



# Research Note

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## Motorcyclist Fatalities in 2001

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The National Highway Traffic Safety Administration's (NHTSA) National Center for Statistics and Analysis (NCSA) released a comprehensive analysis of motorcycle crashes titled "*Recent Trends in Fatal Motorcycle Crashes*" (DOT HS 809 271) in July 2001 and a research note "*Motorcyclist Fatalities in 2000*" (DOT HS 809 387) in December 2001. The report examined trends and rates of motorcycle riders (motorcyclists) killed in motor vehicle crashes during the ten year period 1990-1999 and the research note compared the trends and rates in the report with the 2000 data. This research note compares recently released results from the 2001 Fatality Analysis Reporting System (FARS) to the trends and rates in the earlier report and research note. The analysis in this research note can best be understood when read in conjunction with data from the previous report, *Recent Trends in Fatal Motorcycle Crashes* and research note *Motorcyclist Fatalities in 2000*. The 2000 data in this research note are from the final FARS files and may be different from the 2000 data in the previous research note.

### Background

Motorcyclist fatalities, following a longer-term trend, declined each year from 1993 to 1997, reaching a historic low of 2,116 in 1997. Fatalities among motorcycle riders then increased in 1998 to 2,294 (an 8.4 percent jump), in 1999 to 2,483 (a 8.2 percent increase) and again in 2000 to 2,897 (a 16.7 percent jump). These increases in motorcyclist fatalities, reversing a long-term trend, prompted NCSA to examine factors related to fatal motorcycle crashes resulting in the aforementioned report and research note. The

recently released 2001 FARS data show motorcyclist fatalities increased to 3,181, an increase of 9.8 percent from 2000. The total increase in fatalities between 1997 and 2001 is 1,065 or 50.3 percent.

### FARS Data

NCSA collects and analyzes data, conducts research, and disseminates statistical information to support efforts by NHTSA and the highway safety community aimed at reducing deaths, injuries, and economic losses resulting from motor vehicle crashes. The FARS database, a national census of police-reported motor vehicle crashes resulting in fatal injuries, developed and run by NCSA, is one of the tools used to support these efforts. To be included in FARS, a crash must involve a motor vehicle traveling on a traffic way customarily open to the public, and result in the death of a person (either an occupant of a vehicle or a non-motorist) within 30 days of the crash. For a complete description of FARS, go to:

<http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/FARS.html>.

### Variables Used in the Analysis

The following FARS variables were used in this analysis:

1. Age of Motorcyclist;
2. Land Use (Urban/Rural);
3. Engine Size in Cubic Centimeters (cc);
4. Type of Crash (Single/Multiple);

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5. Helmet Use;
5. Speeding;
6. Operator Alcohol Involvement; and,
7. Operator License Status with License Type Compliance.

These variables were also used in the analysis of the previously released report and research note.

### Exposure Data

Motorcyclist fatality rates are calculated based on the following two measures of exposure:

1. Vehicle Miles Traveled (VMT) [*Source - Federal Highway Administration*]: The number of motorcycle VMT declined from 10,469 million miles in 2000 to 9,529 million miles in 2001, a reduction of 9 percent.
2. Registered Motorcycles [*Source - Federal Highway Administration*]: The number of registered motorcycles increased from 4,346,068 in 2000, to 4,903,056 in 2001, a change of 13 percent.

### Data Analysis

The results of the motorcyclist fatality analysis based on the above FARS variables are given in the following sections.

1. Age of Motorcyclist: Table 1 shows the number and percent of motorcyclist fatalities by year and age group. In 2001, the 20-29 year old age group continued to have the highest number of fatalities among all age groups. The 40 and over age group accounted for 40 percent of all motorcyclist fatalities. The 20-29 year old age group had the largest increase in number of fatalities in 2001 compared to 2000 reversing a trend since 1997. The proportion of fatalities among all age groups has not shown any significant change between 2000 and 2001. The 20-29 year old age group as a long-term trend continued to have the highest number of fatalities among all age groups.

<b>Table 1 Motorcyclist Fatalities by Age Group and Year</b>				
<b>Age Group</b>	<b>Fatalities</b>			
	<b>2000</b>		<b>2001</b>	
	No.	%	No.	%
< 20	189	7	209	7
20-29	818	28	919	29
30-39	707	24	797	25
40-49	677	23	722	23
> 49	501	17	532	17
Unknown	5	0	2	0
<b>Total</b>	<b>2,897</b>	<b>100</b>	<b>3,181</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 2000-2001</b>				

2. Land Use (Urban/Rural): Table 2 shows the number and percent of motorcyclist fatalities by year and land use. In 2001, there were 1,557 (49 percent) motorcyclist fatalities on rural roads and 1,411 (44 percent) fatalities on urban roads. Unknown roads accounted for 213 (7 percent) of motorcyclist fatalities. The trend is similar in 2000 and 2001 with more motorcyclist fatalities occurring on rural roads. The change in proportions in 2001 could change due to the increased number of unknowns. *The number of unknowns in 2001 will change with release of the final FARS 2001 file.*

<b>Table 2 Motorcyclist Fatalities by Land Use and Year</b>				
<b>Land Use</b>	<b>Fatalities</b>			
	<b>2000</b>		<b>2001</b>	
	No.	%	No.	%
Rural	1,428	49	1,557	49
Urban	1,385	48	1,411	44
Unknown	84	3	213	7
<b>Total</b>	<b>2,897</b>	<b>100</b>	<b>3,181</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 2000-2001</b>				

3. Engine Size in Cubic Centimeters (cc): The number and percent of motorcyclist fatalities by year and engine size in cc is shown in Table 3. The highest number of fatalities among all engine size groups was in the 501-1,000 cc engine size accounting for 1,395 or 44 percent of all fatalities in 2001. There were 1,177 or 37 percent of fatalities in the 1,001-1,500 cc engine size. These two engine sizes did not show any significant change in the proportion of fatalities between 2000 and 2001. However, the number of fatalities on 1,001-1,500 cc engine size motorcycles continued to increase following the trend seen in the previous years.

Engine Size (cc)	Fatalities			
	2000		2001	
	No.	%	No.	%
Up to 500	203	7	227	7
501-1,000	1,261	44	1,395	44
1,001-1,500	1,092	38	1,177	37
> 1,500	46	2	48	2
Unknown	295	10	334	10
<b>Total</b>	<b>2,897</b>	<b>100</b>	<b>3,181</b>	<b>100</b>

Source: NCSA, NHTSA, FARS 2000-2001

4. Fatalities on Larger Motorcycles: Table 4 shows the number and percent of motorcyclist fatalities on 1,001-1,500 cc engine size by year and age group. Almost two-thirds (62 percent) of the fatalities were in the 40 and over age group. The highest number of fatalities among all age groups was in the 40-49 year old age group with 420 or 36 percent fatalities in 2001 compared to 416 or 38 percent of fatalities in 2000. The proportion of fatalities among all age groups has not shown any significant change between 2000 and 2001.

Age Group	Fatalities			
	2000		2001	
	No.	%	No.	%
< 20	9	1	12	1
20-29	92	8	125	11
30-39	282	26	311	26
40-49	416	38	420	36
> 49	290	27	308	26
Unknown	3	0	1	0
<b>Total</b>	<b>1,092</b>	<b>100</b>	<b>1,177</b>	<b>100</b>

Source: NCSA, NHTSA, FARS 2000-2001

5. Mean Age of Occupant Fatality: The mean age of motorcyclists killed reduced slightly from 36.8 years in 2000 to 36.3 years in 2001. The reduction in the mean age is due to the change in trend with the largest increase in fatalities occurring in the under 40-age group.
6. Mean Engine Size in Fatal Crash: The mean engine size of a motorcycle involved in a fatal crash increased from 957 cc in 2000 to 959 cc in 2001. This increasing trend in previous years continued in 2001.
7. Type of Crash (Single/Multiple): Table 5 shows the number and percent of motorcyclist fatalities by year and type of crash. In 2001, 46 percent of motorcyclist fatalities were in single vehicle crashes and the remaining 54 percent were in multiple vehicle crashes. The proportion of fatalities by type of crash did not change significantly from 2000.

<b>Table 5 Motorcyclist Fatalities by Type of Crash and Year</b>				
<b>Type of Crash</b>	<b>Fatalities</b>			
	<b>2000</b>		<b>2001</b>	
	No.	%	No.	%
Single Vehicle	1,307	45	1,464	46
Multiple Vehicle	1,590	55	1,717	54
<b>Total</b>	<b>2,897</b>	<b>100</b>	<b>3,181</b>	<b>100</b>

Source: NCSA, NHTSA, FARS 2000-2001

8. Helmet Use: Table 6 shows the number and percent of fatally injured motorcyclists by year and helmet use. There has not been a significant change in the percent of helmet use from 2000. Forty-six percent of fatally injured riders were not wearing a helmet in 2001 compared to 44 percent in 2000.

<b>Table 6 Motorcyclist Fatalities by Helmet Use and Year</b>				
<b>Helmet Use</b>	<b>Fatalities</b>			
	<b>2000</b>		<b>2001</b>	
	No.	%	No.	%
Not Used	1,283	44	1,477	46
Used	1,492	52	1,594	50
Unknown	122	4	110	3
<b>Total</b>	<b>2,897</b>	<b>100</b>	<b>3,181</b>	<b>100</b>

Source: NCSA, NHTSA, FARS 2000-2001

9. Speeding: Table 7 shows the breakdown of fatalities by year and speeding factor. Thirty-nine percent of motorcyclist fatalities in 2001 were attributed to speeding as one of the factors in the crash and 61 percent as not speeding in the crash. The proportion of motorcyclist fatalities attributed to speeding, as a factor in the crash did not change between 2000 and 2001.

<b>Table 7 Motorcyclist Fatalities by Speeding Factor and Year</b>				
<b>Speeding Factor</b>	<b>Fatalities</b>			
	<b>2000</b>		<b>2001</b>	
	No.	%	No.	%
Speeding	1,123	39	1,252	39
Not Speeding	1,774	61	1,929	61
<b>Total</b>	<b>2,897</b>	<b>100</b>	<b>3,181</b>	<b>100</b>

Source: NCSA, NHTSA, FARS 2000-2001

10. Operator Alcohol Involvement: Table 8 shows the breakdown of operator fatalities by year and their blood alcohol concentration (BAC). Thirty-seven percent of fatally injured operators in 2001 had been drinking with a BAC  $\geq 0.01$ . The percent of fatally injured intoxicated operators (BAC  $\geq 0.08$ ) was 29 percent. The proportion of alcohol involvement showed a 3 percentage point reduction from 2000.

<b>Table 8 Motorcycle Operator Fatalities by Operator BAC and Year</b>				
<b>BAC Level</b>	<b>Fatalities</b>			
	<b>2000</b>		<b>2001</b>	
	No.	%	No.	%
0.00	1,581	60	1,856	63
0.01-0.07	213	8	220	7
0.08+	859	32	866	29
<b>Total</b>	<b>2,653</b>	<b>100</b>	<b>2,942</b>	<b>100</b>

Source: NCSA, NHTSA, FARS 2000-2001

11. Operator License Status with License Type Compliance: Table 9 shows the breakdown of operator fatalities by year and their license status. Seventy-two percent of operators killed in 2001 were properly licensed compared to 27 percent improperly licensed. The proportion of operator fatalities by their license status

did not change significantly in 2000 and 2001.

<b>Table 9 Motorcycle Operator Fatalities by License Status and Year</b>				
<b>License Status</b>	<b>Fatalities</b>			
	<b>2000</b>		<b>2001</b>	
	No.	%	No.	%
Properly Licensed	1,894	71	2,105	72
Improperly Licensed	738	28	807	27
Unknown	21	1	30	1
<b>Total</b>	<b>2,653</b>	<b>100</b>	<b>2,942</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 2000-2001</b>				

### Fatality Rates

Fatality rates are calculated based on vehicle miles traveled and number of registered vehicles. The rate based on VMT followed the increasing trend identified in the July report.

- The fatality rate per 100 million VMT increased from 27.7 in 2000 to 33.4 in 2001.
- The fatality rate per 100,000 registered motorcycles reduced from 66.7 in 2000, to 64.9 in 2001.

### Conclusions

Motorcyclist fatalities increased for the fourth year in a row after reaching a historic low in 1997. The conclusions in this research note are an extension of the data included in *Recent Trends in Fatal Motorcycle Crashes and the*

*2000 research note.* The reader must take care to interpret these conclusions within the context of the twelve year trend (1990-2001), not on the two years presented in this research note. The trends in 2001 remain the same as identified in the July 2001 Report.

- Most of the increase in fatalities occurred in the under 40-age group reversing a trend from 1997.
- Almost two-thirds (62 percent) of the fatalities in the 1,001-1,500 cc engine size were riders in the 40 and over age group.
- The change to a higher proportion of fatalities on rural roads compared to urban roads continued.
- The mean age of the riders killed and the mean engine size of motorcycles involved in fatal crashes continued to rise, indicating the involvement of older riders on larger motorcycles in fatal crashes.
- Alcohol involvement and speeding continue to be major contributing factors in fatal motorcycle crashes.
- Motorcycle VMT decreased substantially in 2000 and 2001 after increasing from 1995 to 1999. With the increase in the number of fatalities, the motorcycle fatality rate per 100 million VMT increased significantly in 2001.
- The number of registered motorcycles continued to increase in 2001. The fatality rate per 100,000 registered motorcycles declined.

For additional copies of this research note, please call 1-800-934-8517 or fax your request to (202) 366-3189. For questions regarding the data reported in this research, contact Umesh G. Shankar [202-366-5558]. This research note and other general information on highway traffic safety may be accessed by internet users at: <http://www-nrd.nhtsa.dot.gov/departments/nrd-30/ncsa/AvailInf.html>

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