Traffic Safety Facts
Research Note

NHTSA
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DOT HS 811 149 July 2009

Motorcyclists Injured in Motor Vehicle Traffic Crashes

Summary of Findings

The number of people injured in motor vehicle traffic crashes, as estimated from NHTSA's National Automotive Sampling System (NASS) General Estimate System (GES) has declined from 1999 onwards; however, estimates of motorcyclists injured in crashes have increased each year since 1998. Motorcyclists injured in crashes have increased by 110 percent from 1998 to 2007. Data for the past 10 years (1998-2007) was researched to see various trends among motorcyclists injured in motor vehicle crashes. Following is a summary of findings from this research note:

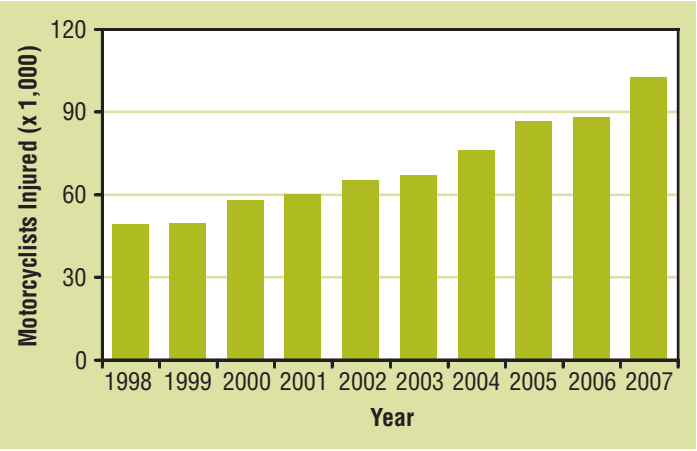
- The proportion of motorcyclists injured in crashes (single-vehicle/multivehicle) has remained almost the same (about 50%).
- More than two-thirds of the motorcyclists injured were in crashes during the months from April through September.
- The proportion of motorcyclists injured in crashes by day of week (weekday versus weekend) has remained almost the same (55% versus 45%).
  - However, based on the number of hours during weekdays and weekends the injury rate was nearly 1.5 times higher during weekends than during weekdays.
- Of the motorcyclists injured, more than 60 percent were in crashes that occurred during daytime.
- Across all 10 years, about 90 percent of the motorcyclists injured in crashes were motorcycle riders (operators) and 10 percent were motorcycle passengers.
- The proportion of motorcyclists injured in alcohol-related crashes has remained almost the same (10% in 1998 to 9% in 2007).
- Nearly 85 percent of the motorcyclists injured in crashes each year are male and about 15 percent are female.
- Motorcyclists injured in crashes increased among all age groups.
  - The largest number of motorcyclists injured in each year was in the 20-29 age group.

Introduction

Of the 2,491,000 people who were injured in motor vehicle crashes on the Nation's highways in 2007, 103,000 (4%) were motorcyclists. Motorcyclists injured in motor vehicle crashes in the last 10 years (1998-2007), have increased by 110 percent, from 49,000 in 1998 to 103,000 in 2007. Figure 1 shows motorcyclists injured in crashes in the past 10 years. The data used is from the NHTSA's National Automotive Sampling System

General Estimate System. NASS GES contains data from a nationally representative sample of police-reported crashes of all severities, including those that result in death, injury, or property damage. Data presented from NASS GES are estimates and are subject to sampling errors (see Appendix C of Traffic Safety Facts each year for more information on these errors). This Research Note analyzes data on motorcyclists injured in police-reported crashes (fatal crashes and injury crashes) by different characteristics. For comparison with motorcyclist fatalities in crashes, a detailed report on motorcyclist fatality trends and characteristics, titled *Recent Trends in Fatal Motorcycle Crashes: An Update* (DOT HS 810 606) is available at: www-nrd.nhtsa.dot.gov/Pubs/810606.PDF.

Figure 1
Motorcyclists Injured in Motor Vehicle Crashes, 1998–2007



Data Analysis

The data analysis in this Research Note looks at motorcyclists injured in motor vehicle crashes over the 10-year period (1998-2007) by the type of crash (single-vehicle/multivehicle), day of week (weekday/weekend) and by other factors such as alcohol involvement, helmet use, age group, sex, and person type of the motorcyclist injured. The data in this Research Note was rounded to the nearest thousand. However, percentages were calculated before rounding, hence row totals may not add up to individual cells.

Motorcyclists Injured, by Crash Type

Of the 103,000 motorcyclists injured in crashes in 2007, 50,000 (48%) were in single-vehicle crashes and 53,000 (52%) were in multivehicle crashes. The number of motorcyclists injured in single-vehicle motorcycle crashes increased by 108 percent from 24,000 in 1998 to 50,000 in 2007. Motorcyclists injured in multivehicle crashes also increased, by 112 percent from 25,000 in 1998 to 53,000 in 2007. However, the proportion of motorcyclists injured by crash type (single-vehicle versus multivehicle) in the past 10 years has remained almost the same. Table 1 shows motorcyclists injured in crashes by crash type and year.

Table 1
Motorcyclists Injured in Motor Vehicle Traffic Crashes, By Crash Type and Year

Calendar Year	Crash Type				Total	
	Single-Vehicle		Multivehicle			
	Number	Percent	Number	Percent	Number	Percent
1998	24,000	49	25,000	51	49,000	100
1999	23,000	46	27,000	54	50,000	100
2000	28,000	48	30,000	52	58,000	100
2001	28,000	47	32,000	53	60,000	100
2002	33,000	51	32,000	49	65,000	100
2003	32,000	48	35,000	52	67,000	100
2004	38,000	50	38,000	50	76,000	100
2005	44,000	50	43,000	50	87,000	100
2006	43,000	49	44,000	51	88,000	100
2007	50,000	48	53,000	52	103,000	100

Source: NHTSA, NCSA, NASS GES 1998-2007

Motorcyclists Injured, by Quarter

Motorcyclists injured in crashes in 2007 when examined at a quarterly basis show that the highest number of motorcyclists injured, 37,000 (36%), were injured during July through September, followed by 33,000 (32%) from April through June, 17,000 (17%) from October through December, and 16,000 (15%) during January through March. More than two-thirds (68%) of the motorcyclists injured in crashes in 2007 were injured during the period April through September. April to September is the high riding season for motorcyclists. Motorcyclists injured in the past 10 years (1998 to 2007) during April through September ranged from 67 percent to 73 percent. Table 2 shows motorcyclists injured in crashes by quarter and year.

Table 2
Motorcyclists Injured in Motor Vehicle Traffic Crashes, By Quarter and Year

Calendar Year	Motorcyclists Injured by Quarter								Total	
	January-March		April-June		July-September		October-December			
	Number	%	Number	%	Number	%	Number	%	Number	%
1998	4,000	8	16,000	33	19,000	40	9,000	19	49,000	100
1999	6,000	12	17,000	33	17,000	34	11,000	21	50,000	100
2000	9,000	15	17,000	29	22,000	38	10,000	18	58,000	100
2001	7,000	11	22,000	37	20,000	34	11,000	18	60,000	100
2002	7,000	10	21,000	33	26,000	39	11,000	17	65,000	100
2003	9,000	13	21,000	31	24,000	36	13,000	20	67,000	100
2004	10,000	14	24,000	32	28,000	37	13,000	17	76,000	100
2005	8,000	10	27,000	31	35,000	40	17,000	19	87,000	100
2006	12,000	13	31,000	36	28,000	32	17,000	19	88,000	100
2007	16,000	15	33,000	32	37,000	36	17,000	17	103,000	100

Source: NHTSA, NCSA, NASS GES 1998-2007

Motorcyclists Injured, by Day of Week

Among the motorcyclists injured in crashes in 2007, 57,000 (55%) were injured in crashes that occurred during weekdays and 46,000 (45%) were injured in crashes during weekends. In the past 10 years this trend has remained almost the same except for year 2002 when the proportions of motorcyclists injured in crashes during weekday and weekends were the same. NHTSA uses the following definitions for "weekday" and "weekend":

Weekday: 6 a.m. Monday to 5:59 p.m. Friday.
Weekend: 6 p.m. Friday to 5:59 a.m. Monday.

Based on the definition above, the number of hours during a weekend is 60 (2½ days) and during weekdays is 108 (4½ days). The total number of weekend days during a year is 130 (52 weeks x 2½ days) and the total number of weekdays during a year is 234 (52 weeks x 4½ days). In 2007, there were 57,000 motorcyclists injured during weekdays, which translates to an average of 244 motorcyclists injured per day. During weekends there were 46,000 injured, which translates to an average of 354 motorcyclists injured per day. Hence, in 2007, the injury rate (per time period) was nearly 1.5 times higher during weekends than during weekdays. This might suggest more recreational motorcycle riding during weekends. Table 3 shows motorcyclists injured in crashes by year and day of week.

Table 3
Motorcyclists Injured in Motor Vehicle Traffic Crashes, By Day of Week and Year

Calendar Year	Day of Week				Total	
	Weekday		Weekend			
	Number	Percent	Number	Percent	Number	Percent
1998	27,000	55	22,000	45	49,000	100
1999	26,000	53	24,000	47	50,000	100
2000	31,000	54	27,000	46	58,000	100
2001	34,000	57	26,000	43	60,000	100
2002	32,000	50	32,000	50	65,000	100
2003	37,000	55	30,000	45	67,000	100
2004	42,000	54	35,000	46	76,000	100
2005	48,000	55	40,000	45	87,000	100
2006	49,000	56	38,000	44	88,000	100
2007	57,000	55	46,000	45	103,000	100

Source: NHTSA, NCSA, NASS GES 1998-2007

Motorcyclists Injured, by Time of Day

Nearly two-thirds (67,000) of the motorcyclists injured in 2007 were injured in crashes that occurred during daytime, and 35 percent (36,000) were injured during nighttime crashes. In all the years the number of motorcyclists injured in daytime crashes was more than 60 percent except in year 1998. Motorcyclists injured during daytime crashes in the 10 year period (1998-2007) have ranged from a low of 58 percent in 1998 to a high of 67 percent in 2002. Table 4 shows motorcyclists injured in crashes by time of day and year.

Table 4
Motorcyclists Injured in Motor Vehicle Traffic Crashes, By Time of Day and Year

Calendar Year	Time of Day				Total	
	Nighttime		Daytime			
	Number	Percent	Number	Percent	Number	Percent
1998	20,000	42	29,000	58	49,000	100
1999	20,000	39	30,000	61	50,000	100
2000	20,000	35	38,000	65	58,000	100
2001	22,000	37	38,000	63	60,000	100
2002	22,000	33	43,000	67	65,000	100
2003	24,000	36	43,000	64	67,000	100
2004	28,000	37	48,000	63	76,000	100
2005	32,000	37	55,000	63	87,000	100
2006	31,000	35	57,000	65	88,000	100
2007	36,000	35	67,000	65	103,000	100

Source: NHTSA, NCSA, NASS GES 1998-2007

Motorcyclists Injured, by Person Type

Of the 103,000 motorcyclists injured in crashes in 2007, 94,000 (92%) were motorcycle riders (operators) and 9,000 (8%) were motorcycle passengers. In each of the years (1998 to 2007) about 90 percent of the motorcyclists injured were motorcycle riders and about 10 percent were motorcycle passengers. This trend is similar to the trend seen in motorcyclists killed in fatal crashes. From 1998 to 2007, the proportion of injured motorcycle riders in crashes has ranged from 87 percent to 92 percent and the proportion of injured motorcycle passengers in crashes has ranged from 8 percent to 13 percent. Table 5 shows motorcyclists injured in crashes by person type and year.

Table 5

Motorcyclists Injured in Motor Vehicle Traffic Crashes, By Person Type and Year

Calendar Year	Person Type				Total	
	Rider		Passenger			
	Number	Percent	Number	Percent	Number	Percent
1998	43,000	87	6,000	13	49,000	100
1999	45,000	89	5,000	11	50,000	100
2000	51,000	88	7,000	12	58,000	100
2001	54,000	90	6,000	10	60,000	100
2002	57,000	88	9,000	12	65,000	100
2003	61,000	91	6,000	9	67,000	100
2004	69,000	90	8,000	10	76,000	100
2005	79,000	90	8,000	10	87,000	100
2006	81,000	92	7,000	8	88,000	100
2007	94,000	92	9,000	8	103,000	100

Source: NHTSA, NCSA, NASS GES 1998-2007

Motorcyclists Injured in Alcohol-Related Crashes

In 2007, of the total motorcyclists injured, 9,000 (9%) were injured in crashes in which alcohol was involved. The proportion of motorcyclists injured in alcohol-related crashes has remained almost the same in the past 10 years, from 10 percent in 1998 to 9 percent in 2007. The proportion of motorcyclists injured in crashes when alcohol was involved ranged from a high of 13 percent in 2002 to a low of 7 percent in 2006. Table 6 shows total motorcyclists injured in crashes, and motorcyclists injured in alcohol-involved crashes. Alcohol involvement in a crash in GES is from a derived variable based on police-reported alcohol involvement, which indicates alcohol use for drivers, pedestrians, cyclists, and other types of non-motorists involved in the crash. GES does not collect blood alcohol concentration (BAC) data. Hence different BAC levels for motorcyclists injured in alcohol-related crashes cannot be obtained.

Table 6

Motorcyclists Injured in Crashes and Motorcyclists Injured In Alcohol-Related Crashes, by Year

Calendar Year	Motorcyclists Injured	Motorcyclists Injured in Alcohol-Related Crashes	
		Number	Percent
1998	49,000	5,000	10
1999	50,000	5,000	11
2000	58,000	7,000	11
2001	60,000	7,000	12
2002	65,000	8,000	13
2003	67,000	6,000	10
2004	76,000	9,000	12
2005	87,000	7,000	8
2006	88,000	6,000	7
2007	103,000	9,000	9

Source: NHTSA, NCSA, NASS GES 1998-2007

Motorcyclists Injured, by Helmet Use

Among the 103,000 motorcyclists injured in motor vehicle crashes in 2007, 65,000 (63%) were helmeted at the time of the crash, 31,000 (30%) were not helmeted, and helmet use was unknown for 7,000 (7%) of the motorcyclists injured. Helmet use from 1998-2007 among motorcyclists injured in crashes has ranged from a low of 55 percent in 2002 and 2003 to a high of 63 percent in 2007. Of the motorcyclists injured in crashes who were not helmeted, the proportion ranged from a high of 40 percent in 2002 to a low of 30 percent in 2006 and 2007. Table 7 shows motorcyclists injured in crashes by helmet use and year.

Table 7
Motorcyclists Injured in Motor Vehicle Traffic Crashes, By Helmet Use and Year

Calendar Year	Helmet Use						Total	
	Not Helmeted		Helmeted		Unknown			
	Number	%	Number	%	Number	%	Number	%
1998	17,000	35	29,000	59	3,000	6	49,000	100
1999	16,000	32	30,000	60	4,000	8	50,000	100
2000	20,000	35	32,000	56	5,000	9	58,000	100
2001	21,000	35	35,000	57	4,000	7	60,000	100
2002	26,000	40	36,000	55	3,000	5	65,000	100
2003	23,000	34	37,000	55	7,000	11	67,000	100
2004	25,000	33	44,000	58	7,000	9	76,000	100
2005	29,000	33	53,000	60	6,000	6	87,000	100
2006	26,000	30	53,000	61	8,000	9	88,000	100
2007	31,000	30	65,000	63	7,000	7	103,000	100

Source: NHTSA, NCSA, NASS GES 1998-2007

Motorcyclists Injured, by Gender

In 2007, of the 103,000 motorcyclists injured in crashes, 89,000 (87%) were males and 14,000 (13%) were females. About 85 percent of the motorcyclists injured in crashes each year were males and about 15 percent were females. Similar trends have been noticed among motorcyclists killed in fatal crashes. In the last 10 years, of the motorcyclists injured the proportion of male to female motorcyclists injured has ranged from 90 percent males to 10 percent females in 1999, to 83 percent males and 17 percent females in 2002. Table 8 shows motorcyclists injured in crashes by gender and year.

Table 8
Motorcyclists Injured in Motor Vehicle Traffic Crashes, By Gender and Year

Calendar Year	Gender				Total	
	Male		Female			
	Number	Percent	Number	Percent	Number	Percent
1998	41,000	84	8,000	16	49,000	100
1999	45,000	90	5,000	10	50,000	100
2000	48,000	84	9,000	16	58,000	100
2001	52,000	86	9,000	14	60,000	100
2002	54,000	83	11,000	17	65,000	100
2003	57,000	86	10,000	14	67,000	100
2004	66,000	86	11,000	14	76,000	100
2005	75,000	86	13,000	14	87,000	100
2006	77,000	88	11,000	12	88,000	100
2007	89,000	87	14,000	13	103,000	100

Source: NHTSA, NCSA, NASS GES 1998-2007

Motorcyclists Injured, by Age Group

Nearly one-third (32,000 or 31%) of the 103,000 motorcyclists injured in 2007 in crashes were in the 20-to-29 age group, the highest among all age groups. This was followed by 21,000 (21%) in the 40-to-49 age group, 18,000 (17%) in the 30-to-39 age group, 15,000 (15%) in the 50-to-59 age group, 9,000 (9%) in the under-20 age group and 8,000 (7%) in the above-59 age group. The number of motorcyclists injured from 1998 to 2007 increased among all age groups. Motorcyclists injured in the under-20 age group increased by 29 percent from 7,000 to 9,000, in the 20-to-29 age group from 13,000 to 32,000 (146% increase), in the 30-to-39 age group from 12,000 to 18,000 (50% increase), in the 40-to-49 age group from 9,000 to 21,000 (133% increase), in the 50-to-59 age group from 6,000 to 15,000 (150% increase) and in the above-59 age group from 2,000 to 8,000 (300% increase). The 20-to-29 and 40 and above age groups had the largest increase in motorcyclists injured in the past 10 years. Motorcyclists injured in the 20-to-29 group had the highest number in all the years. Table 9 shows motorcyclists injured in crashes by age group and year.

Table 9
Motorcyclists Injured in Motor Vehicle Traffic Crashes, by Age Group and Year

Calendar Year	Age Group												Total	
	< 20		20–29		30–39		40–49		50–59		> 59			
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
1998	7,000	13	13,000	27	12,000	25	9,000	19	6,000	11	2,000	4	49,000	100
1999	8,000	15	14,000	28	12,000	24	11,000	21	4,000	8	2,000	3	50,000	100
2000	5,000	9	18,000	31	13,000	23	11,000	19	8,000	13	3,000	5	58,000	100
2001	6,000	10	16,000	27	13,000	22	15,000	26	7,000	12	2,000	4	60,000	100
2002	8,000	13	17,000	27	14,000	21	14,000	21	8,000	13	3,000	5	65,000	100
2003	7,000	10	18,000	27	15,000	22	15,000	22	9,000	14	4,000	5	67,000	100
2004	9,000	11	20,000	27	15,000	20	17,000	23	11,000	14	4,000	6	76,000	100
2005	10,000	11	25,000	29	18,000	21	18,000	21	12,000	14	4,000	5	87,000	100
2006	8,000	9	23,000	26	18,000	20	21,000	24	13,000	14	6,000	7	88,000	100
2007	9,000	9	32,000	31	18,000	17	21,000	21	15,000	15	8,000	7	103,000	100

Source: NHTSA, NCSA, NASS GES 1998-2007

Conclusions

The findings from this research note indicate that data trends among motorcyclists injured in motor vehicle crashes are very similar to the trends seen in fatal motorcycle crashes. In the past 10 years (1998-2007), motorcyclists injured in crashes have increased at a higher rate than the increase in motorcycle registrations (110% versus 84%). There is an overall shift in the age of the motorcyclists injured in crashes with more older motorcyclists (40 and older) getting injured. Even though the 20-to-29 age group still continues to have the highest number of motorcyclists injured the other age groups are closely catching up. More motorcyclists are getting injured in crashes during weekends, indicating recreational driving.

This research note was written by Cherian Varghese, a contractor employed by URC Enterprises, Inc., working with the Data Reporting and Information Division, Office of Traffic Records and Analysis, National Center for Statistics and Analysis. For questions regarding the data reported in this publication, please send an e-mail to the NCSA Webmaster at ncsaweb@dot.gov

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