ITSMR Research Note

KEY FINDINGS

F&PI Motorcycle Crashes involving alcohol: 2014-2018

- 26% of the fatal MC crashes were alcohol-related; less than 3% of the personal injury MC crashes were alcohol-related.
- 76% of the alcohol-related F&PI MC crashes occurred Upstate; 13% on Long Island and 11% in New York City.
- 53% of the alcohol-related F&PI MC crashes occurred on weekends.

Alcohol-Impaired Motorcycle Operators: 2014-2018

- 51% of the impaired motorcyclists were ages 21-39, with 25% being ages 21-29 and 26% being ages 30-39.
- 84% of the impaired motorcyclists were using a helmet.
- 46% of the impaired motorcyclists had "unsafe speed" reported as a contributing factor.

Motorcycle Models & Engine Sizes: 2018

- 31% of the motorcycles involved in F&PI crashes were Sport models, followed by Custom models (18%).
- 42% of the motorcycles involved in F&PI crashes had engine sizes between 501 and 1,000 cc, 21% had engine sizes between 1,001 and 1,500 cc and 18% had engine sizes greater than 1,500 cc.

Conclusions

- Despite decreases in the number of alcohol-impaired F&PI motorcycle crashes in recent years, the proportion of fatal and personal injury MC crashes that are alcohol-related has remained unchanged. This result should be of concern to the alcohol and highway safety community, in particular the GTSC, the NYS Advisory Council on Impaired Driving, and DMV's Advisory Group on Motorcycle Safety, in the development of countermeasures that address the problem of impaired driving among motorcyclists in New York State.

Study on Motorcyclists and Alcohol-Impaired Driving in New York State

Introduction

In 2013, a study by the Institute for Traffic Safety Management and Research (ITSMR) found that motorcycle licenses, motorcycle registrations and the three-year moving averages for alcohol-related fatal and personal injury motorcycle crashes were all on a general upward trend during the five-year period, 2008-2012. The study further found that 27% of the fatal MC crashes and 3% of the personal injury MC crashes were alcohol-related.

Because MC licenses and registrations have been on a downward trend over the past few years, with licenses peaking in 2017 at 754,601 and registrations peaking in 2016 at 350,420 (Figure 1), the Governor's Traffic Safety Committee (GTSC) recently funded ITSMR to update its 2013 study. This 2019 study focused on police-reported fatal and personal injury (F&PI) motorcycle crashes, with an emphasis on alcohol-related F&PI motorcycle crashes, that occurred during the five-year period 2014-2018.

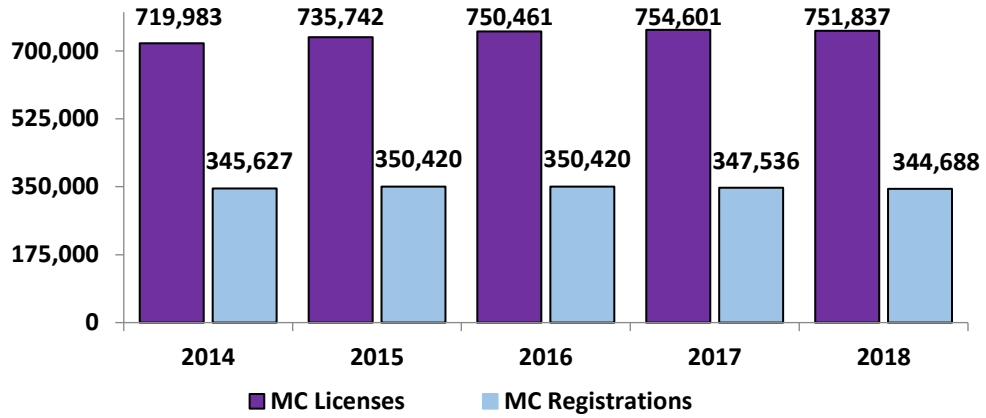
This Research Note presents Information on these crashes and the drivers and vehicles involved as follows:

- Overview of Fatal and Personal Injury Crashes
  - ✓ Motorcyclists killed or injured
  - ✓ Single vehicle involvement
  - ✓ Region of the state
  - ✓ Month, day of week & time of day
- Impaired Motorcycle Operators
  - ✓ Age & gender
  - ✓ Helmet use
  - ✓ Contributing factors
  - ✓ Tickets issued to motorcycle operators
- Motorcycle Models and Engine Sizes

New York State defines an alcohol-related motor vehicle crash as one in which at least one of the following three factors is present: 1) "alcohol involvement" was noted as a contributing factor on the police crash report form, 2) a ticket for impaired driving was issued to one or more drivers involved in the crash or 3) a BAC was reported for the impaired driver, pedestrian or bicyclist involved.

The data sources for the study were the NYS Department of Motor Vehicles' Accident Information System (AIS) system and Vehicle Registration file. The NYS crash data can be viewed through its Traffic Safety Statistical Repository (TSSR) at www.Itsmr.org/tssr.

FIGURE 1: NYS Motorcycle Licenses and Registrations



Overview of Fatal and Personal Injury Crashes

Based on the above definition, the proportion of fatal motorcycle crashes involving alcohol fluctuated over the five years, ranging from a high of 30% in 2014 to a low of 19% in 2016 (Table 1). In comparison, the proportion of personal injury motorcycle crashes involving alcohol remained at approximately 3% in each of the five years.

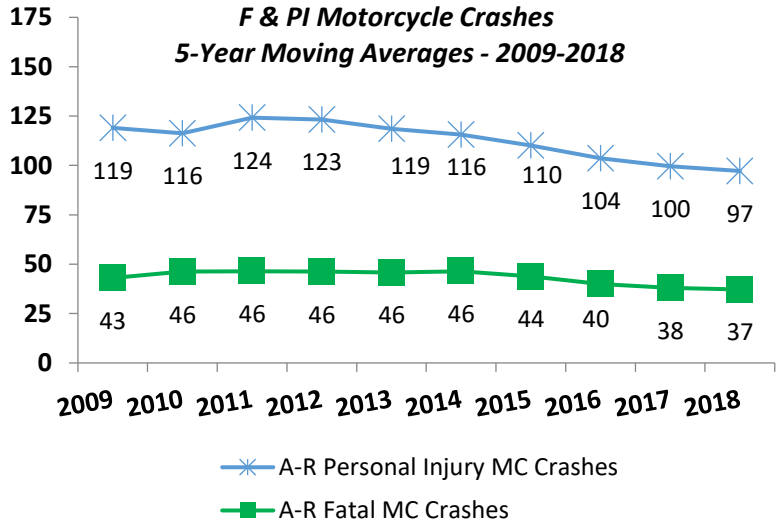
TABLE 1: NYS Police-Reported Fatal & Personal Injury (F & PI) Motorcycle Crashes

	2014	2015	2016	2017	2018	2014-18
Total F&PI Motorcycle Crashes	4,005	3,947	4,151	3,933	3,708	19,744
Fatal MC Crashes	142	155	134	143	149	723
Alcohol-Related Fatal Crashes	43	44	25	35	39	186
% of all fatal MC crashes	*30.3%*	*28.4%*	*18.7%*	*24.4%*	*26.2%*	*25.6%*
Personal Injury MC Crashes	3,863	3,792	4,017	3,790	3,559	19,021
Alcohol-Related Injury Crashes	92	93	103	109	89	486
% of all injury MC crashes	*2.4%*	*2.5%*	*2.6%*	*2.9%*	*2.5%*	*2.6%*

Since moving averages are commonly used to smooth out short-term fluctuations in the data and highlight longer-term trends or cycles, five-year moving averages were computed for alcohol-related fatal and personal injury motorcycle crashes. Shown in Figure 2, the five-year moving averages indicate that both alcohol-related fatal and personal injury motorcycle crashes have been on a downward trend recently.

Since 2014, the five-year moving average of alcohol-related fatal MC crashes dropped from 46 to 37 in 2018, representing a decrease of 20%. Similarly, the five-year moving average of alcohol-related personal injury MC crashes fell from 116 in 2014 to 97 in 2018, a drop of 16%.

FIGURE 2: NYS Police-Reported Alcohol-Related F & PI Motorcycle Crashes 5-Year Moving Averages - 2009-2018



Motorcyclists Killed or Injured

During the five years, 2014-2018, motorcyclist fatalities accounted for 14% of total motor vehicle fatalities (Table 2). Table 2 further shows that 25% of the motorcyclist fatalities over those five years occurred in alcohol-related motorcycle crashes. With regard to motorcyclists injured in motor vehicle crashes, 2% were injured in alcohol-related motorcycle crashes.

TABLE 2: NYS Police-Reported F & PI Crashes - Motorcyclists Killed or Injured

	2014	2015	2016	2017	2018	2014-18
Total Statewide Fatalities	1,026	1,116	1,029	1,000	936	5,107
Motorcyclist Fatalities	146	160	130	143	150	729
% of total fatalities	*14.2%*	*14.3%*	*12.6%*	*14.3%*	*16.0%*	*14.3%*
Motorcyclist Fatalities in A-R Crashes	41	43	25	35	38	182
% of motorcyclist fatalities	*28.1%*	*26.9%*	*19.2%*	*24.5%*	*25.3%*	*25%*
Total Statewide Persons Injured	148,620	145,991	157,452	158,603	160,066	770,732
Motorcyclists Injured in Crashes	4,049	3,997	4,188	3,954	3,712	19,900
% of total persons injured	*2.7%*	*2.7%*	*2.7%*	*2.5%*	*2.3%*	*2.6%*
Motorcyclists Injured in A-R Crashes	92	94	102	106	87	481
% of motorcyclists injured	*2.3%*	*2.4%*	*2.4%*	*2.7%*	*2.3%*	*2.4%*

The analyses also examined specific characteristics of motorcycle crashes, including single vehicle involvement, crash location (i.e., region of the state), month, day of week and time of day. Since the data for these variables for the five years, 2014-2018, showed little variation among the years, the data were aggregated for the five years and the results from the analyses are presented below

Single Vehicle Involvement

As indicated in Table 3, over the five years 2014-2018, the proportions of fatal motorcycle crashes and personal injury motorcycle crashes that involved just the motorcycle (i.e., single vehicle and no pedestrian or bicyclist involvement) were similar, 36% and 39%, respectively. However, single vehicle fatal MC crashes were much more likely than single vehicle personal injury crashes to be alcohol-related (39% vs. 5%).

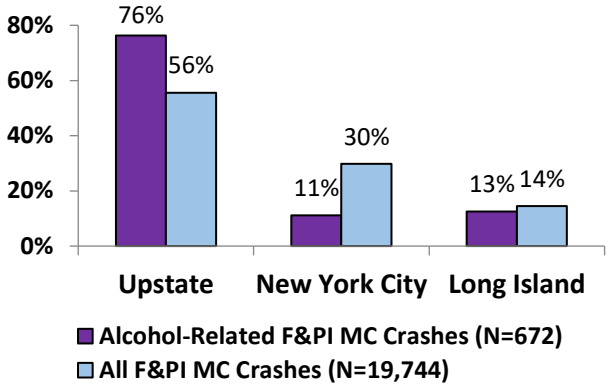
TABLE 3: NYS Police-Reported F & PI Motorcycle Crashes by Single Vehicle Involvement, 2014 - 2018

	Fatal MC Crashes (N=723)	**Personal Injury MC Crashes (N=19,021)**
Single Vehicle (SV) Motorcycle Crashes	261	7,478
% of total MC crashes	*36.1%*	*39.3%*
Alcohol-Related SV Motorcycle Crashes	101	365
% of total SV MC crashes	*38.7%*	*4.9%*

Region of the State

For the analyses by region, the state is divided into three regions: Upstate, Long Island and New York City. The Upstate region consists of the 55 counties north of New York City, the Long Island region includes Nassau and Suffolk counties and the New York City region is comprised of five counties (Bronx, Kings, New York, Queens and Richmond). Figure 3 shows that 56% of all F&PI motorcycle crashes occurred in the Upstate region, compared to 76% of the alcohol-related F&PI motorcycle crashes occurring Upstate. Only 11% of the alcohol-related crashes occurred in New York City and 13% on Long Island where 30% and 14% of the total F&PI crashes occurred, respectively.

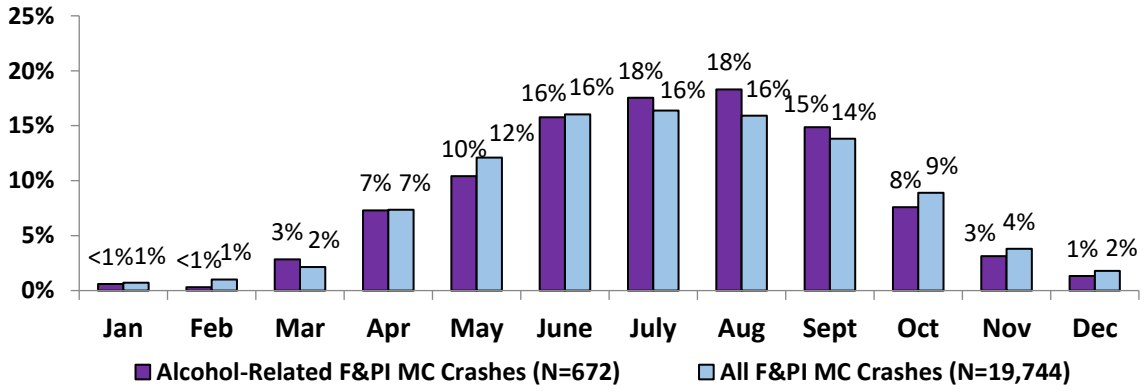
FIGURE 3: NYS Police-Reported F & PI Motorcycle Crashes by Region of the State, 2014 - 2018



Month, Day of Week and Time of Day

Additional analyses were undertaken by month of year, day of week and time of day to determine when alcohol-related motorcycle crashes are most likely to occur. As would be expected in New York State due to weather conditions, the motorcycle riding season extends primarily from May through September. Figure 4 shows that approximately eight out of ten alcohol-related F&PI motorcycle crashes in the years 2014-2018 occurred during this five-month period. More than one-half (52%) of the alcohol-related F&PI motorcycle crashes occurred in June (16%), July (18%) and August (18%). Figure 4 further shows that the distribution of alcohol-related F&PI motorcycle crashes by month is similar to the distribution of all F&PI motorcycle crashes.

FIGURE 4: NYS Police-Reported F & PI Motorcycle Crashes by Month, 2014 - 2018



As indicated in Figure 5, over one-half (53%) of the alcohol-related F&PI motorcycle crashes occurred on weekends compared to 36% of all F&PI motorcycle crashes

FIGURE 5: NYS Police-Reported F & PI Motorcycle Crashes by Day of Week, 2014 - 2018

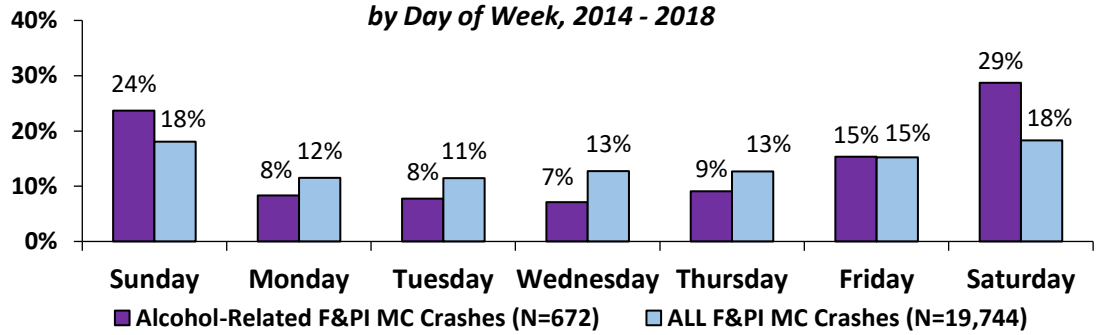
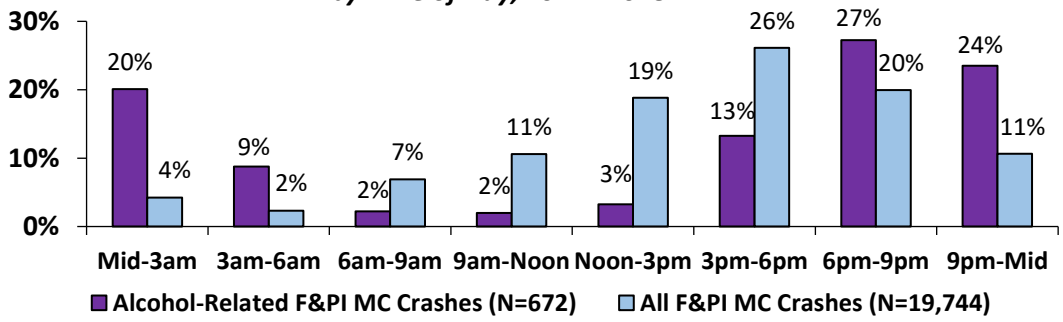


Figure 6 shows that alcohol-related F&PI motorcycle crashes were much more likely to occur between 6pm and Midnight than all F&PI motorcycle crashes (51% vs. 31%). Another 20% of the alcohol-related F&PI motorcycle crashes occurred between Midnight and 3am, compared to only 4% of all F&PI motorcycle crashes.

FIGURE 6: NYS Police-Reported F & PI Motorcycle Crashes by Time of Day, 2014 - 2018



IMPAIRED MOTORCYCLE OPERATORS

As shown in Table 4, the proportion of motorcycle operators impaired in fatal crashes has fluctuated between a high of 29% in 2014 and a low of 19% in 2016. In contrast, the proportion of impaired motorcycle operators involved in personal injury crashes remained constant at 2%-3% over the five years.

TABLE 4: NYS Police-Reported F & PI Crashes - Impaired Motorcycle Operators Involved

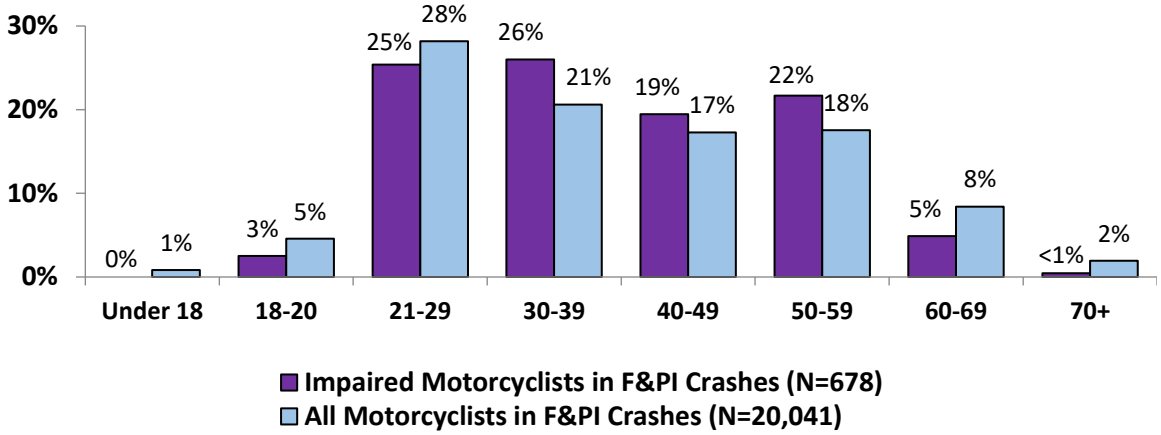
	2014	2015	2016	2017	2018	2014-18
Fatal MC Crashes						
MC Operators	147	161	136	149	151	744
Impaired MC Operators	43	44	26	35	40	188
% of All MC Operators in Fatal Crashes	*29.3%*	*27.3%*	*19.1%*	*23.5%*	*26.5%*	*25.3%*
Personal Injury MC Crashes						
MC Operators	3,929	3,868	4,062	3,834	3,604	19,297
Impaired MC Operators	93	95	103	109	90	490
% of All MC Operators in Injury Crashes	*2.4%*	*2.5%*	*2.5%*	*2.8%*	*2.5%*	*2.5%*

A series of analyses were conducted to examine various characteristics associated with impaired motorcyclists, including age, gender, helmet use and other contributing factors. Because analyses of the data for these variables for each of the five years, 2014-2018, showed little variation, the data were aggregated for the five years.

Age and Gender

With regard to gender, 98% of the impaired motorcyclists were men, compared to 94% of all motorcycle operators involved in F&PI crashes. With respect to age, Figure 7 shows that the largest proportions of the impaired motorcycle operators involved in F&PI crashes were in the age groups of 21-29 (25%) and 30-39 (26%). Similarly, the largest proportions of all motorcyclist operators were also ages 21-29 (28%) and ages 30-39 (21%).

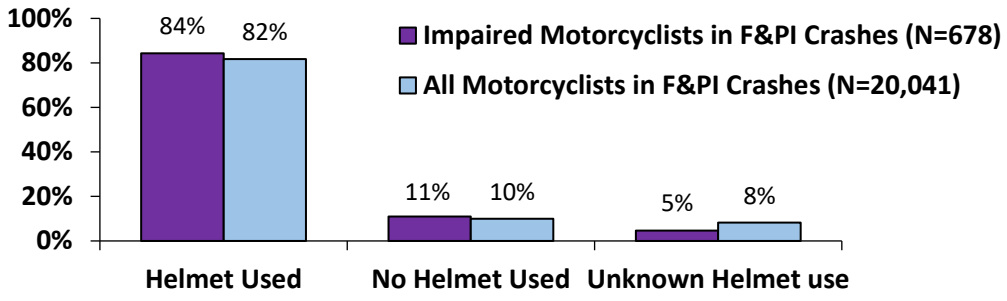
FIGURE 7: NYS Police-Reported F & PI Crashes
Motorcyclists Involved By Age, 2014 - 2018



Helmet Use

In New York State, motorcyclists are required to use a federally approved helmet when riding. Figure 8 shows that 84% of the impaired motorcycle operators involved in F&PI crashes were wearing a helmet, similar to the proportion of all motorcyclists in F&PI crashes (82%).

FIGURE 8: NYS Police-Reported F & PI Crashes
Motoryclists Involved by Helmet Use, 2014 - 2018



Contributing Factors

Analyses were conducted to determine the extent to which other contributing factors were associated with the impaired motorcycle operators involved in F&PI crashes. As shown in Table 5, 46% of the impaired motorcyclists involved in F&PI crashes between 2014 and 2018 also had "unsafe speed" reported as a contributing factor in the crash. Fourteen percent had "passing, improper lane usage or unsafe lane changing" reported as a contributing factor; 4% had "driver inexperience" reported as a contributing factor. Table 5 also shows the differences in contributing factors reported for impaired MC operators by the severity of the crash (fatal vs. personal injury). Unsafe speed is reported more often as a factor in fatal crashes than in personal injury crashes (60% vs. 40%).

TABLE 5: NYS Police-Reported F & PI Crashes Selected Contributing Factors Reported for Impaired Motorcycle Operators 2014- 2018			
	Impaired MC Operators		
Contributing Factors	F&PI Crashes (N=678)	Fatal Crashes (N=188)	Personal Injury Crashes (N=490)
Unsafe speed	45.7%	60.1%	40.2%
Passing/improper lane usage/unsafe lane changing	13.6%	12.8%	13.9%
Failure to keep right	6.8%	9.6%	5.7%
Driver inexperience	3.8%	6.9%	2.7%
Driver inattention/distraction	4.1%	7.4%	2.9%
Following too closely	2.9%	1.6%	3.5%

Tickets Issued to Motorcycle Operators

The final set of analyses examined the extent to which the surviving motorcycle operators were issued tickets for violations of the Vehicle and Traffic Law (VTL) as a result of the crash. The results are summarized in Table 6.

As would be expected, 9 out of 10 surviving MC operators in alcohol-related F&PI crashes were ticketed for impaired driving, compared to only 2% of all surviving drivers in motorcycle crashes. The surviving MC operators in alcohol-related crashes were much more likely than all surviving drivers to be ticketed for a speed violation (34% vs. 4%) or for unlicensed operation/ operating out-of-class (26% vs. 9%).

TABLE 6: NYS Police-Reported F & PI Crashes Tickets Issued to Surviving Motorcycle Operators 2014 - 2018		
Violation	Surviving MC Operators in Alcohol-Related F&PI Crashes (N=496)	Surviving MC Operators in F&PI Crashes (N=19,361)
Impaired driving	88.9%	2.3%
Speed	34.3%	4.4%
Unlicensed / operating out-of-class	26.4%	9.1%
Moved from lane unsafely	21.2%	1.8%
Aggravated unlicensed operation	15.1%	2.9%
Operating w/o insurance	13.3%	4.2%
Failure to keep right	10.9%	1.1%
Unregistered vehicle	10.7%	3.7%
Uninspected vehicle	10.3%	2.3%
No helmet	7.5%	1.3%

MOTORCYCLE MODELS & ENGINE SIZES

Using the Vehicle Identification Number (VIN), analyses were conducted to determine the model type and engine sizes of the motorcycles involved in F&PI crashes in 2018. For the 3,708 police-reported F&PI crashes involving motorcycles in 2018, a VIN was available for 3,335 motorcycles. A file of these VINs was sent to the National Highway Traffic Safety Administration (NHTSA) for imported into their VIN Decoder program. The results of the analyses are presented below.

As seen in Table 7, of the 3,335 motorcycles for which a VIN was available, the largest proportion of motorcycles involved in motor vehicle crashes in 2018 were Sport models (31%), followed by Custom models (18%). Approximately 13% of the motorcycles involved were Touring bikes and another 12% were Cruisers. With regard to engine size, the largest proportion (42%) of motorcycles were between 501 and 1,000 cc, followed by motorcycle with engine sizes of 1,001-1,500 cc (21%). Table 7 also shows that 18% of the motorcycles involved in F&PI cases had the largest engine sizes, 1,500 cc and above; 15% of the motorcycles had the smallest engine size, 500 cc or less.

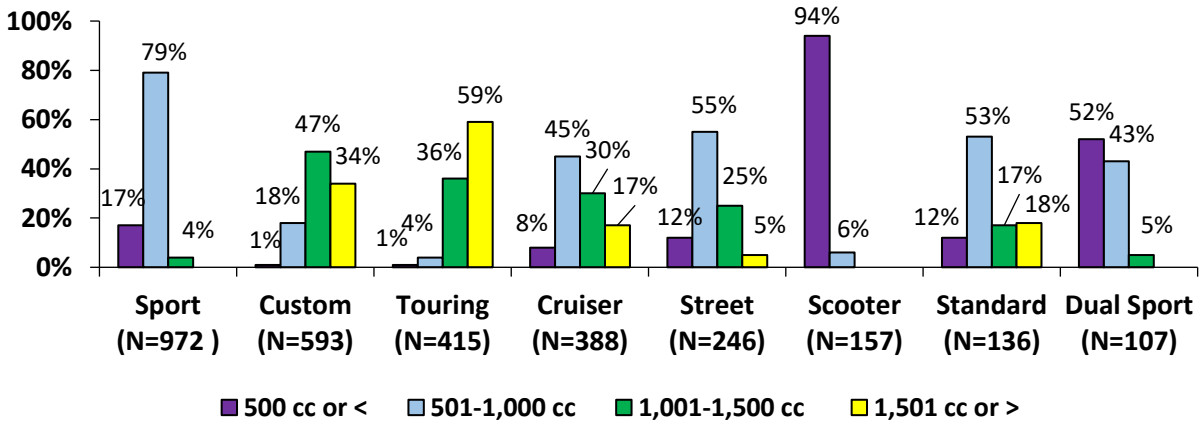
TABLE 7: NYS Police-Reported F&PI Motorcycle Crashes - Model Types & Engine Sizes Involved, 2018

Model Type	In F&PI Crashes (N=3,335)
Sport	31.1%
Custom	17.8%
Touring	12.6%
Cruiser	11.9%
Street	7.7%
Scooter	4.9%
Standard	4.6%
Dual Sport	3.3%
Other*	1.6%
Unknown	4.5%
Engine Size	
Up to 500 cc	15%
501- 1,000 cc	42%
1,001 – 1,500 cc	21%
1,501 & Higher cc	18%
Unknown	4%

**Other includes the following models; Dirt Bike, Enduro Off-Road, Mini-Bike, Moped, Motorcross, Trikes and 3 Wheel Autocycle.*

Figure 9 shows the distribution of motorcycle types by engine size. As might be expected, Scooters were the most likely model to have an engine size of 500 cc or less, while Touring models were the most likely to have an engine size of 1,500 cc or more.

FIGURE 9: NYS Police-Reported F&PI Crashes Motorcycle Model Types by Engine Size, 2018



SUMMARY AND CONCLUSIONS

As indicated previously, an earlier study on motorcyclists and alcohol-impaired driving conducted by ITSMR In 2013 found that motorcycle licenses, motorcycle registrations and the three-year moving averages for alcohol-related fatal and personal injury motorcycle crashes were all on a general upward trend during the five-year period, 2008-2012. The 2013 study also found that 27% of the fatal MC crashes and 3% of the personal injury MC crashes were alcohol-related. As summarized below in Table 10, the differences noted between the 2013 five-year study (2008-2012) and this 2019 five-year study (2014-2018) include:

- Although alcohol-related fatal MC crashes declined 19% and alcohol-related personal injury MC crashes dropped 21% between the five-year periods of 2008-12 and 2014-18, the proportions of alcohol-related fatal and personal injury crashes to the totals basically remained unchanged (26% vs. 27% for fatal crashes and 3% vs. 3% for personal injury crashes).
- 53% of the alcohol-related F&PI motorcycle crashes occurred on weekends in 2014-18, up from 48% in 2008-12.
- 76% of the alcohol-impaired F&PI MC crashes occurred Upstate in 2014-18, down from 84% in 2008-12.
- 51% of the alcohol-impaired MC operators were ages 21-39 in 2014-18, up from 46% in 2008-12.
- Similar proportions of the alcohol-impaired MC operators in the time periods 2008-12 and 2014-18 (47% and 46%, respectively) had "unsafe speed" noted as a contributing factor in their crash.

TABLE 10: NYS Police-Reported F & PI Motorcycle Crashes
Comparison of 2008-2012 and 2014-2018

	2008-2012 (N=22,944)	*2014-2018 (N=19,744)*	Change 2008-12 vs 2014-18
Fatal MC Crashes	**848**	**723**	**-15%**
Alcohol-Related Fatal Crashes	231	186	-19%
% of all fatal MC crashes	*27%*	*26%*	*-1 point*
Personal Injury MC Crashes	**22,096**	**19,021**	**-14%**
Alcohol-Related Injury Crashes	616	486	*-21%*
% of all injury MC crashes	*3%*	*3%*	*No change*
Alcohol-Related F & PI MC Crashes			
	(N=847)	(N=672)	
Weekends (Sat-Sun)	48%	53%	*+ 5 points*
Region of the State			
Upstate	84%	76%	*- 8 points*
NYC	7%	11%	*+4 points*
Long Island	9%	13%	*+4 points*
Alcohol-Impaired MC Operators			
Age	(N=850)	(N=678)	
21 - 39	46%	51%	*+5points*
40 - 59	47%	41%	*-6 points*
Key Contributing Factor			
Unsafe speed	47%	46%	*-1 point*

The results of this study should be useful to the alcohol and highway safety community, in particular the GTSC, the NYS Advisory Council on Impaired Driving, and DMV's Advisory Group on Motorcycle Safety, in the development of countermeasures that address the problem of alcohol-impaired driving among motorcyclists in New York State.

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