Motorcycle Crashes 360° Approach Prepared By: National Study Center for Trauma & EMS (NSC) University of Maryland, Baltimore

Prepared For: Maryland Motor Vehicle Administration – Maryland Highway Safety Office Maryland Department of Transportation



Maryland Highway Safety Office

Background

- The previous report, published by the National Study Center (NSC) in 2016, supported discussions at the Motorcycle Safety Summit held in June 2018.
- This is the first preliminary report since 2016 and is intended to highlight new trends and insights based on the latest data. The findings aim to guide next steps and potential initiatives for improving motorcycle safety in Maryland.
- Based on data from the ACRS database for 2019 to 2023, this report presents a comprehensive overview of motorcycle crashes in Maryland, including detailed information on the operators and vehicles involved.
- The analysis includes tables, and summaries of key demographics, covering factors such as age, gender, impairment/speed, single- vs. multi-vehicle incidents, and helmet use among motorcyclists involved in crashes.

Data Sources

• Maryland Crash Reports (ACRS): Data derived from all reported motorcycle crashes from 2019 to 2023.

Selection Criteria

• Includes all motorcycle crashes recorded between 2019 and 2023.

Definitions

- **Motorcycle Crashes**: Defined as crashes involving at least one vehicle with a body type coded as '01' (motorcycle).
- **Crash Severity**: Categorized by the highest KABCO injury score for any motorcycle driver or passenger involved:
 - No Injury/ Minor Injury KABCO 1, 2, or 3
 - Serious Injury/ Fatal Injury KABCO 4 or 5
- **Operator Age**: Ages recorded as 0 or greater than or equal to 90 are treated as "age unknown".

Summary

• Results/Findings

MD Motorcycle Involved Crashes 2019-2023



- Between 2019 and 2023, 7,016 Motorcyclists (Operators and Passengers) were involved in crashes on Maryland roads.
 - ▶ Of these, 1,975 (28.1%) resulted in serious injuries or fatalities.
 - Fatalities accounted for 19.5% of all serious injury and fatality cases, with about 395 motorcyclists killed on Maryland roads between 2019 and 2023.







The trend over time based on the data from 2019 to 2023 shows a mixed pattern in the severity of injuries sustained by people involved in crashes:

- No/Minor Injury Crashes: The proportion of people involved in crashes who experienced no/minor injuries decreased from 74.1% in 2019 to 70.38% in 2023. This indicates a gradual reduction in the share of crashes resulting in minor or no injuries.
- Severe Injury Crashes: The percentage of people involved in crashes experiencing severe injuries increased from 20.31% in 2019 to 23.81% in 2023. This suggests a rising proportion of people experiencing severe injuries over time.
- Fatal Injury Crashes: The proportion of people involved in crashes resulting in fatalities increased slightly from 5.57% in 2019 to 5.81% in 2023, showing a modest but consistent rise in the share of crashes with fatal outcomes each year.

Overall, the data reveals a trend where the severity of crashes appears to be increasing over time. The proportion of severe injury crashes is rising, while no/minor injury crashes are decreasing slightly. Fatal injury crashes show a small but steady increase, indicating a growing impact of crashes over time.

Comprehensive Motorcycle Crash Summary (2019-2023)				
	Cotogonias	N	0/	
By Condor	Famala	752	10 7%	
by Genuer	Mala	5 008	85 50/	
	Unknown	266	2 80%	
	Total Number of Motorcyclists	200	5.070	
	(Operators and Passengers)	7,016	100%	
By Age group	15 and under	87	1.2%	
	16	32	0.5%	
	17	47	0.7%	
	18	89	1.3%	
	19	135	1.9%	
	20	151	2.2%	
	21-24	733	10.5%	
	25-29	921	13.1%	
	30-34	842	12.0%	
	35-39	721	10.3%	
	40-44	509	7.3%	
	45-49	499	7.1%	
	50-54	640	9.1%	
	55-59	565	8.1%	
	60-64	392	5.6%	
	65-69	242	3.5%	
	70-79	132	1.9%	
	80 +	12	0.2%	
	Unknown	267	3.8%	
	Total Number of Motorcyclists			
	(Operators and Passengers)	7,016	100%	
By Impairment	Impaired	330	5.0%	
	Not Impaired	6,234	95.0%	
	Motorcyclist Operators	6,564	100%	
By Speeding	Speeding	1,043	15.9%	
	Not Speeding	5,521	84.1%	
	Motorcyclist Operators	6,564	100%	
By Hemet Use	Unhelmeted	2,073	29.5%	
	Helmeted	4,943	70.5%	
	Total Number of Motorcyclists	7,016	100%	
	(Operators and rassengers)			

Comprehensive Motorcycle Crash Summary (2019-2023)				
Categories		Ν	%	
By Collision				
Туре	Single Vehicle Crash	2,472	38.7%	
	Multi-Vehicle Crash	3,342	52.3%	
	Other	575	9.0%	
	Total Number of Crash Reports	6,389	100%	

Comprehensive Motorcycle Crash Summary (2019-2023)

Between 2019 and 2023, a total of 6,389 motorcycle crashes occurred, involving 7,016 people. There was an 8.2% increase in the number of motorcycle crashes from 1,216 in 2019 to 1,316 in 2023. Out of these, 6,564 were motorcyclists (operators), and the remaining 452 were passengers. The data provides a detailed breakdown of the characteristics of these crashes, focusing on various factors such as gender, age, impairment, speeding, helmet use, and the type of collision.

Gender and Person Type Distribution:

In terms of gender, the majority of people involved in motorcycle crashes were male (85.5%), totaling 5,998 individuals. Female individuals accounted for 10.7% of the total, with 752 females involved in crashes. The remaining 266 individuals (3.8%) had an unknown gender. This gender disparity is consistent with broader trends, where males are more likely to be involved in motorcycle crashes due to higher overall motorcycle usage.

When we break the data down by person type (operator vs. passenger), we see a clearer distribution. Among the 6,564 drivers, 5,927 were male drivers (90.3%) and 374 were female drivers (5.7%). The remaining 263 drivers had an unknown gender (4.0%). In terms of passengers, there were 452 passengers in total. Of these, 378 were female passengers (83.6%) and 71 were male passengers (15.7%). The remaining 3 passengers had an unknown gender (0.7%).

This breakdown highlights that male drivers dominate the data as the largest group involved in crashes, reflecting the higher overall male participation in motorcycling. Interestingly, females make up the majority of passengers involved in crashes, accounting for more than 80% of the passenger group. This disparity between the gender distribution of drivers and passengers suggests that female passengers may be more frequently involved in crashes relative to their lower representation among riders.

Age Group Analysis:

Age-wise, the most significant portion of crash involvement was in the 21-29 age group (23.6%), with 1,654 people. The distribution across other age groups reveals that younger individual, especially those between 21-39 years old, represented a large share of the crashes. For example, the 30-34 age group had 842 individuals (12%), and the 35-39 age group had 721 individuals (10.3%). Conversely, older motorcyclists over the age of 50 made up a smaller portion of the crash data, with those aged 50-59 accounting for 17.2% of the crashes. The youngest group, 15 and under, had the fewest crashes, representing just 1.2% of the total.

Impairment Status:

Regarding impairment, the majority of motorcyclists were not impaired at the time of the crash. Specifically, 95% (6,234 motorcyclists) were not impaired, while only 5% (330 motorcyclists) were found to be impaired. This suggests that impairment, although a contributing factor in a small proportion of crashes, is not the predominant cause in this dataset.

Speeding Factor:

Speeding was a factor in 15.9% of the crashes, with 1,043 motorcyclists involved in speeding-related incidents. The remaining 84.1% (5,521 motorcyclists) were not speeding at the time of their crash. This highlights that, while speeding is a significant factor, the majority of crashes involved motorcyclists who were not exceeding speed limits.

Helmet Use:

Out of a total of 7,016 motorcyclists (including operators and passengers), 70.5% (4,943) were helmeted, while 29.5% (2,073) were unhelmeted. Specifically, among motorcyclists/drivers involved in crashes, 70.2% (4,610) wore helmets, while 29.8% (1,954) did not. This indicates a concerning trend, as a significant portion of motorcyclists involved in crashes were unprotected, which could have serious implications for injury severity in these incidents.

Collision Type:

When considering the type of collisions, multi-vehicle crashes were the most common, making up 52.3% of the incidents (3,342 crashes). In contrast, single-vehicle crashes accounted for 38.7% of the total (2,472 crashes). Other types of collisions made up the remaining 9% (575 crashes). This breakdown suggests that, while many crashes involved a single vehicle, over half of the crashes were the result of collisions with other vehicles, which likely contributed to the severity of these crashes.

Conclusion

The analysis of motorcycle crashes from 2019 to 2023 provides key insights into the demographics, behaviors, and conditions associated with these incidents. Male motorcyclists, particularly in younger age groups, overwhelmingly dominate crash involvement, with the most affected age range being 21-39 years. Interestingly, females are more commonly represented as passengers, highlighting a gender-based distribution between operators and passengers in motorcycle incidents.

The trend over time from 2019 to 2023 reveals an increasing severity of injuries for people involved in crashes, with severe injury crashes rising and a slight decrease in no/minor injury crashes. Fatal injury crashes have shown a small but steady increase, highlighting the need for improved safety measures such as enhanced helmet use and enforcement. Despite high rates of non-impairment, factors such as speeding and helmet non-use emerge as significant risk factors, with approximately 16% of crashes involving speeding and nearly 30% of motorcyclists not wearing helmets at the time of the crash. Helmet use shows a concerning trend, as non-helmeted riders are likely to face higher injury severity, underscoring the importance of helmet laws and enforcement.

Collision types reveal that over half of the incidents involve multiple vehicles, suggesting that interactions with other vehicles on the road contribute to the frequency and potential severity of crashes. In contrast, single-vehicle crashes, though less common, still represent a substantial portion of incidents, likely tied to factors like speeding or loss of control.

These trends highlight the ongoing need for enhanced safety measures to reduce crash severity and improve overall motorcycle safety.