restraint usage (50%).
- Passengers age infant to 4 years (99%), 5-9 (91%) & 65-69 year olds (93%) had the highest restraint usage among passengers in major crashes.
- Pickup truck occupant had relatively low restraint usage (59%).
- For occupants in passenger cars, sport utility vehicles and the severely injured in major crashes, restraint usage was the lowest for 18-20 year olds, i.e. 62%, 47% and 54%, respectively.
- In passenger cars, children (infant to 12 years old) had the highest restraint usage.
- In the fatality reports, half of those killed were not using a seat belt (excludes missing data, motorcyclists, pedestrians and bicyclists).

## **Reducing Impaired Driving**

- 65% of the alcohol related major crashes occurred at night (6pm-6am).
- Almost 80% of the alcohol involved operators were male.
- 62% took place on Friday, Saturday and Sunday.
- Half happened on state roads and 27 % occurred on city/village roadways.
- Primary causes were under the influence of medication/drugs/alcohol, failure to keep in proper lane/off road and driving too fast for conditions.
- Only 40% of the occupants in alcohol related vehicles were restrained.
- 61% of the alcohol related vehicles ran off the road.

## **Curbing Aggressive Driving**

- The largest number of crashes occurred in Chittenden County (26%).
- Highest rate per population and rate per vmt were found in Bennington County.
- The largest number of crashes occurred in the afternoon (98; 28%), however many took place during midday (74; 21%) and in the evening (71; 18).
- Major causes were excessive speed, following too closely and operating vehicle recklessly.
- For drivers ages 18-20, 35-44 & 65-74, over 70% were males.
- The proportion of alcohol related crashes (24%) was over 3 times that for all reported crashes in 1999-2003.
- Almost half occurred at posted speeds of 50-65 mph.

## **Keeping Drivers Alert**

- Many of the inattention major crashes occurred on a main road (60%) or at an intersection (24%).
- More happened at t-intersections than other types of intersections.
- Many occurred during the day (61%) and on state highways (61%).

- Over half took place where there was no traffic control.
- Major causes were inattention, falling asleep, failure to keep in proper lane/off road and failure to yield.
- 66% of the vehicles hit another vehicle in traffic.
- Primary cause for interstate crashes was failing asleep.
- Over half occurred at posted speeds of 50-65 mph.