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## Motorcyclist Fatalities in 2000

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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. This report examined trends and rates of motorcycle riders (motorcyclists) killed in motor vehicle crashes during the ten year period 1990-1999. This research note compares recently released results from the 2000 Fatality Analysis Reporting System (FARS) to the trends and rates in the earlier report. The analysis in this research note can best be understood when read in conjunction with the data from the previous report, *Recent Trends in Fatal Motorcycle Crashes*. The 1999 data in this research note are from the final FARS files and may be different from the 1999 data in the previous report.

### 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) and again in 1999 to 2,483 (a 8.2 percent increase). These increases in motorcyclist fatalities, reversing a long-term trend, prompted NCSA to examine factors related to fatal motorcycle crashes and resulted in the aforementioned report. The recently released 2000 FARS data show motorcyclist fatalities increased to 2,862, an increase of 15.3 percent from 1999. The total increase in fatalities between 1997 and 2000 is 746 or 35.3 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 completed 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);
5. Helmet Use;
6. Speeding;
7. Operator Alcohol Involvement; and,
8. Operator License Status with License Compliance.

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

## Exposure Data

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

1. Vehicle Miles Traveled (VMT) [Source - Federal Highway Administration]: The number of motorcycle VMT declined from 10,584 million miles in 1999 to 10,479 million miles in 2000, a reduction of 1.0 percent.
2. Registered Motorcycles [Source - Federal Highway Administration]: The number of registered motorcycles increased from 4,152,433 in 1999, to 4,346,068 in 2000, a change of 4.7 percent.
3. US Resident Population [Source - Census Bureau projections based on 1990 Census]: The total US resident population increased from 272,691,000 in 1999, to 275,843,000 in 2000, an increase of 1.2 percent. Table 1 shows the US resident population by year and age group. The largest increase in population from 1999 to 2000 was in the 40-49 (a 2.7 percent increase) and over 49 (an 3 percent jump) age groups.

Age Group	Population (100,000)	
	1999	2000
< 20	781.85	785.22
20-29	362.35	363.12
30-39	422.72	416.53
40-49	416.24	427.51
> 49	743.75	766.05
<b>Total</b>	<b>2,726.91</b>	<b>2,758.43</b>

Source: Census Bureau, Internet Release Date, November 29, 2000

## Analysis of the Data

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

1. Age of Motorcyclist: Table 2 shows the number and percent of motorcyclist fatalities by year and age group. In 2000, the 20-29 year old age group continued to have the highest number of fatalities among all age groups. The 40-49 year old and greater than 49-year old age-groups account for 40 percent of all motorcyclist fatalities and 50 percent of the increase in fatalities from 1999 to 2000. The proportion of fatalities among all age groups has not shown any significant change between 1999 and 2000 except in the 20-29 year old age group with a 3 percentage point decline.

Age Group	Fatalities			
	1999		2000	
	No.	%	No.	%
< 20	137	6	188	7
20-29	761	31	808	28
30-39	612	25	698	24
40-49	570	23	668	23
> 49	403	16	496	17
Unknown	0	0	4	0
<b>Total</b>	<b>2,483</b>	<b>100</b>	<b>2,862</b>	<b>100</b>

Source: NCSA, NHTSA, FARS 1999-2000

2. Land Use (Urban/Rural): Table 3 shows the number and percent of motorcyclist fatalities by year and land use. In 2000, there were 1,402 (49 percent) motorcyclist fatalities on rural roads and 1,372 (48 percent) fatalities on urban roads. Unknown roads accounted for 88 (3 percent) motorcyclist fatalities. The trend is similar in 1999 and 2000 with more motorcyclist fatalities occurring on rural roads. The change in proportions from 1999 to 2000 is partially due to the increase in number of unknowns. *The number of unknowns in 2000 could change with release of the final FARS 2000 file.*

<b>Table 3 Motorcyclist Fatalities by Land Use and Year</b>				
<b>Land Use</b>	<b>Fatalities</b>			
	<b>1999</b>		<b>2000</b>	
	No.	%	No.	%
Rural	1,290	52	1,402	49
Urban	1,175	47	1,372	48
Unknown	18	1	88	3
<b>Total</b>	<b>2,483</b>	<b>100</b>	<b>2,862</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 1999-2000</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 4. The highest number of fatalities among all engine size groups was in the 501-1,000 cc engine size accounting for 1,234 or 43 percent of all fatalities in 2000. There were 1,067 or 37 percent of fatalities in the 1,001-1,500 cc engine size. These two engine sizes showed significant change in the proportion of fatalities between 1999 and 2000.

<b>Table 4 Motorcyclist Fatalities by Engine Size and Year</b>				
<b>Engine Size (cc)</b>	<b>Fatalities</b>			
	<b>1999</b>		<b>2000</b>	
	No.	%	No.	%
Up to 500	185	7	200	7
501-1,000	982	40	1,234	43
1,001-1,500	818	33	1,067	37
> 1,500	23	1	46	2
Unknown	475	19	315	11
<b>Total</b>	<b>2,483</b>	<b>100</b>	<b>2,862</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 1999-2000</b>				

4. Fatalities on Larger Motorcycles: Table 5 shows the number and percent of motorcyclist fatalities on 1,001-1,500 cc engine size by year and age group. Almost two-thirds (65 percent) of the fatalities were in the 40-49 and over 49-year old age groups. The highest number

of fatalities among all age groups was in the 40-49 year old age group with 408 or 38 percent fatalities in 2000 compared to 294 or 36 percent of fatalities in 1999. The proportion of fatalities among all age groups has not shown any significant change between 1999 and 2000.

<b>Table 5 Motorcyclist Fatalities on 1,001-1,500 cc Engine Size by Age Group and Year</b>				
<b>Age Group</b>	<b>Fatalities</b>			
	<b>1999</b>		<b>2000</b>	
	No.	%	No.	%
< 20	3	0	9	1
20-29	79	10	86	8
30-39	205	25	276	26
40-49	294	36	408	38
> 49	237	29	286	27
Unknown	0	0	2	0
<b>Total</b>	<b>818</b>	<b>100</b>	<b>1,067</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 1999-2000</b>				

5. Mean Age of Occupant Fatality: The mean age of motorcyclists killed increased from 36.5 years in 1999 to 36.8 years in 2000. The mean age followed the trend exhibited in previous years.
6. Mean Engine Size in Fatal Crash: The mean engine size of a motorcycle involved in a fatal crash increased from 922 cc in 1999 to 955 cc in 2000. This increasing trend in previous years continued in 2000.
7. Type of Crash (Single/Multiple): Table 6 shows the number and percent of motorcyclist fatalities by year and type of crash. Forty-five percent of motorcyclist fatalities were in single vehicle crashes and the remaining 55 percent were in multiple vehicle crashes. The proportion of fatalities by type of crash did not change significantly from 1999.

<b>Table 6 Motorcyclist Fatalities by Type of Crash and Year</b>				
<b>Type of Crash</b>	<b>Fatalities</b>			
	<b>1999</b>		<b>2000</b>	
	No.	%	No.	%
Single Vehicle	1,140	46	1,298	45
Multiple Vehicle	1,343	54	1,564	55
<b>Total</b>	<b>2,483</b>	<b>100</b>	<b>2,862</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 1999-2000</b>				

8. Helmet Use: Table 7 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 1999. Forty-four percent of fatally injured riders were not wearing a helmet in 2000 compared to 43 percent in 1999.

<b>Table 7 Motorcyclist Fatalities by Helmet Use and Year</b>				
<b>Helmet Use</b>	<b>Fatalities</b>			
	<b>1999</b>		<b>2000</b>	
	No.	%	No.	%
Not Used	1,080	43	1,261	44
Used	1,313	53	1,481	52
Unknown	90	4	120	4
<b>Total</b>	<b>2,483</b>	<b>100</b>	<b>2,862</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 1999-2000</b>				

9. Speeding: Table 8 shows the breakdown of fatalities by year and speeding factor. Thirty-nine percent of motorcyclist fatalities in 2000 were attributed to speeding as one of the factors in the crash and 60 percent as not speeding in the crash. The percent of motorcyclist fatalities attributed to speeding as a factor in the crash declined by 3 percentage points from 1999.

<b>Table 8 Motorcyclist Fatalities by Speeding Factor and Year</b>				
<b>Speeding Factor</b>	<b>Fatalities</b>			
	<b>1999</b>		<b>2000</b>	
	No.	%	No.	%
Speeding	1,032	42	1,105	39
Not Speeding	1,417	57	1,716	60
Unknown	34	1	41	1
<b>Total</b>	<b>2,483</b>	<b>100</b>	<b>2,862</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 1999-2000</b>				

10. Operator Alcohol Involvement: Table 9 shows the breakdown of operator fatalities by year and their blood alcohol concentration (BAC). Thirty-nine percent of fatally injured operators in 2000 were alcohol involved with a BAC  $\geq 0.01$ . The percent of fatally injured intoxicated operators (BAC  $\geq 0.10$ ) was 28 percent. The proportion of alcohol involvement did not change from 1999.

<b>Table 9 Motorcycle Operator Fatalities by Operator BAC and Year</b>				
<b>BAC Level</b>	<b>Fatalities</b>			
	<b>1999</b>		<b>2000</b>	
	No.	%	No.	%
0.00	1,401	61	1,599	61
0.01-0.09	239	10	278	11
0.10+	646	28	745	28
<b>Total</b>	<b>2,286</b>	<b>100</b>	<b>2,622</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 1999-2000</b>				

11. Operator License Status with License Compliance: Table 10 shows the breakdown of operator fatalities by year and their license status. Seventy-one percent of operators killed in 2000 were properly licensed compared to 28 percent improperly licensed. The percentage of operator fatalities by their license status remained the same in 1999 and 2000.

<b>Table 10</b> <b>Motorcycle Operator Fatalities by License Status and Year</b>				
<b>License Status</b>	<b>Fatalities</b>			
	<b>1999</b>		<b>2000</b>	
	No.	%	No.	%
Properly Licensed	1,628	71	1,859	71
Improperly Licensed	636	28	731	28
Unknown	22	1	32	1
<b>Total</b>	<b>2,286</b>	<b>100</b>	<b>2,622</b>	<b>100</b>
<b>Source: NCSA, NHTSA, FARS 1999-2000</b>				

### Fatality Rates

Fatality rates are calculated based on vehicle miles traveled, number of registered vehicles and US resident population by age group. All rates followed the increasing trend identified in the July report.

- The fatality rate per 100 million VMT increased from 23.4 in 1999 to 27.3 in 2000.
- The fatality rate per 100,000 registered motorcycles increased from 59.8 in 1999, to 65.9 in 2000.
- Table 11 shows fatality rates based on age group per 100,000 US resident population.

<b>Table 11</b> <b>Fatality Rates by Age Group and Year</b>		
<b>Age Group</b>	<b>Rate per 100,000 Population</b>	
	<b>1999</b>	<b>2000</b>
< 20	0.18	0.24
20-29	2.10	2.23
30-39	1.45	1.68
40-49	1.37	1.56
> 49	0.54	0.65
<b>Total</b>	<b>0.91</b>	<b>1.04</b>
<b>Source: NCSA, NHTSA, FARS 1999-2000 and Census Bureau</b>		

### Conclusions

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

- Most of the increase in fatalities continued to be in the 40-49 and over 49 year age groups and for riders of larger than 1,000 cc engine size motorcycles.
- Almost two-thirds (65 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 slightly in 2000 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 2000.
- The number of registered motorcycles continued to increase in 2000. However, the fatality rate per 100,000 registered motorcycles also increased.
- The fatality rates based on 100,000 US resident population increased in every age group. The highest fatality rate was in the 20-29 age group. The trend in fatality rates are similar to the previous report.

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For additional copies of this research note, please call (202) 366-4198 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/nca/AvailInf.html>

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