Understanding Crash Characteristics of Novice Riders in Single Vehicle Crashes

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CENTER FOR URBAN TRANSPORTATION RESEARCH

New motorcyclists are more prone to getting involved in crashes

- Lack of Experience

- Overconfidence

- Poor Judgment

- Inability to Anticipate Hazards

- Riskier Riding Behaviors

- Inexperience with Handling Emergencies

Florida Motorcycle Licensing

- Mandatory Training
  - Require entry-level training for all riders, regardless of age.
- MSF BRC

Florida Rider Training Program Graduates

Which of the following best described you prior to the course:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I had never operated a motorcycle before.	433	39.5	44.5	44.5
	I had some prior experience riding a motorcycle.	417	38.1	42.8	87.3
	I had significant prior experience riding a motorcycle.	124	11.3	12.7	100.0
	Total	974	88.9	100.0	
Missing	System	121	11.1		
Total		1095	100.0		

How long have you had a motorcycle?

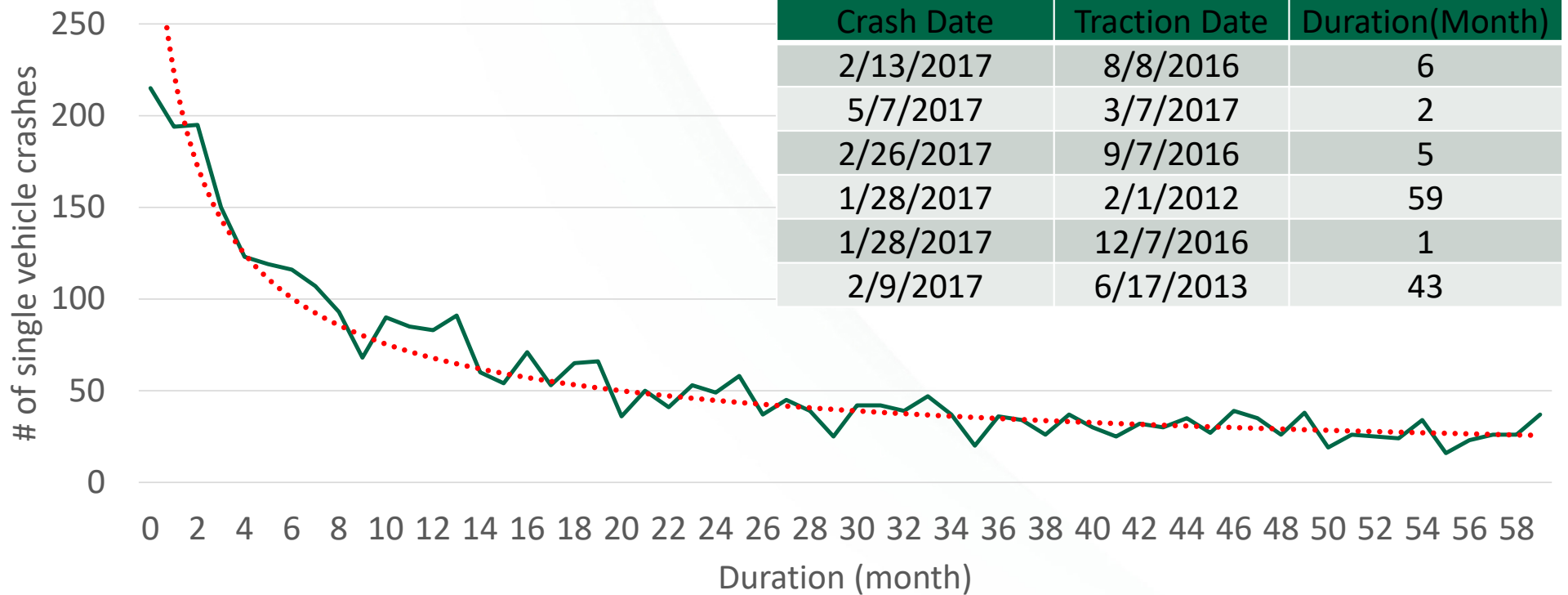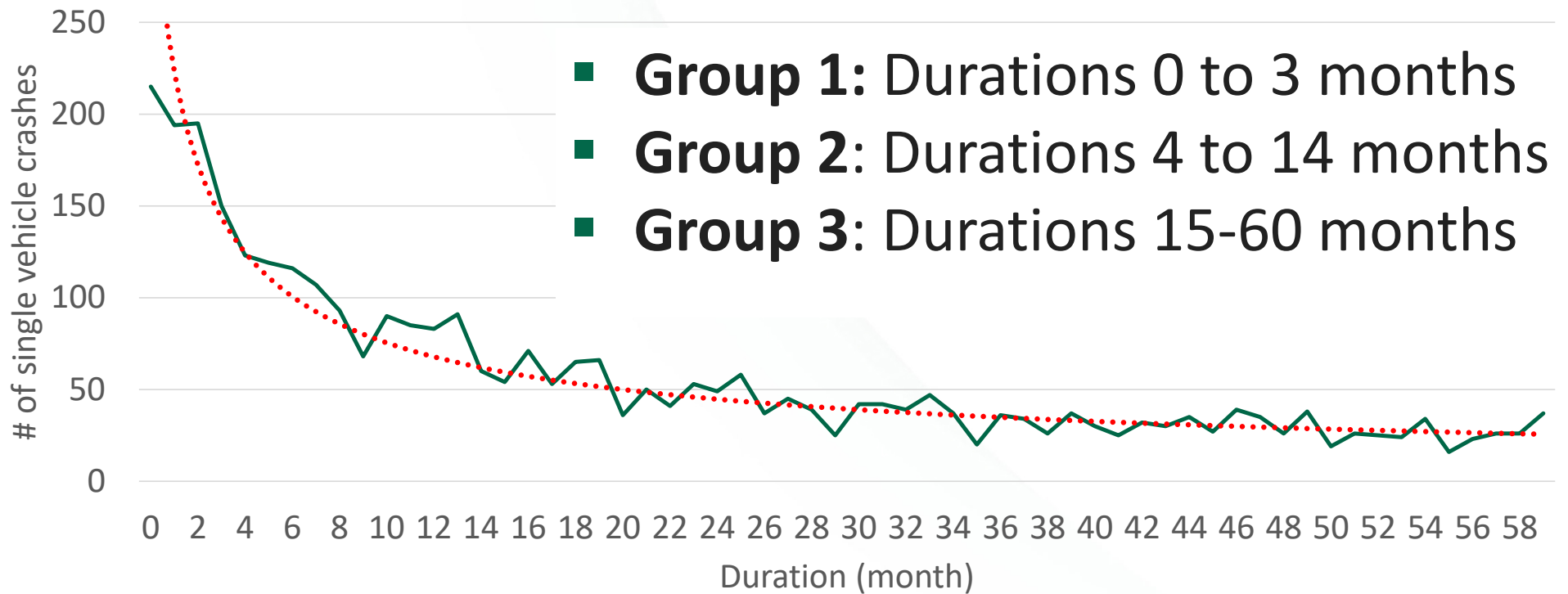|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than a month	124	11.3	31.9	31.9
	1-3 months	65	5.9	16.7	48.6
	4-6 months	37	3.4	9.5	58.1
	7-12 months	10	.9	2.6	60.7
	More than one year	153	14.0	39.3	100.0
	Total	389	35.5	100.0	
Missing	System	706	64.5		
Total		1095	100.0		

Dataset

- Florida Motorcycle Crash Data (2017-2019)

- Single Vehicle Motorcycle Crashes

- Crash Date - Date of Traction at Florida DMV = Duration by month

- Duration: Less than 60 months

Crash Date	Traction Date	Duration(Month)
2/13/2017	8/8/2016	6
5/7/2017	3/7/2017	2
2/26/2017	9/7/2016	5
1/28/2017	2/1/2012	59
1/28/2017	12/7/2016	1
2/9/2017	6/17/2013	43

Florida Single Vehicle Motorcycle Crashes (2017-2019)

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Clustering of Crash Frequency

- **Group 1:** Durations 0 to 3 months
- **Group 2**: Durations 4 to 14 months
- **Group 3**: Durations 15-60 months

# of single vehicle crashes

Duration (month)

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Clustering

- **Group 1:** Durations 0 to 3 months
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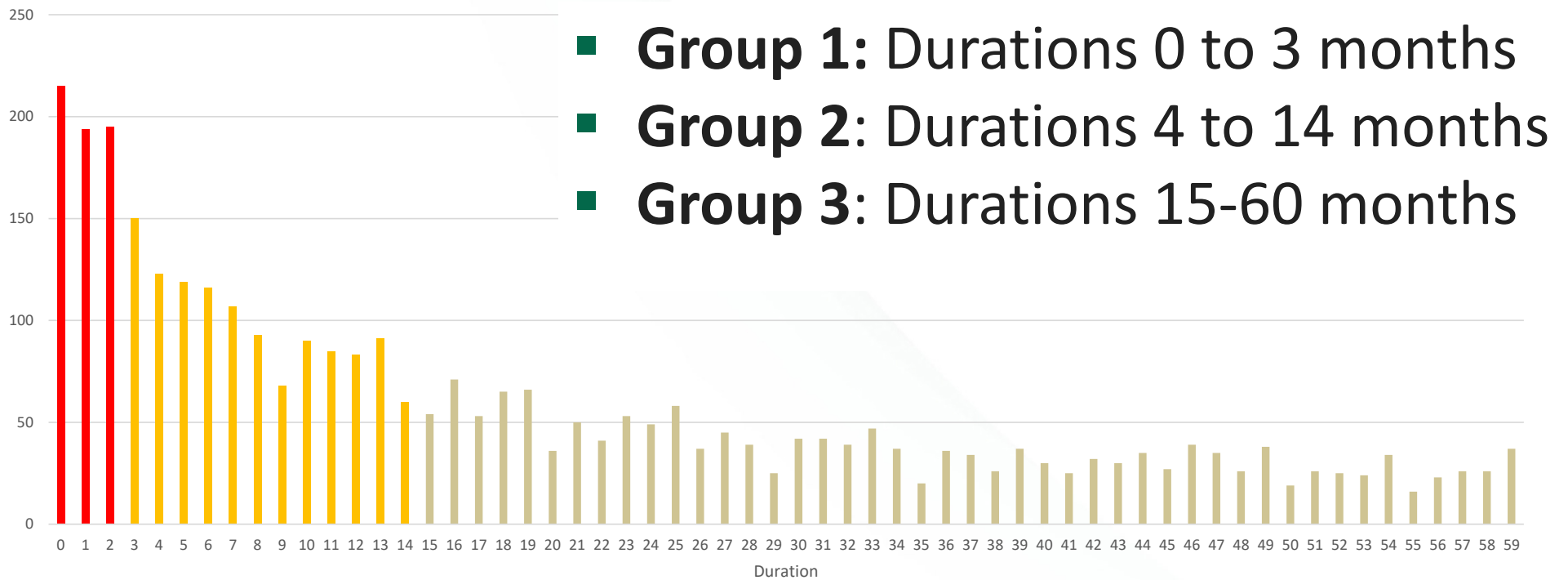
Executed Statistical Tests

- For categorical variables, Chi-Square Independence tests were conducted to check whether the variable is dependent on groups.

- For continuous variables, the Kruskal – Wallis test (similar to ANOVA but Non–Parametric method) was conducted to check the distribution is different.
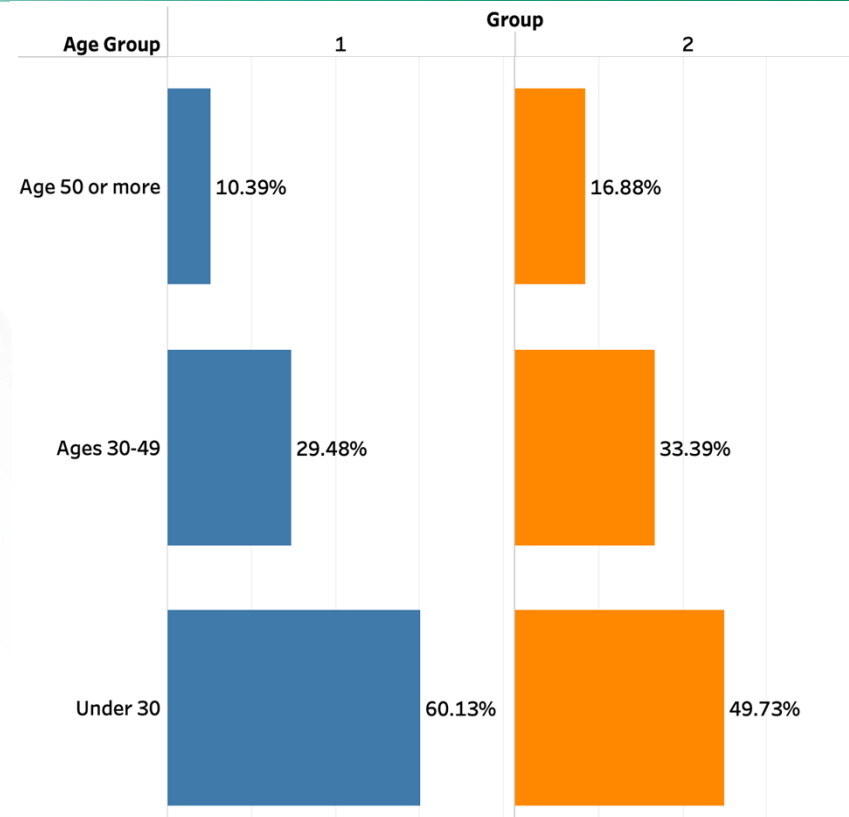
Dependent variable with Group 1,2 (Age)

Group 1 has more young riders
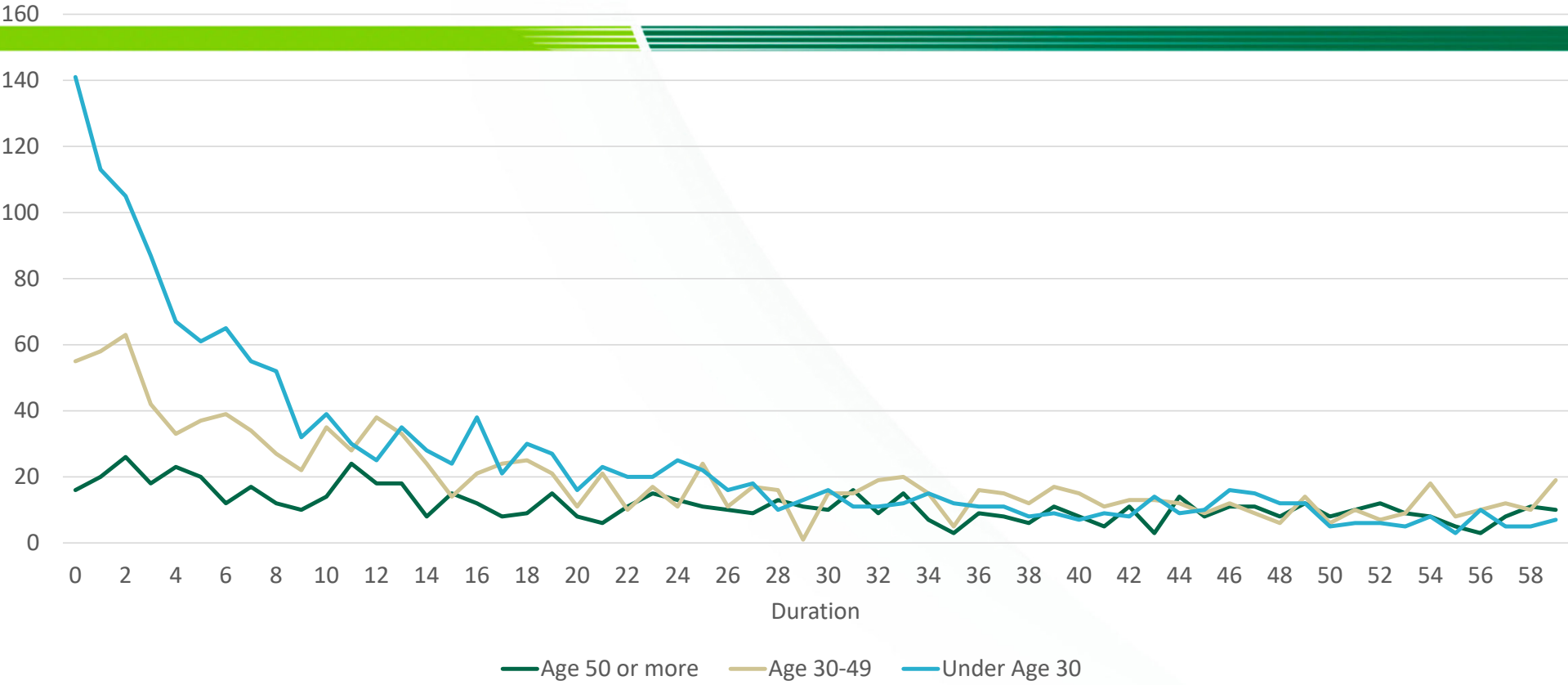
- Group1_average: 30.64
- Group2_average: 34.06

S4_AGE_AT_TIME_OF_CRASH
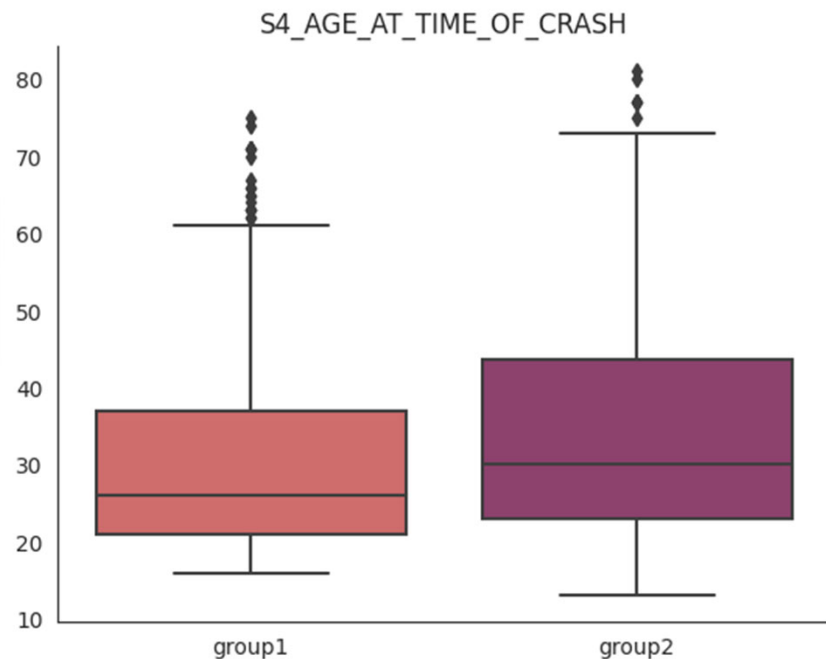
Dependent variable with Group 1,2 (Age Group)

Age group is significantly different.

Age Group	Group 1	Group 2
Age 50 or more	10.39%	16.88%
Ages 30-49	29.48%	33.39%
Under 30	60.13%	49.73%

Crash Frequency by Age Group

Dependent variable with Group 1,2 (Helmet Use)

Group 1 wears helmets more than Group 2.

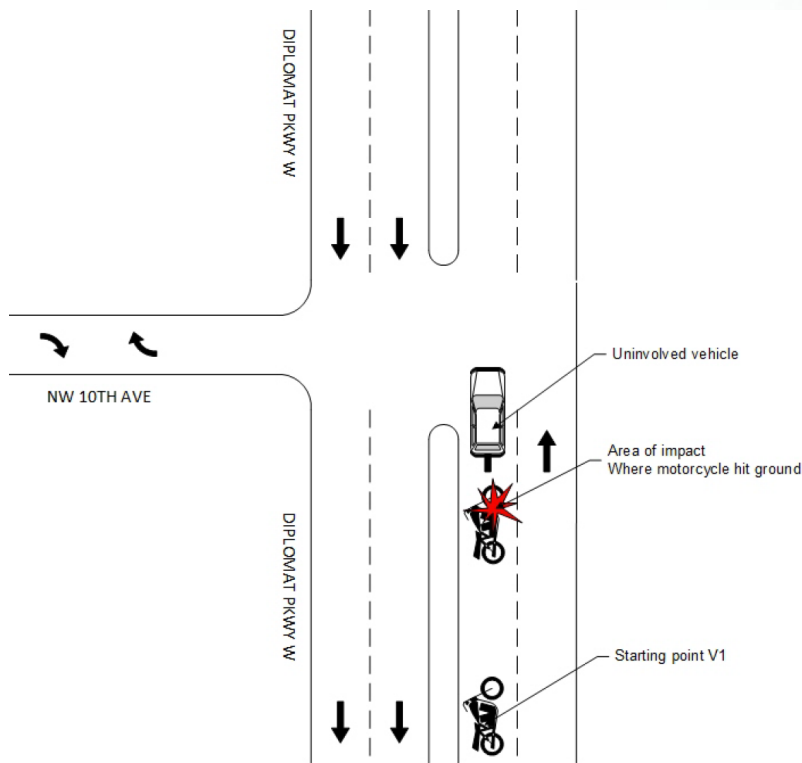| Helmet Code	Group	
	1	2
Compliant Helmet	74.96%	67.55%
No Helmet	24.00%	30.94%
Other Helmet	1.04%	1.51%
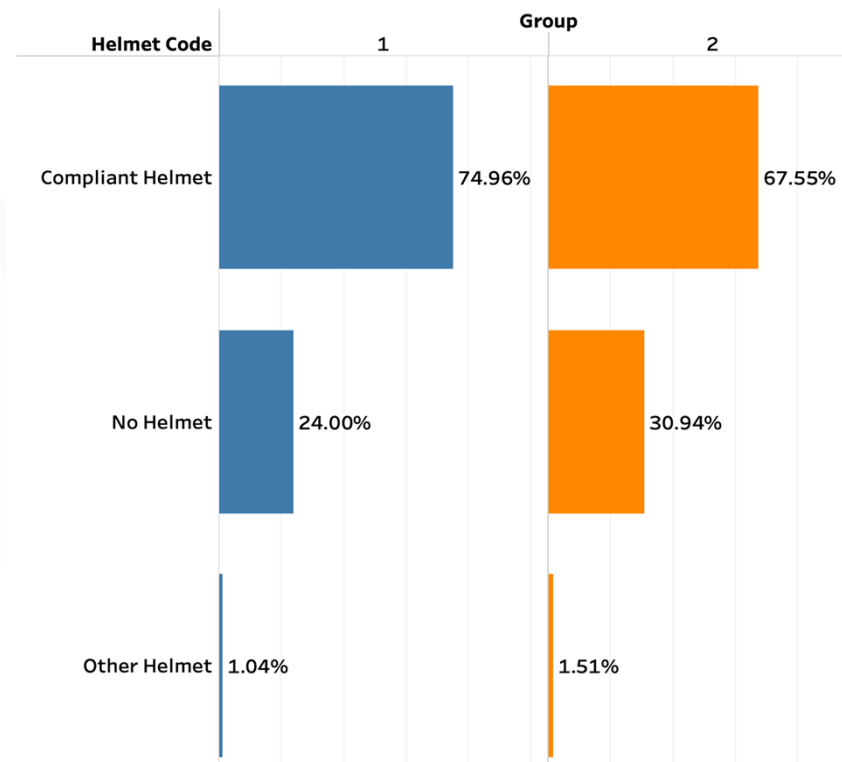
Dependent variable with Group 1,2 (Alcohol – related)

Group 1 is less associated with alcohol than Group 2.
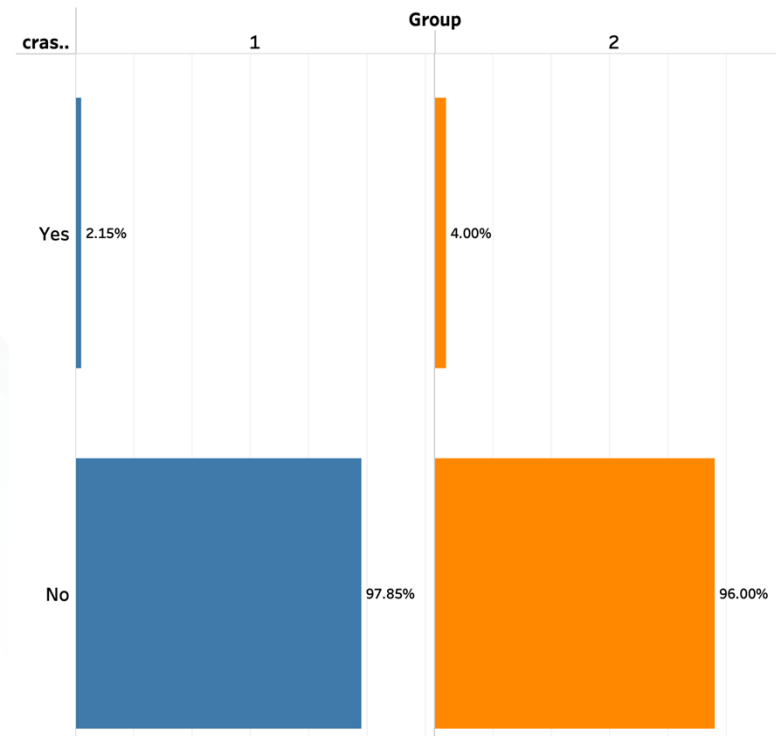
DRIVER_ACTION - Followed too closely (1)

THE DRIVER OF V1 STATED THAT HE WAS SLOWING DOWN TO MAKE A LEFT TURN ONTO NW 10TH AVE. HE STATED THAT THE VEHICLE IN FRONT OF HIM ALSO ATTEMPTING TO TURN LEFT ONTO NW 10TH AVE HAD NO BRAKE LIGHTS AND DID NOT HAVE THEIR TURN SIGNAL ON.

V1 WAS FOLLOWING THE OTHER VEHICLE TOO CLOSELY NOT ALLOWING V1 TO HAVE THE PROPER DISTANCE REQUIRED TO STOP SAFELY. V1 ATTEMPTED TO STOP BUT THE ROADS WERE WET DUE TO THE RAIN WHICH CAUSED THE DRIVER OF V1 TO LOSE CONTROL OF HIS MOTORCYCLE CAUSING HIM TO FALL OFF OF THE MOTORCYCLE AND SLIDE ON THE GROUND.

V1 NEVER STRUCK THE OTHER VEHICLE MAKING THIS A SINGLE VEHICLE COLLISION. THE PHANTOM VEHICLE WAS UNABLE TO BE LOCATED.

Sarah's Single Vehicle Motorcycle Crash
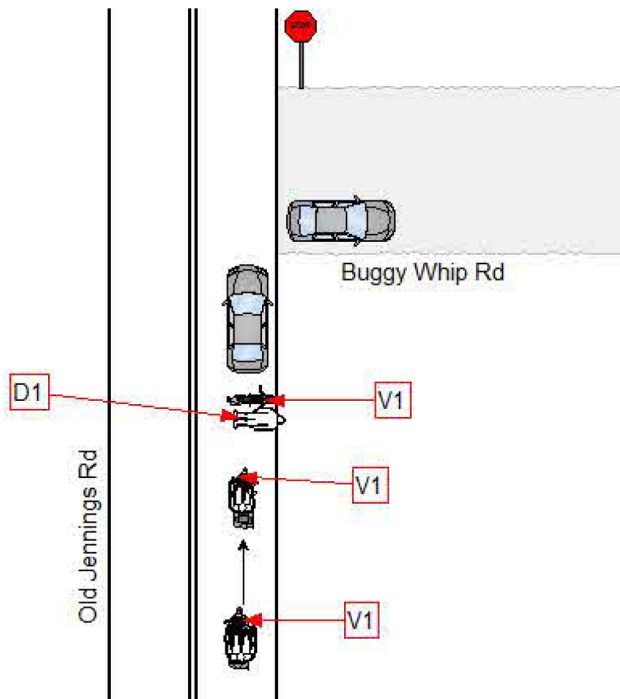

H-D Sportster 883 custom 2009
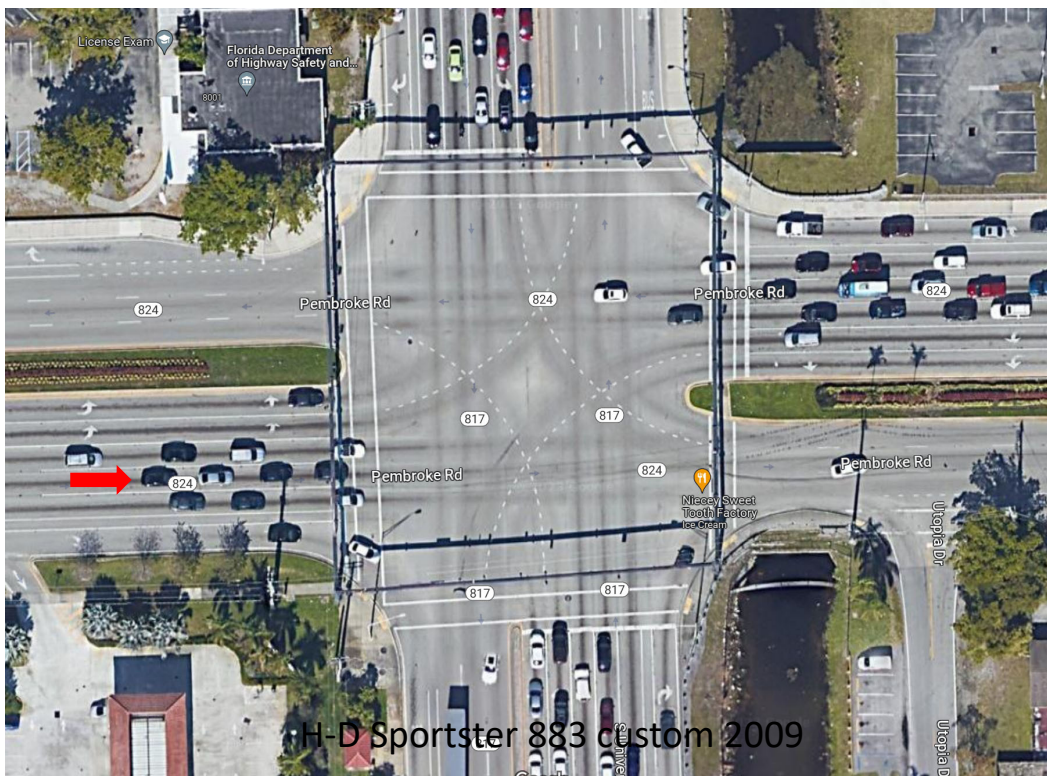
DRIVER OF MOTORCYCLE #1 FAILED TO REALIZE THE VEHICLE IN FRONT HAD STOPPED, SHE THEN APPLIED THE BRAKES, LOSING CONTROL AND SLID WHILE ON THE MOTORCYCLE ABOUT 10 FEET. THE MOTORCYCLE DID NOT MAKE ANY CONTACT WITH ANY OTHER VEHICLES BUT SUSTAINED DAMAGE ON THE RIGHT SIDE.

DRIVER_ACTION - Followed too closely (2)

V1 was located upon Old Jennings Rd near the intersection of Buggy Whip, headed westbound. D1 stated he was "zoned out," that his mind was elsewhere and he then he saw the vehicle directly in front of his motor cycle stopping due to another vehicle turning right onto Buggy Whip Rd. D1 stated he had no choice but to drop and "slide" with his motorcycle.

Dependent variable with Group 1,2 (Roadway Alignment)

Group 1 has more crashes on curves than Group 2.
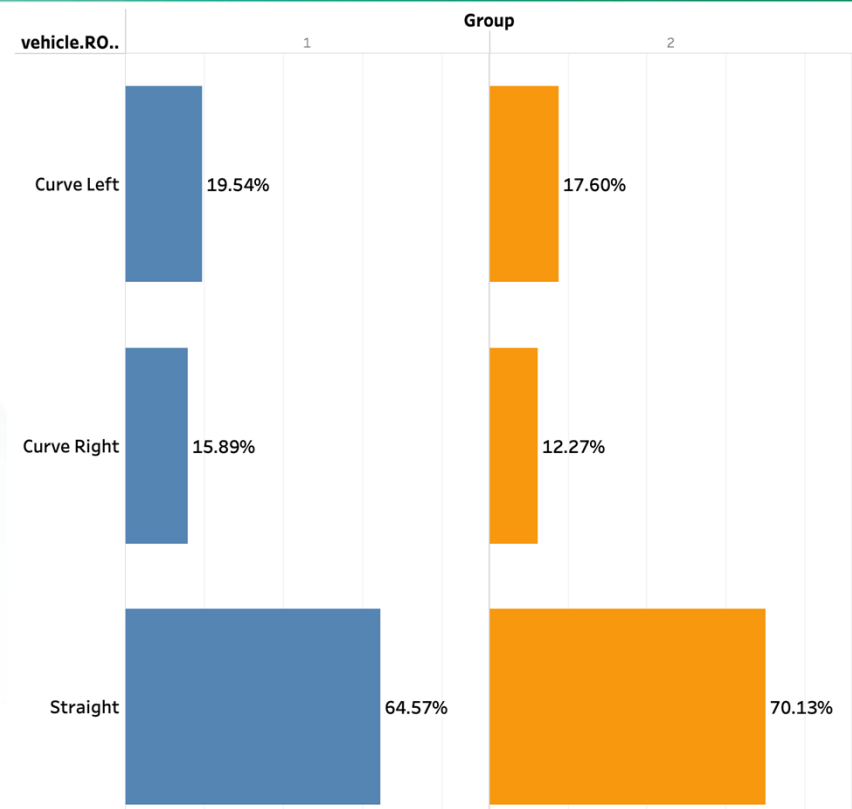
Negotiating a Curve (1)

V01 AT FINAL REST

GOUGE MARKS

V01 OVERTURNING ON LEFT SIDE

V01
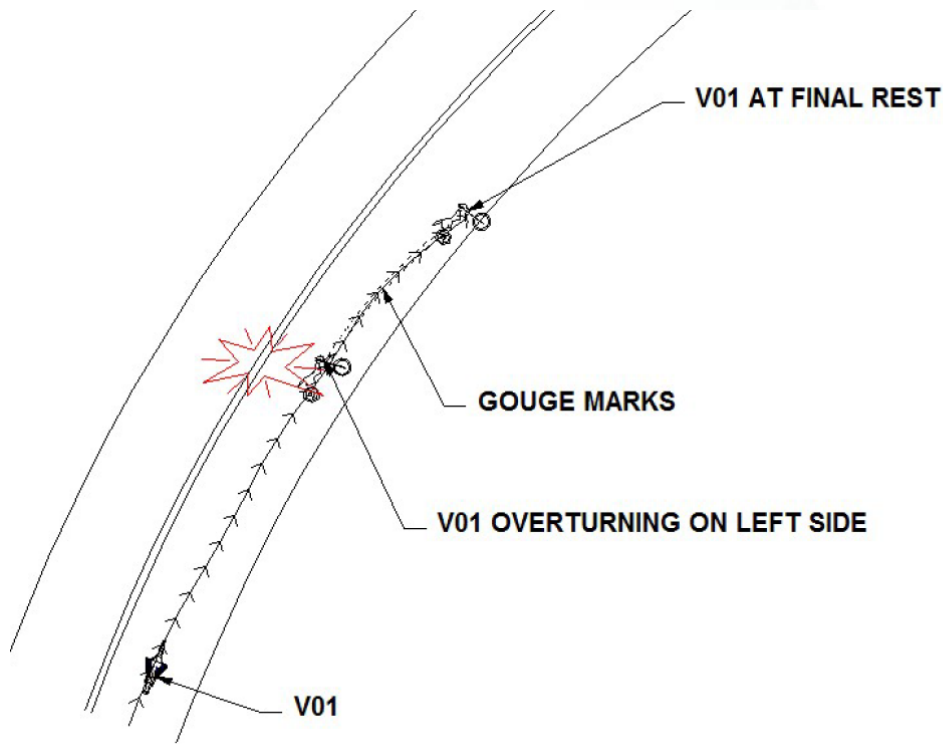
The driver of V01 failed to negotiate the right curve in the roadway. As a result V01 overturned on its left side.

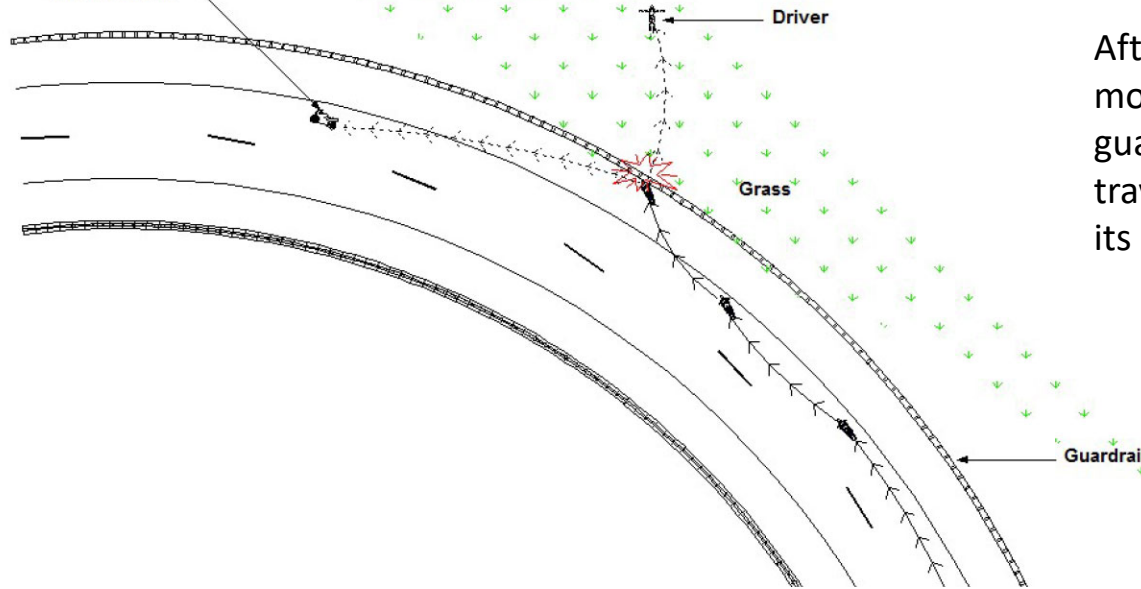V01 came to final rest in the southbound lane of Culbreath Rd on its left side facing southwest.

Honda   Magna

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Negotiating a Curve (2)

The driver of V01 was traveling too fast on the entrance ramp and lost control of V01. V01 veered right striking the guardrail with the front of V01.

After impact the driver of V01 was ejected from the motorcycle and fell onto the other side of the guardrail in the grassy shoulder. V01 continued to travel north on the ramp and came to final rest in its side in the outside lane.

Findings (Group 1 vs. Group 2)

- Motorcycle crashes in Group 1 were less related to speeding, alcohol, or drugs; they were affected more by **driving environments, driving skills, and age.**
- Group 1 was younger but wore helmets more, and estimated speeds were lower.
- Injury severity was lower in Group 1. They were less likely to be towed, and the estimated total damage amount was less, with fewer crashes on the highway (identified more locally).
- However, Group 1 had more crashes on **curved roads, undivided two-way roads, unpaved shoulders, and narrower roads (2-lane road).**

Findings

- Until now, these were the factors statistically dependent variables with Group 1 and Group 2.

- Some variables were not statistically significantly dependent on Group 1 and Group 2 but were statistically dependent on Group 1, Group 2, and Group 3. These variables help us understand the characteristics of groups.

- For most variables, there were patterns that Group1 > Group 2 > Group 3 or Group1 < Group 2 < Group3.

Dependent variable with Group 1,2,3

1. Drug related

- Although the numbers is rather small, group 1 has the least related to drugs, while group 3 was the most.
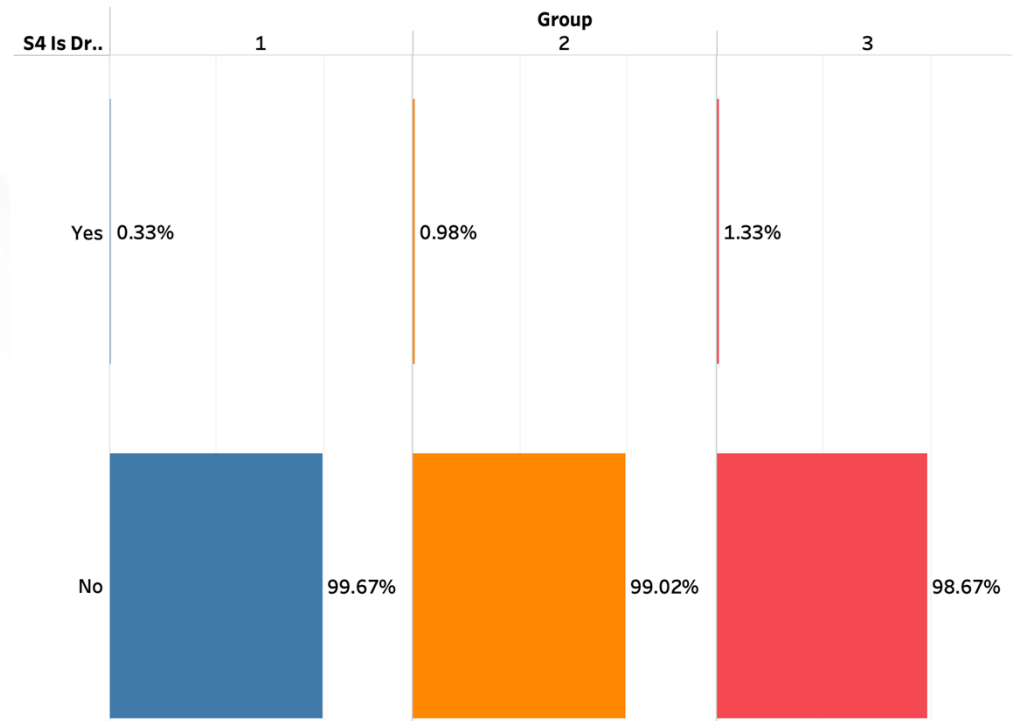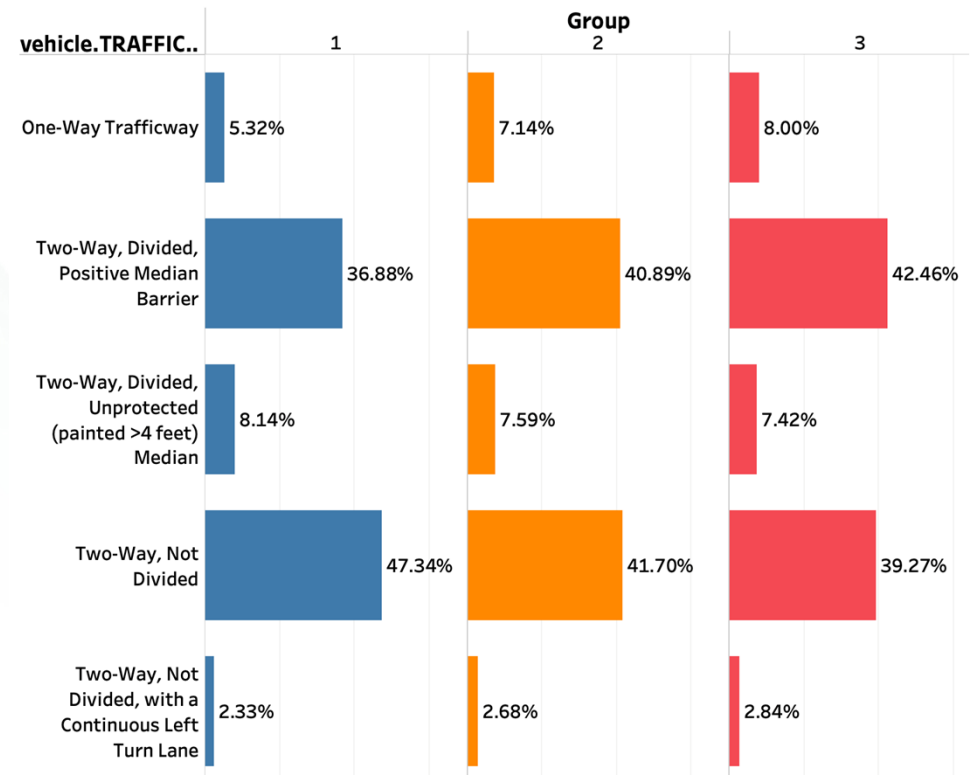
Dependent variable with Group 1,2,3

2. Traffic Way

- Group 1 tends to have crashes on the non-divided two-way roads compared to Group 3.

- Group 1 has fewer crashes on one-way roads or divided two-way traffic.

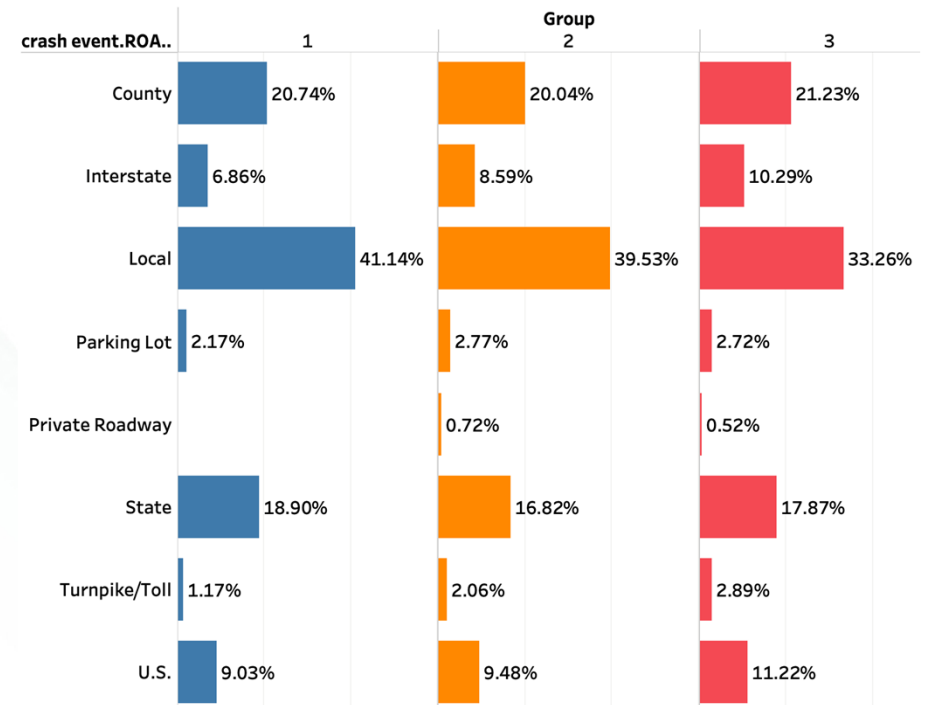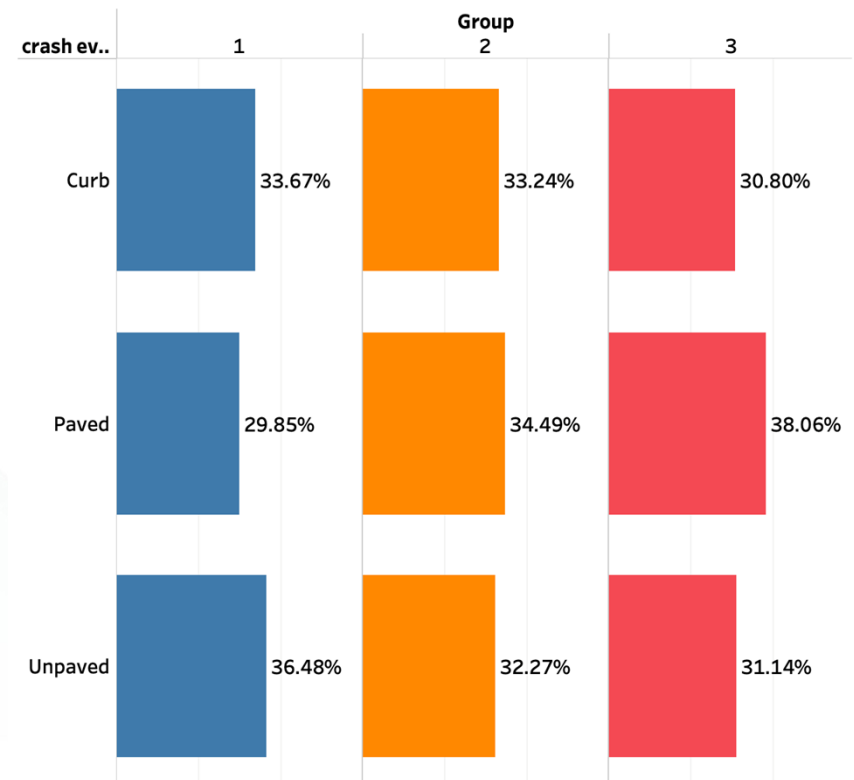| vehicle.TRAFFIC..	Group 1	Group 2	Group 3
One-Way Trafficway	5.32%	7.14%	8.00%
Two-Way, Divided, Positive Median Barrier	36.88%	40.89%	42.46%
Two-Way, Divided, Unprotected (painted >4 feet) Median	8.14%	7.59%	7.42%
Two-Way, Not Divided	47.34%	41.70%	39.27%
Two-Way, Not Divided, with a Continuous Left Turn Lane	2.33%	2.68%	2.84%

Dependent variable with Group 1,2,3

3. Road system identifier

- Group 1 has more crashes on 'local roads' compared to Group 3.
- Group 1 has less crashes on 'interstate' compared to Group 3.

crash event.ROA..	1	Group 2	3
County	20.74%	20.04%	21.23%
Interstate	6.86%	8.59%	10.29%
Local	41.14%	39.53%	33.26%
Parking Lot	2.17%	2.77%	2.72%
Private Roadway		0.72%	0.52%
State	18.90%	16.82%	17.87%
Turnpike/Toll	1.17%	2.06%	2.89%
U.S.	9.03%	9.48%	11.22%

Dependent variable with Group 1,2,3

4. Type of shoulder

- Group 1 has more crashes when the shoulder was unpaved than Group 3.

crash ev..	Group		
	1	2	3
Curb	33.67%	33.24%	30.80%
Paved	29.85%	34.49%	38.06%
Unpaved	36.48%	32.27%	31.14%

Dependent variable with Group 1,2,3

5. Total number of Lanes

- Group 1 tends to have crashes on the 2-lane road rather than wider roads, compared to Group 3.

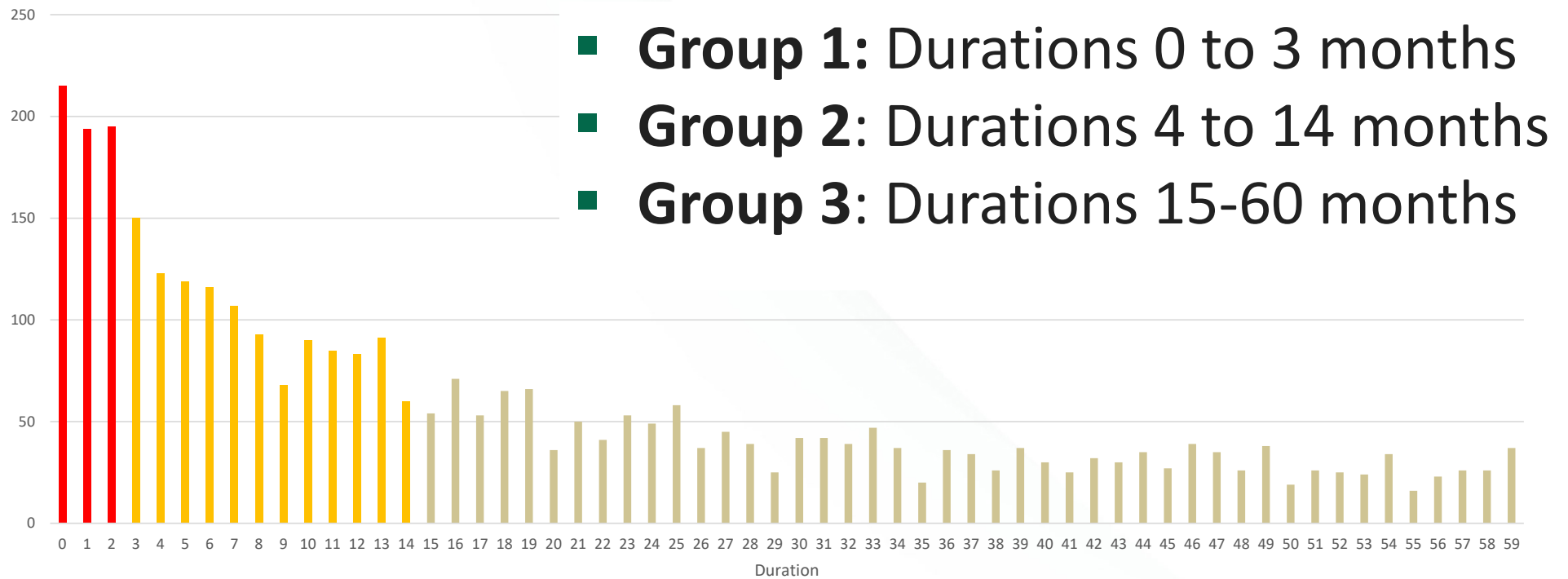| vehicle...	Group 1	Group 2	Group 3
0	0.50%	0.27%	0.41%
1	3.19%	5.21%	4.76%
2	51.93%	46.45%	44.37%
3	4.54%	5.03%	4.70%
4	26.22%	26.15%	26.31%
5	2.35%	3.32%	3.08%
6	9.92%	11.05%	12.78%
7		1.26%	0.93%
8	1.34%	0.99%	2.32%
10		0.27%	0.17%
12			0.17%
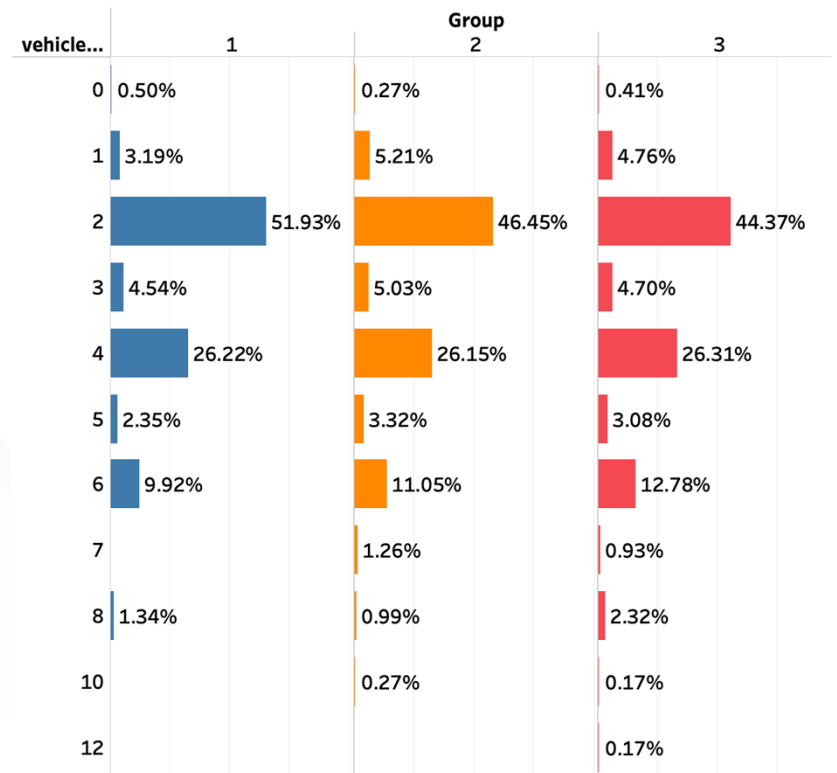
Dependent variable with Group 1,2,3

6. Posted speed limit and estimated travel speed (mph)

- Group 1 occurred on a low-speed road compared to Group 3.
- The estimated speed of the crashes in Group 1 was lower than that in Group 3
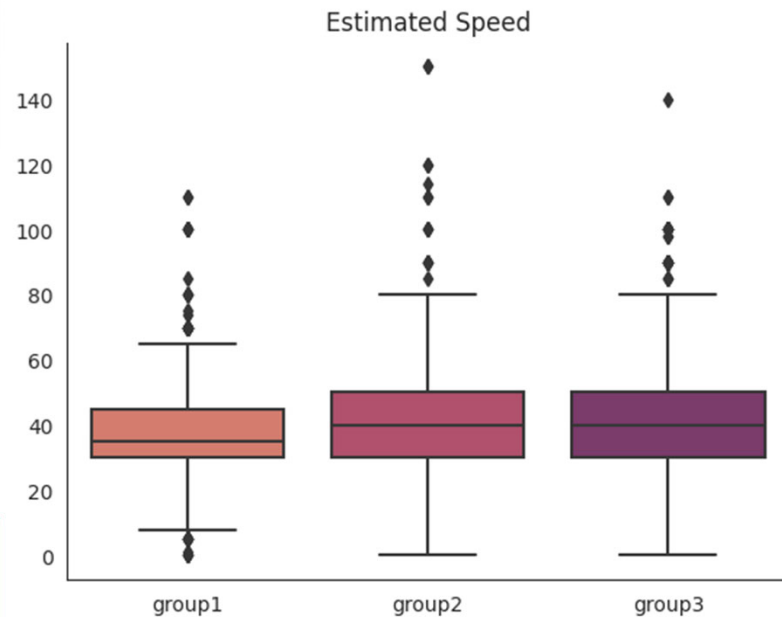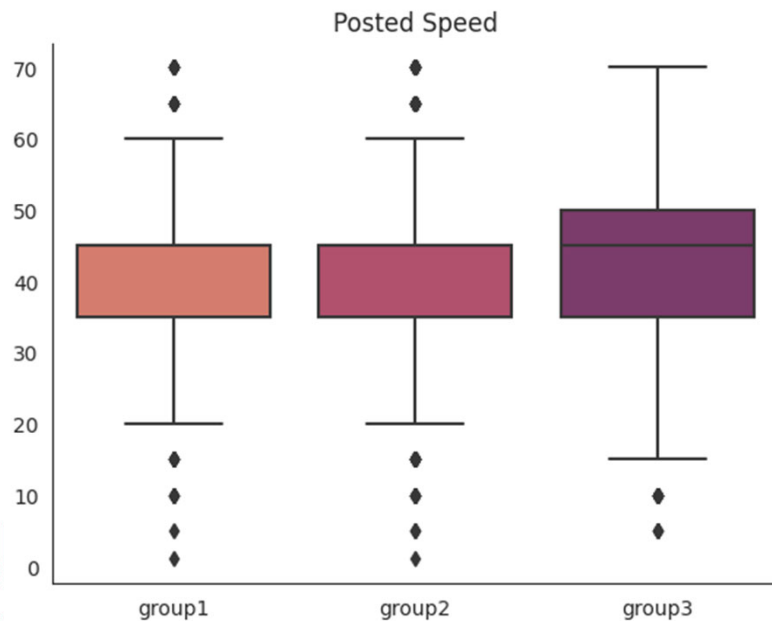
Novice Riders (In Florida)

- **Group 1:** Durations 0 to 3 months
- **Group 2**: Durations 4 to 14 months
- **Group 3**: Durations 15-60 months

Conclusion

- Newly endorsed motorcycle riders have a higher likelihood of being involved in single-vehicle motorcycle crashes within the first three months of receiving their endorsement.

- Two common contributing factors to these crashes are riders following too closely and failing to negotiate curves.

- Negative or risky behaviors such as alcohol or drug use and speeding are more common among riders in Group 2 (those who have been riding for 4 -14 months) and Group 3 (those who have been riding for 14 months or more).

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