

Where are the Increases in Motorcycle Rider Fatalities?

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ABSTRACT:

According to statistics from the National Highway Traffic Safety's Administration (NHTSA's) Fatality Analysis Reporting System (FARS), total traffic deaths in the United States in the last ten years has increased by 2 percent, while motorcycle rider deaths were up by 80 percent as compared to 1995. In fact, motorcycle rider fatalities increased for the seventh year in a row since reaching a historic low of 2,116 fatalities in 1997. In 2004, 4,008 motorcycle riders were killed, an increase of 1,892 fatalities or 89 percent between 1997 and 2004.

This paper presents information from data on fatal motorcycle crashes relating to trends and where the increases were from 1995-2004. The paper also looks at the gain in popularity of motorcycles by comparing the sales data, demographic changes relating to the shifting trends in the age of ownership and engine size of motorcycles from the latest 2003 Motorcycle Industry Council (MIC) Annual Statistics. The analysis focuses on how demographic changes in motorcycle ownership, rider age and, engine size of motorcycles has affected motorcycle crashes. The changes in behavioral issues among age groups relating to motorcycle riders in crashes like alcohol involvement, speeding, helmet usage and licensing are also analyzed. Fatality rates are calculated using exposure data based on vehicle miles of travel, registered motorcycles, and population by age.

INTRODUCTION

An estimated 128,000 motorcycle riders have died in traffic crashes since the enactment of the Highway Safety Act of 1966 and The National Traffic and Motor Vehicle Safety Act of 1966.

This paper examines motorcycle rider fatalities from 1995-2004. In 2003, motorcycles made up more than 2 percent of all registered vehicles in the United States and accounted for only 0.3 percent of all vehicle miles traveled (2004 VMT and Registration data not yet available). Motorcycle riders accounted for 5 percent of total traffic fatalities in 1995 and have increased to 9 percent of the total traffic fatalities in 2004. Per 100,000 registered vehicles, fatality rate for motorcycle riders (69.16) in 2003 was 4.6 times the fatality rate for passenger car occupants (14.99). Per vehicle mile traveled in 2003, motorcycle riders (38.9) were about 32 times more likely than passenger car occupants (1.2) to die in motor vehicle traffic crash.

The purpose of this paper is to:

- Analyze NHTSA's motor vehicle crash data from FARS along with data from the MIC, the Federal Highway Administration (FHWA) and the US Census Bureau;
- Identify areas that may explain for the recent increase in fatalities.

The following sections give details of data used in the analysis, describe the methodology to analyze crash and exposure data and highlight the findings.

METHODOLOGY

The methodology for this paper involved the following steps:

- Reviewing the data sources, FARS, MIC, FHWA and US Census Bureau, to determine the data elements of interest in FARS and how these data sources could be combined with data from the other three sources;
- Formulating hypotheses about factors in fatal motorcycle crashes that may vary with different data elements and from year to year;
- Calculating proportions and rates to analyze 10 years of trend data and within specific data elements; and,
- Summarizing data that focus on increases in motorcycle rider fatalities.

DATA SOURCES

The following four data sources were used in this analysis:

Fatality Analysis Reporting System (FARS) Data

NHTSA's Fatality Analysis Reporting System annually collects crash statistics from 50 States, the District of Columbia and Puerto Rico. FARS is a census of all crashes of motor vehicles traveling on a public roadway in which a person died within 30 days of the crash. Total fatalities in motor vehicle crashes in the past ten years have increased by nearly 2 percent from 41,817 in 1995 to 42,636 in 2004. Table 1 shows the fatalities from motor vehicle crashes by year and person type from 1995 to 2004.

Table 1: Motor Vehicle Crash Fatalities by Year and Person Type					
Year	Person Type				Total Fatalities
	Passenger Vehicle* Occupants	Motorcycle Riders	Non-occupants**	Other Occupants**	
1995	31,693	2,227	5,494	1,441	41,817
1996	32,271	2,161	5,543	1,356	42,065
1997	32,843	2,116	5,630	1,262	42,013
1998	32,043	2,294	5,756	1,200	41,501
1999	32,225	2,483	5,597	1,226	41,717
2000	32,127	2,897	5,842	1,265	41,945
2001	31,899	3,197	6,119	1,189	42,196
2002	32,448	3,270	6,288	1,161	43,005
2003	32,437	3,714	6,368	1,099	42,884
2004	31,991	4,008	6,526	1,073	42,636

Source: NCSA, FARS 1995-2003(Final), 2004(ARF)

* Include passenger cars, vans, sport utility vehicles, pickups and other light trucks
 ** Include pedestrians, pedalcyclists and other/unknown non-occupants
 *** Include occupants of large trucks, buses & other/unknown vehicle types

Motorcycle rider fatalities had reached an all time low of 2,116 in 1997 and then kept increasing every year. A review of FARS data from 1995 through 2004 shows that in 1997 motorcycle rider fatalities (2,116) were only 5 percent of the overall motor vehicle fatalities (42,013) and in 2004 motorcycle rider fatalities (4,008) has increased to 9.4 percent of the total motor vehicle fatalities (42,636). Table 2 shows the comparison of total motor vehicle crash fatalities and motorcycle rider fatalities from 1997-2004.

Table 2: Comparison of Total Fatalities and Motorcycle Riders Killed by Year

	Year							
	1997	1998	1999	2000	2001	2002	2003	2004
Total Killed	42,013	41,501	41,717	41,945	42,196	43,005	42,884	42,636
Change		-512	216	228	251	809	-121	-248
Motorcycle Riders Killed	2,116	2,294	2,483	2,897	3,197	3,270	3,714	4,008
Increase		178	189	414	300	73	444	294
% Increase		8.4%	8.2%	17%	10%	2.3%	14%	7.9%
Cumulative Increase		178	367	781	1,081	1,154	1,598	1,892
Percent of all Fatalities	5.0%	5.5%	6.0%	6.9%	7.6%	7.6%	8.7%	9.4%

Source: NCSA, FARS 1997-2003(Final), 2004(ARF)

Motorcycle Industry Council (MIC) Data

According to the *2004 Motorcycle Industry Council Statistics Annual*, motorcycle registrations accounted for 2.3 percent of all motor vehicles registered for use on public roads in 2003.

There were 3.0 motorcycles in use for every 100 persons living in U.S. in 2003. California, Florida, Texas, New York and Pennsylvania represented almost one-third (33 percent) of the motorcycles in use in 2003. An estimated 6,390,000 “on-highway” motorcycles were in use in 2003 compared to 3,650,000 motorcycles in 1990, an increase of 75 percent between 1990 and 2003. Table 3 shows the distribution of motorcycles by engine size in cubic centimeters (cc) for the years 1990, 1998 and 2003. More than three-fourths (76 percent) of the motorcycles in 2003 had an engine displacement of over 749 cc, compared to 40 percent in 1990. The percentage of motorcycles for all other engine sizes has decreased from 1990 to 2003. These data indicate that motorcycles with engines over 749 cc are becoming more prevalent.

Table 3: On-highway Motorcycles by Engine Displacement in cc

Engine Displacement	Calendar Year					
	1990		1998		2003	
	No.	%	No.	%	No.	%
Under 125 cc	430,700	11.8	202,000	4.2	234,500	3.7
125-349 cc	328,500	9.0	240,400	5.0	223,800	3.5
350-449 cc	197,100	5.4	187,600	3.9	5,900	0.1
450-749 cc	1,215,500	33.3	995,500	20.7	1,052,600	16.5
Over 749 cc	1,478,200	40.5	3,183,500	66.2	4,873,200	76.2
Total	3,650,000	100.0	4,809,000	100.0	6,390,000	100.0

Source: Motorcycle Industry Council statistics, 2004

Table 4 shows the number of new on-highway motorcycle units sold from 1995-2004. There has been an increase each year in the number of units sold, from 1995. The cumulative increase in the number of units sold is almost 128 percent between 1995 and 2003 with most of the increases occurring in 1998, 1999 and 2000. An estimated 379,000 new on-highway motorcycle units were sold in 1999, about 27 percent over the previous year and an increase of over 50 percent from the 247,000 units sold in 1997. The average number of units sold between 1995 and 2003 was over 400,000 units per year.

Table 4: New On-Highway Motorcycle Units Sold by Year and Percent and Cumulative Increases			
Year	Units Sold	Percent Increase from Previous Year	Cumulative Increase
1995	214,000	+1.9	+3.7
1996	228,000	+6.5	+10.2
1997	247,000	+9.2	+19.4
1998	298,000	+20.6	+40.0
1999	379,000	+27.2	+67.2
2000	471,000	+24.3	+91.5
2001	556,000	+18.0	+109.5
2002	618,000	+11.2	+120.7
2003	662,000	+7.1	+127.8
2004	*	*	*
Source: Motorcycle Industry Council statistics, 2004		* Data not available yet	

The mean age of a motorcycle owner in 2003 was 40.2 years, compared to 38.1 years in 1998, 33.1 years in 1990. Table 5 shows the percent of ownership of motorcycles by age groups for three individual years. The percent of ownership for those age 50 years and over in 2003 was 25.1 percent compared to 19.1 percent in 1998 and 10.1 percent in 1990. Similar increases are also seen in the 40-49 age groups. Motorcycle ownership in the under 18, 25-29 and 30-34 age groups showed corresponding decreases. The largest decrease was in the 25-29 age group and the greatest increase was in the 50 and over age group.

Table 5: Ownership of Motorcycles by Age Group			
Age Group	Year		
	1990	1998	2003
Under 18	8.3%	4.1%	3.7%
18 – 24	15.5%	10.6%	10.8%
25 – 29	17.1%	10.9%	7.6%
30 – 34	16.4%	11.5%	8.9%
35 – 39	14.3%	16.0%	10.4%
40 – 49	16.3%	24.6%	27.9%
50 and Over	10.1%	19.1%	25.1%
Not Stated	2.0%	3.2%	5.6%
Median Age	32.0 Years	38.0 Years	41.0 Years
Mean Age	33.1 Years	38.1 Years	40.2 Years
Source: Motorcycle Industry Council statistics, 2004			

Federal Highway Administration (FHWA) Data

Exposure data from Federal Highway Administration in the form of vehicle miles of travel and motorcycle registrations in the past 10 years show that motorcycle registrations have increased from 1995 to 2003 by nearly 38 percent while the vehicle miles of travel (VMT) for motorcycles shows a decrease of about 3 percent from 1995 to 2003. Table 6 shows motorcycle registrations and VMT from 1995 to 2004. Fatality rates for motorcycle riders declined between 1995 and 1997 when measured per 100,000 registered motorcycles and when measured per 100 million motorcycle VMT. However, starting from 1998 fatality rates started to increase steadily. Fatality rate per 100,000 registered motorcycles has increased by 25 percent from 55.30 in 1997 to 69.16 in 2003 and fatality rate per 100 million motorcycle vehicle miles traveled has increased by 85 percent from 20.99 in 1997 to 34.23 in 2003. The number of fatalities has increased more sharply for these years than the increase in VMT.

Table 6: Motorcycle Rider Fatalities and Fatality Rates by Year and Per Registered Vehicle and Vehicle Miles of Travel

Year	Registered Motorcycles	Vehicle Miles Traveled (Millions)	Motorcycle Rider Fatalities	Fatality Rate per 100,000 Registered Motorcycles	Fatality Rate per 100 Million VMT
1995	3,897,191	9,797	2,227	57.14	22.73
1996	3,871,599	9,920	2,161	55.82	21.78
1997	3,826,373	10,081	2,116	55.30	20.99
1998	3,879,450	10,283	2,294	59.13	22.31
1999	4,152,433	10,584	2,472	59.53	23.46
2000	4,346,068	10,469	2,897	66.66	27.67
2001	4,903,056	9,639	3,197	65.20	33.17
2002	5,004,156	9,552	3,270	65.35	34.23
2003	5,370,035	9,539	3,714	69.16	38.93
2004	*	*	4,008	*	*

Source: NCSA, FARS 1995-2003(Final), 2004(ARF), VMT, Registered Motorcycles – FHWA

* Data not yet available

US Census Bureau Data

The US population increased from 262,803,000 in 1995 to 293,655,000 in 2004, or by nearly 12 percent as per the estimates released by the Census Bureau on December 22, 2004. Table 7 shows the population estimates from 1995 to 2004 by age group.

The population in, the under 20, 40-49, 50-59 and 59 and above age groups has steadily increased each year from 1995 to 2004 and population in the 30-39 age group has seen decreases each year since 1995 with the exception of year 2000, where it increased. Population in the age group of 20-29 decreased each year from 1995 to 1999 and then on, has increased every year. The greatest increase in population has been in the 50-59 age group, followed by the, 40-49 age group. The population in the age group of 50-59 increased by more than 45 percent from 1995 to 2004 and in the age group of 40-49 increased by nearly 20 percent. In 2004, the proportion of 50-59 population was 12 percent of the overall population compared to 9 percent in 1995. The increase in under 20 and 20-29 age groups for the same years were 8 percent and 10 percent respectively. The decrease in population in the, 30-39 age group was nearly 6 percent.

Table 7: Estimate of US Resident Population (100,000) by Year and Age Group							
Year	Resident Population Age Group						Total
	< 20	20-29	30-39	40-49	50-59	59+	
1995	756.8	368.9	441.2	377.2	247.3	436.7	2,628.0
1996	764.4	364.4	438.7	392.4	252.8	439.5	2,652.3
1997	771.0	363.1	433.7	398.5	269.1	442.5	2,677.8
1998	777.0	362.5	427.8	407.4	281.2	446.5	2,702.5
1999	781.9	362.3	422.7	416.2	293.2	450.5	2,726.9
2000	805.5	384.3	432.0	427.5	313.3	459.3	2,821.9
2001	807.8	387.4	430.1	435.5	326.0	464.3	2,851.0
2002	809.8	392.4	426.5	442.2	337.8	470.9	2,879.4
2003	812.2	398.8	421.3	447.5	347.6	480.5	2,907.9
2004	815.5	405.3	415.2	451.8	359.9	488.8	2,936.6
Source: Census Bureau							

ANALYSIS

The analysis of all data is categorized between trends covering a ten year span and common crash characteristics relating to motorcycles covering the latest 2004 data.

Trends

The following tables provide analysis of trend data between 1995 and 2004.

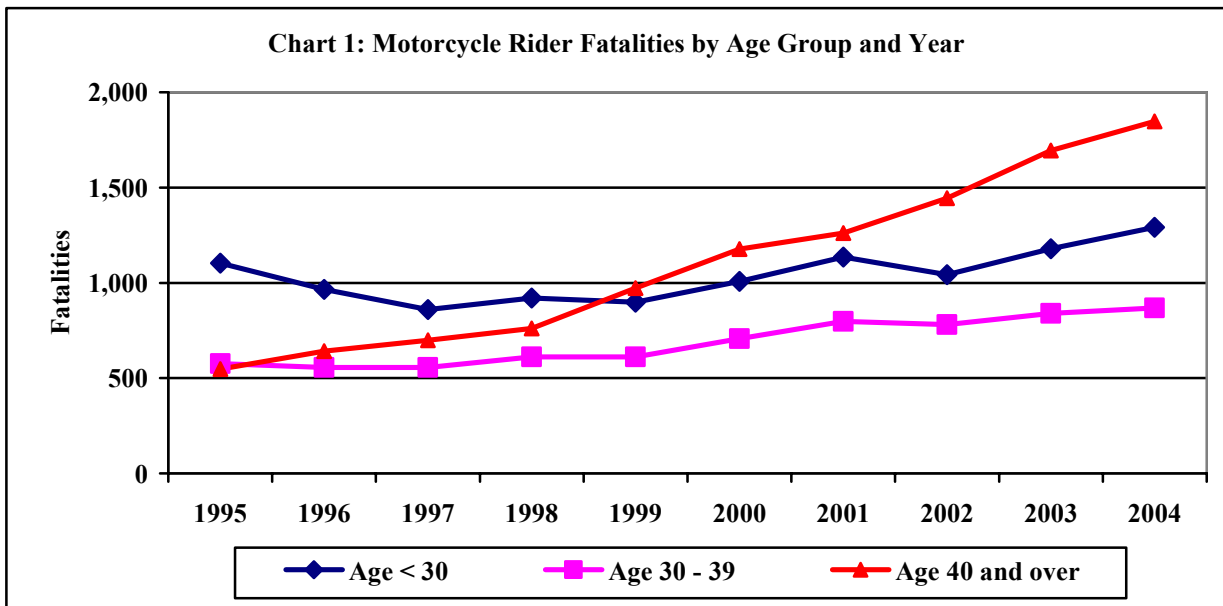
Motorcycle Rider Fatalities by Age Group

Motorcycle rider fatalities, from 1995 to 2004, have increased in all the age groups. The number of motorcycle rider fatalities in the age group of 40-49 has steadily increased, each year from 405 in 1997 to 971 in 2004, an increase of 140 percent. The largest increase during this time period was in the 59 and above age group. In all the years (1995-2004) the most number of motorcycle rider fatalities were in the 20-29 age groups. Table 8 shows the number of motorcycle rider fatalities from 1995 to 2004 by age group. Chart 1 shows motorcycle rider fatalities by age group and year.

Table 8: Motorcycle Rider Fatalities by Year and Age Group

Year	Motorcycle Rider Age Group							Total
	< 20	20-29	30-39	40-49	50-59	59+	Unknown	
1995	195	909	576	359	131	57	0	2,227
1996	202	763	555	420	151	70	0	2,161
1997	166	694	556	405	207	87	1	2,116
1998	201	720	612	475	199	86	1	2,294
1999	137	761	612	570	286	117	0	2,483
2000	189	818	707	677	348	153	5	2,897
2001	211	925	798	729	383	149	2	3,197
2002	177	866	781	770	496	178	2	3,270
2003	229	950	839	904	575	215	2	3,714
2004	250	1,041	869	971	646	230	1	4,008

Source: NCSA, FARS 1995-2003(Final), 2004(ARF)



Motorcycle Rider Fatality Rate per 100,000 US Resident Population

Even though the population in the 40-49, 50-59 and over 59 age groups grew between 1995 and 2004, the increase in motorcycle rider fatalities for these groups have outpaced the increase in population as evident from the increase in the fatality rates. Table 9 gives the motorcycle rider fatality rates per 100,000 US resident populations. The greatest rate increase is seen for the over 59-age group with the rate jumping from 0.13 in 1995 to 0.47 in 2004. Similarly the fatality rate for the, 50-59 age group has risen from 0.53 in 1995 to 1.79 in 2004 and the fatality rate for the 40-49 age group has risen from 0.95 in 1995 to 2.14 in 2004. The rates for other age groups

have also increased over the same period of time. These rates underscore the increase in motorcycle rider fatalities in the over 40 age groups seen in previous sections.

Table 9: Motorcycle Rider Fatality Rate* by Age Group and Year							
Year	Age Group						Total
	< 20	20-29	30-39	40-49	50-59	> 59	
1995	0.26	2.46	1.31	0.95	0.53	0.13	0.85
1996	0.26	2.09	1.27	1.07	0.6	0.16	0.81
1997	0.22	1.91	1.28	1.02	0.77	0.2	0.79
1998	0.26	1.99	1.43	1.17	0.71	0.19	0.85
1999	0.18	2.1	1.45	1.37	0.98	0.26	0.91
2000	0.23	2.13	1.64	1.58	1.11	0.33	1.03
2001	0.26	2.39	1.86	1.67	1.17	0.32	1.12
2002	0.22	2.21	1.83	1.74	1.47	0.38	1.14
2003	0.28	2.38	1.99	2.02	1.65	0.44	1.27
2004	0.3	2.56	2.09	2.14	1.79	0.47	1.36

Source: FARS & Census Bureau * Per 100,000 population.

Motorcycle Rider Fatalities by Engine Displacement in Cubic Centimeters (cc)

In addition to the overall increase in motorcycle rider fatalities in recent years, there has been a considerable increase in motorcycle rider fatalities within the 1,001-1,500 cc engine size category. The number of motorcycle rider fatalities in the 1,001-1,500 cc engine group increased from 666 in 1995 to 1,542 in 2004, an increase of 132 percent. Increases in motorcycle rider fatalities were also seen in the 501-1,000 cc and above 1,500 cc engine groups. The largest number of motorcycle rider fatalities is still in the 501-1,000 cc engine group. However, the fatality count among motorcycle riders in the 1,001-1,500 cc group is fast approaching the 501-1,000 cc level. Motorcycle rider fatalities in the 500 cc and below engine group declined 40 percent from 1995 to 2004. Fatalities in the 501-1,000 cc group have increased by 62 percent during the same time period. Starting in 1996, a small number of all motorcycle rider fatalities are reported involving motorcycles with engine displacements greater than 1,500 cc. Table 10 shows fatalities from 1995 to 2004 by engine displacement.

Table 10: Motorcycle Rider Fatalities by Year and Engine Displacement

Year	Engine Displacement in Cubic Centimeters										Total
	Up to 500		501-1,000		1,001-1,500		> 1,500		Unknown		
	No.	%	No.	%	No.	%	No.	%	No.	%	
1995	370	17	1,009	45	666	30	0	0	182	8	2,227
1996	321	15	1,001	46	654	30	8	0	177	8	2,161
1997	260	12	957	45	729	34	11	1	159	8	2,116
1998	214	9	1,040	45	781	34	16	1	243	11	2,294
1999	185	7	982	40	818	33	23	1	475	19	2,483
2000	210	7	1,261	44	1,092	38	46	2	288	10	2,897
2001	233	7	1,410	44	1,178	37	48	2	328	10	3,197
2002	209	6	1,381	42	1,252	38	98	3	330	10	3,270
2003	213	6	1,531	41	1,510	41	106	3	354	10	3,714
2004	221	6	1,631	41	1,542	38	124	3	490	12	4,008

Source: NCSA, FARS 1995-2003(Final), 2004(ARF)

Motorcycle Rider Fatalities in 1,001-1,500 cc Engine Size by Year and Age Group

Data from Table 10 shows that, between 1995 and 2004 the major increase in motorcycle rider fatalities was in the 1,001-1,500 cc engine size group. Analysis of data from Table 11 shows, the number of motorcycle rider fatalities in the 1,001-1,500 cc engine sizes has increased in the 30-39, 40-49, 50-59 and over 59 age groups between 1995 and 2004. Motorcycle rider fatalities in the 40-49 age group have been steadily increasing each year since 1995, and in the 50-59 age group have been increasing each year since 1998.

Motorcycle rider fatalities in the 40-49 age group in the 1,001-1,500 cc engine size have increased by 3.1 times and in 50-59 age group have increased by 5.3 times, between 1995 and 2004. This increase in motorcycle rider fatality numbers indicates the involvement of more number of large motorcycles, like 1,001-1,500 cc engine size with riders over 40 years of age, in fatal crashes.

The percentage of motorcycle rider fatalities in 40-49 age group has increased from 27 percent in 1995 to 37 percent in 2004 in the 1,001-1,500 cc engine size. About 72 percent of the motorcycle rider fatalities in 2004 were in the over 40-age group and the rest 28 percent in the under 40-age group compared to 43 percent in over 40-age and 57 percent in under 40-age group in 1995.

Table 11: Motorcycle Rider Fatalities in 1,001-1,500 cc Engine Size by Year and Age Group

Year	Motorcycle Rider Age Group												Total*
	< 20		20-29		30-39		40-49		50- 59		59+		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1995	12	2	135	20	233	35	182	27	77	12	27	4	666
1996	15	2	119	18	211	32	198	30	85	13	26	4	654
1997	8	1	99	14	232	32	225	31	124	17	41	6	729
1998	17	2	91	12	252	32	267	34	111	14	42	5	781
1999	3	0	79	10	205	25	294	36	177	22	60	7	818
2000	9	1	92	8	282	26	416	38	215	20	75	7	1,092
2001	12	1	125	11	313	27	420	36	236	20	71	6	1,178
2002	9	1	105	8	290	23	443	35	324	26	81	6	1,252
2003	18	1	122	8	342	23	541	36	371	25	116	8	1,510
2004	13	1	105	7	310	20	575	37	413	27	126	8	1,542

Source: NCSA, FARS 1995-2003(Final), 2004(ARF) * Includes unknown age.

Mean Age of Motorcycle Rider Killed & Mean Engine Displacement in Fatal Crash

The average age of motorcycle rider killed in crashes has increased each year from 1995 to 2004. The mean age of the motorcycle rider killed in 2004 was 38.0 years compared to 32.1 years in 1995, an increase of nearly 6 years. Similarly the mean engine displacement of the motorcycles involved in fatal crashes has increased from 841 cc in 1995 to 1,015 cc in 2004. The data indicates a rise in the average age of motorcycle rider killed and greater involvement of motorcycles with larger engines in fatal crashes. Table 12 shows the mean age of motorcycle rider killed and mean engine displacement in fatal crash from 1995 to 2004.

Table 12: Mean Age of Motorcycle Rider Killed & Mean Engine Size Involved in Fatal Crashes by Year

Year	Mean Age (yrs.)	Mean Engine Size (cc)
1995	32.1	841
1996	33.4	866
1997	34.8	897
1998	34.6	902
1999	36.5	927
2000	36.8	961
2001	36.3	957
2002	37.9	1,002
2003	38	1,014
2004	38	1,015

Source: NCSA, FARS 1995-2003(Final), 2004(ARF)

Motorcycle Rider Fatalities by Crash Type

Motorcycle rider fatalities in single-vehicle and multivehicle vehicle crashes each year is shown in Table 13. Motorcycle rider fatalities in single-vehicle crashes increased by 88 percent from 960 in 1995 to 1,808 in 2004 and in multivehicle crashes increased by 74 percent from 1,267 in 1995 to 2,200 in 2004. The proportions of motorcycle rider fatalities in single-vehicle to multivehicle crashes do not indicate any significant variation over the ten-year period.

Table 13: Motorcycle Rider Fatalities by Year and Crash Type

Year	Single-vehicle Crash		Multivehicle Crash		Total
	Number	Percent	Number	Percent	
1995	960	43	1,267	57	2,227
1996	937	43	1,224	57	2,161
1997	937	44	1,179	56	2,116
1998	1,042	45	1,252	55	2,294
1999	1,140	46	1,343	54	2,483
2000	1,307	45	1,590	55	2,897
2001	1,469	46	1,728	54	3,197
2002	1,540	47	1,730	53	3,270
2003	1,629	44	2,085	56	3,714
2004	1,808	45	2,200	55	4,008

Source: NCSA, FARS 1995-2003(Final), 2004(ARF)

Motorcycle Operator Fatalities by License Status and License Compliance

The definitions of properly and improperly licensed terms used in this paper are based on the following:

Properly Licensed – a valid driver license (*Non-CDL License Status*) with a motorcycle endorsement, a motorcycle only license, learner’s permit; and a temporary license; or no license required for operating a motorcycle type vehicle like mopeds.

Improperly Licensed – not licensed, not licensed to operate a motorcycle, or a license that is suspended, revoked, expired, or canceled or denied.

From 1995 to 2004 the percentage of fatally injured motorcycle operators who were properly licensed has increased steadily. In 2004, the percentage of properly licensed motorcycle operators fatally injured in crashes reached an all time high of 75 percent, an increase of 12 percentage points compared to 63 percent in 1995. Still 25 percent of the operators killed in 2004 were riding a motorcycle with an improper license. Table 14 shows the number and percentage of operators killed by their license status for the past ten years.

Year	License Status with License Compliance						Total
	Properly Licensed		Improperly Licensed		Unknown		
	Number	Percent	Number	Percent	Number	Percent	
1995	1,263	63	737	36	20	1	2,020
1996	1,274	65	666	34	22	1	1,962
1997	1,300	67	623	32	14	1	1,937
1998	1,405	67	665	32	19	1	2,089
1999	1,628	71	636	28	22	1	2,286
2000	1,894	71	738	28	21	1	2,653
2001	2,114	72	815	28	26	1	2,955
2002	2,233	74	779	26	22	1	3,034
2003	2,562	75	847	25	18	1	3,427
2004	2,753	75	909	25	31	1	3,693

Source: NCSA, FARS 1995-2003(Final), 2004(ARF)

Fatally Injured Motorcycle Rider by Helmet Use

Helmet use in fatal crashes among fatally injured motorcycle riders remained almost the same from 1995 to 2004. Table 15 shows the number and percent of fatally injured motorcycle riders by helmet use from 1995 to 2004. In 2004, 20 States, the District of Columbia, and Puerto Rico required helmet use by all motorcycle operators and passengers. In another 27 States, only persons under a specific age, usually 18, were required to wear helmets. Three States had no laws requiring helmet use.

Table 15: Fatally Injured Motorcycle Riders by Year and Helmet Use

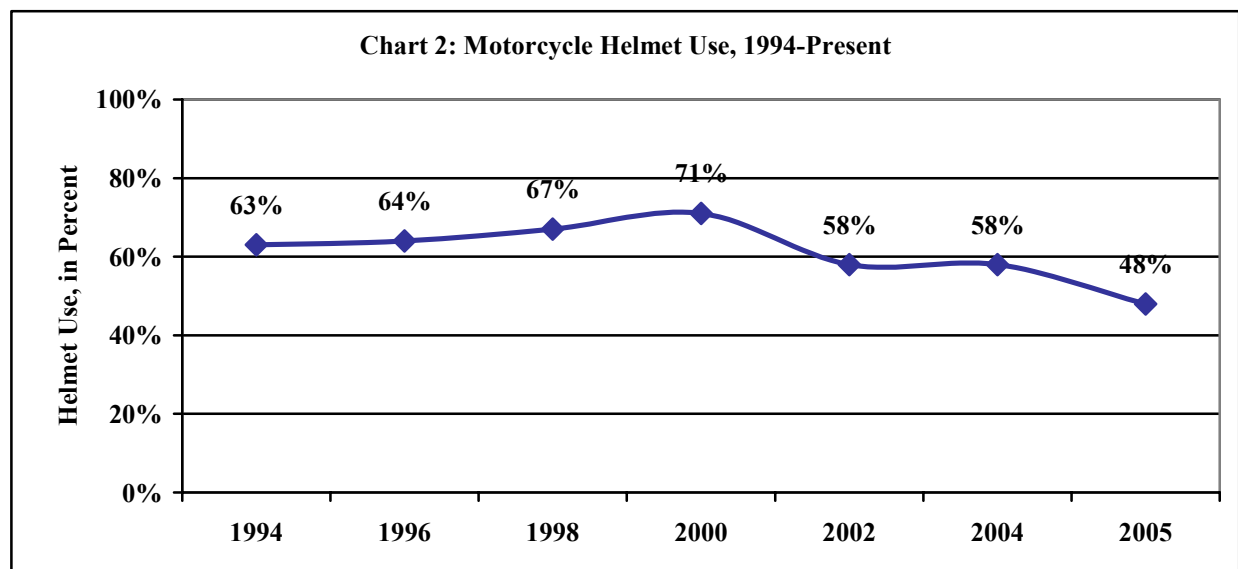
Year	Helmet Use				Total
	Helmet Not Used		Helmet Used		
	Number	Percent	Number	Percent	
1995	980	44	1,247	56	2,227
1996	958	44	1,203	56	2,161
1997	919	43	1,197	57	2,116
1998	1,063	46	1,231	54	2,294
1999	1,121	45	1,362	55	2,483
2000	1,339	46	1,558	54	2,897
2001	1,537	48	1,660	52	3,197
2002	1,565	48	1,705	52	3,270
2003	1,743	47	1,971	53	3,714
2004	1,794	45	2,214	55	4,008

Source: NCSA, FARS 1995-2003(Final), 2004(ARF)

Unknown helmet use was distributed proportionally to the known use categories.

According to NCSA’s 2005 National Occupant Protection Usage Survey (NOPUS), which provides the only probability based observed data on helmet use in the United States, 48 percent of the motorcyclists in the U.S. used DOT-compliant helmets, a 10 point drop from helmet usage rate in 2004. Helmet usage dropped by 23 percentage points between 2000 and 2005. Chart 2 shows observed helmet use between 1994 and 2005. More information on observed motorcycle helmet use, NOPUS survey methodology and definitions can be accessed at:

<http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/RNotes/2005/809-937/images/809937.pdf>



Motorcycle Rider Fatalities by Day of Week

In the last ten years motorcycle rider fatality proportion during weekdays and weekends has changed slightly. More number of motorcycle rider fatalities is seen during weekends. The definition for weekdays and weekends are as follows:

Weekday: 6 a.m. Monday through 5:59 p.m. Friday.

Weekend: 6 p.m. Friday through 5:59 a.m. Monday.

Based on the definition mentioned above, the number of hours during a weekend is 60 hrs (2 ½ days) and during weekdays is 108 hrs (4 ½ days). The total number of weekend days during a year is 130 (52 weeks x 2 ½ days) and the total number of weekdays during a year is 264 (52 weeks x 4 ½ days). In 2004, there were 1,891 motorcycle rider fatalities during weekdays, which translates to an average of 8 fatalities every day and there were 2,107 weekend fatalities, which translates to an average of 16 fatalities every day. There were twice as many motorcycle rider fatalities during weekends than during weekdays. This trend has not changed in the past ten years. This might indicate to more recreational motorcycle riding during weekends.

Table 16: Motorcycle Rider Fatalities by Year and Day of Week

Year	Day of Week						Total
	Weekday		Weekend		Unknown		
	Number	Percent	Number	Percent	Number	Percent	
1995	1,113	50	1,100	49	14	1	2,227
1996	1,068	49	1,086	50	7	0	2,161
1997	988	47	1,120	53	8	0	2,116
1998	1,081	47	1,204	52	9	0	2,294
1999	1,162	47	1,314	53	7	0	2,483
2000	1,323	46	1,563	54	11	0	2,897
2001	1,525	48	1,660	52	12	0	3,197
2002	1,568	48	1,695	52	7	0	3,270
2003	1,736	47	1,959	53	19	1	3,714
2004	1,891	47	2,107	53	10	0	4,008

Source: NCSA, FARS 1995-2003(Final), 2004(ARF)

Motorcycle Rider Fatalities by Speeding

A crash is considered to be speeding-related if the driver was charged with a speeding-related offense or if an officer indicated that racing, driving too fast for conditions, or exceeding the posted speed limit was a contributing factor in the crash. The percent of motorcycle rider fatalities, in crashes where speeding was recorded as driver contributing factor – decreased by 6 percentage points from 43 percent in 1995 to 37 percent in 2004. Table 17 shows the numbers and percentage of fatalities listed for each of the past ten years.

Table 17: Motorcycle Rider Fatalities by Year and Speeding Factor					
Year	Speeding Related				Total
	Speeding		Not Speeding		
	Number	Percent	Number	Percent	
1995	963	43	1,264	57	2,227
1996	942	44	1,219	56	2,161
1997	885	42	1,231	58	2,116
1998	956	42	1,338	58	2,294
1999	1,033	42	1,450	58	2,483
2000	1,123	39	1,774	61	2,897
2001	1,260	39	1,937	61	3,197
2002	1,272	39	1,998	61	3,270
2003	1,373	37	2,341	63	3,714
2004	1,497	37	2,511	63	4,008

Source: NCSA, FARS 1995-2003(Final), 2004(ARF)

Motorcycle Operator Fatalities by Driver Blood Alcohol Concentration (BAC)

The National Highway Traffic Safety Administration defines a fatal traffic crash as being alcohol-related if either a driver or a non-occupant (e.g., pedestrian) had a blood alcohol concentration (BAC) of .01 grams per deciliter (g/dL) or greater in a police reported traffic crash. Persons with a BAC of .08 g/dL or greater involved in fatal crashes are considered to be intoxicated. This is the legal limit of intoxication in all states, the District of Columbia and Puerto Rico. BAC values have been assigned to drivers involved in fatal crashes when alcohol test results are unknown. Alcohol involvement among motorcycle operators has been declining over the last ten years.

The percent of fatally injured operators, who had been drinking, declined by 8 percentage points from 42 percent in 1995 to 34 percent in 2004. But a majority of operators killed who had been drinking were intoxicated with a BAC of .08 or higher. In 2004, there were 1,264 operators killed that had been drinking (BAC .01+) of which 1,025 (81 percent) operators killed were intoxicated (BAC .08+). These numbers indicate that even though the alcohol involvement among operators is declining, there is still an underlying problem because of the high proportion with BACs over .08+. Table 18 shows the numbers and percent of operators killed by their BAC from 1995 to 2004.

Table 18: Motorcycle Operator Fatalities by Year and Operator BAC									
Year	BAC .00		BAC .01-.07		BAC .08+		BAC .01+		Total
	No.	%	No.	%	No.	%	No.	%	
1995	1,165	58	174	9	681	34	855	42	2,020
1996	1,101	56	160	8	700	36	861	44	1,962
1997	1,134	59	163	8	640	33	803	41	1,937
1998	1,214	58	139	7	736	35	875	42	2,089
1999	1,370	60	163	7	753	33	916	40	2,286
2000	1,581	60	213	8	859	32	1,072	40	2,653
2001	1,860	63	223	8	872	30	1,095	37	2,955
2002	1,840	61	236	8	958	32	1,194	39	3,034
2003	2,156	63	245	7	1,026	30	1,271	37	3,427
2004	2,429	66	239	6	1,025	28	1,264	34	3,693

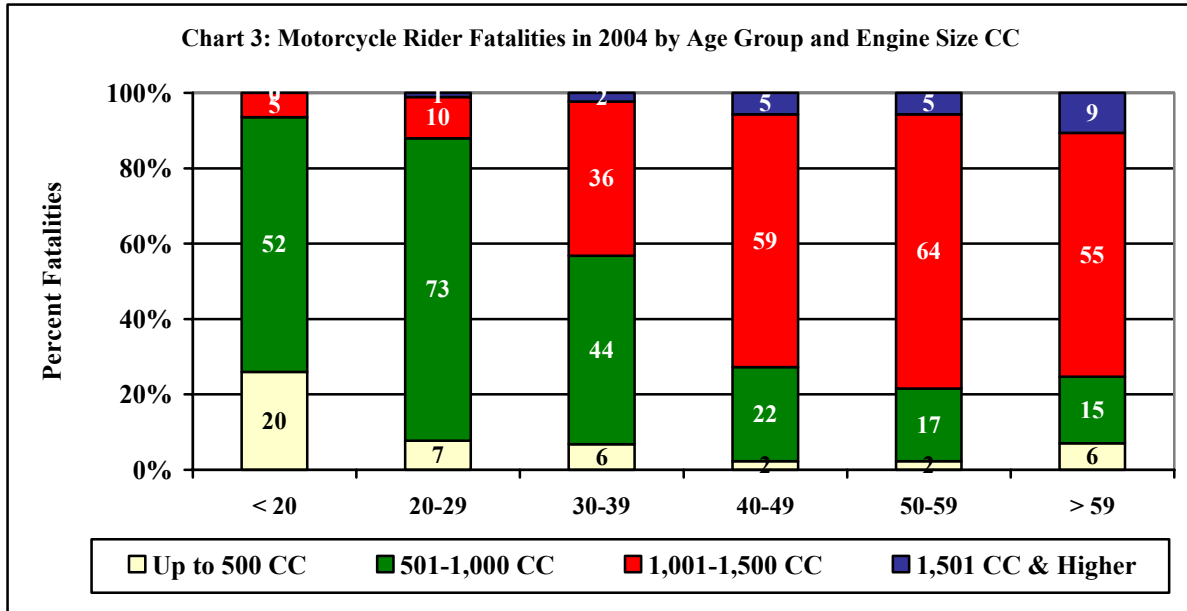
Source: NCSA, FARS 1995-2003(Final), 2004(ARF)

Common Crash Characteristics

After looking at the motorcycle rider fatality trend in the past ten years, variables like Age Group, Engine size, Speed, Alcohol and Day of the week were taken into consideration to find the most common crash characteristics specifically relating to motorcycles. The data for the charts in this section is provided in the section titled 'DATA TABLES' in the same order.

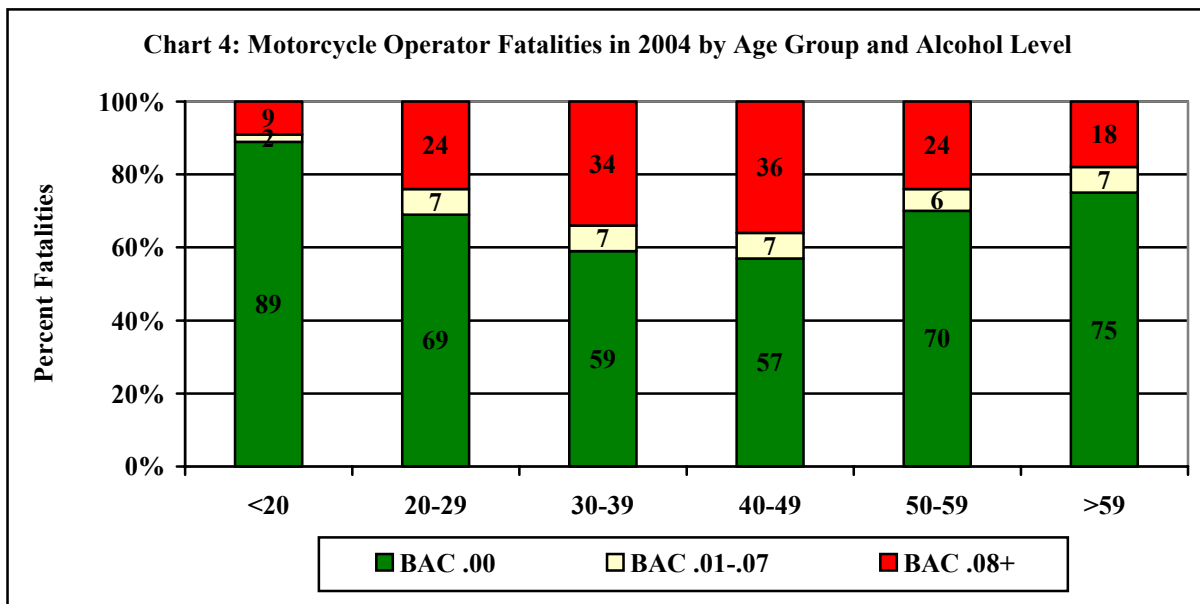
Motorcycle Rider Fatalities by Age Group and Engine Size cc

In 2004, motorcycle rider fatalities in the under 40 age groups, were mainly involving motorcycles with engine sizes of 1,000 cc and under, whereas motorcycle rider fatalities in the 40 and above age groups were mostly involving motorcycles with engine sizes of 1,000 cc and larger. This could indicate that larger motorcycles are being driven mostly by older riders over the age of 40. Chart 3 shows motorcycle rider fatalities in 2004 by age group and engine size cc.



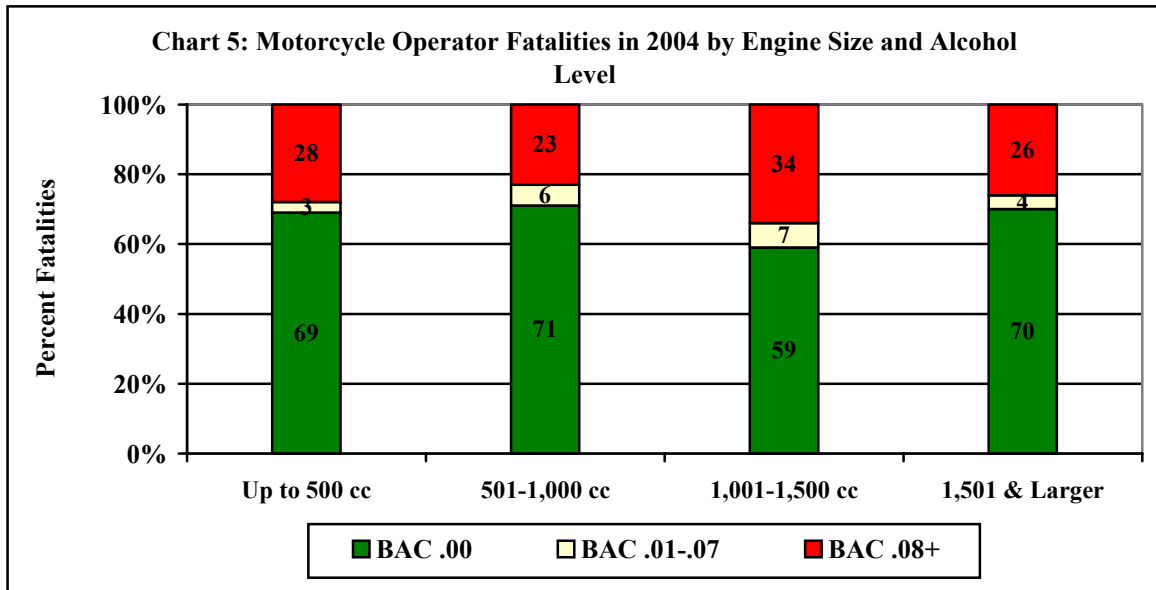
Motorcycle Operator Fatalities by Age Group and Alcohol Involvement

Alcohol involvement among fatally injured motorcycle operators in 2004 was highest in the 40-49 age group followed by the 30-39 age group. Among all the age groups, a majority of the alcohol involved were in the impaired (BAC .08 or higher). Chart 4 shows motorcycle operator fatalities by age group and alcohol involvement.



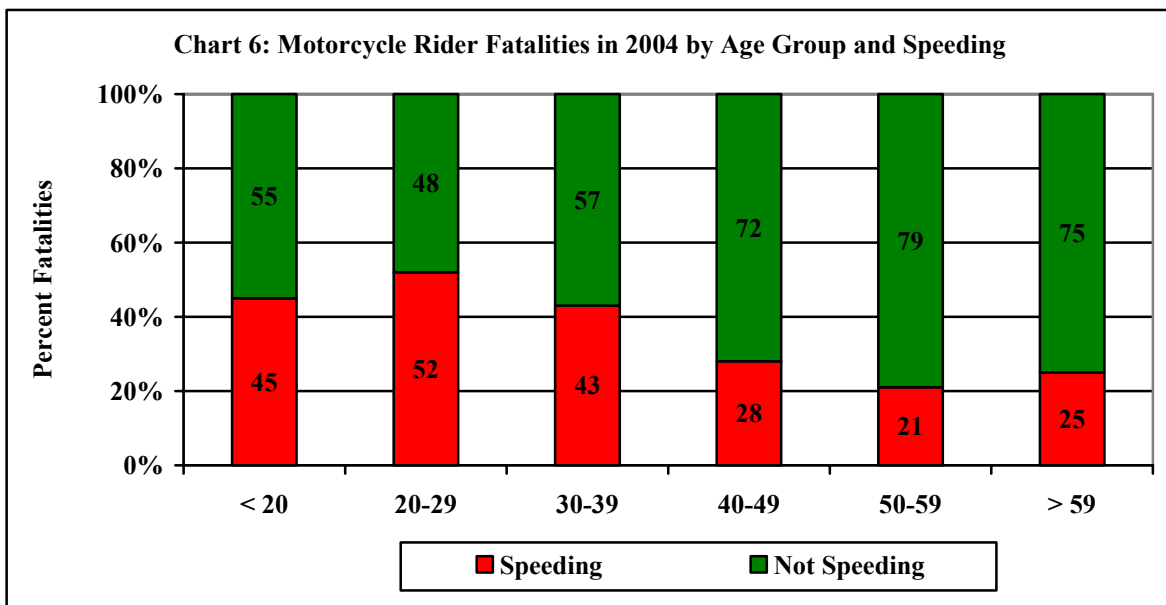
Motorcycle Operator Fatalities by Engine Size cc and Alcohol Involvement

Alcohol involvement among fatally injured motorcycle operators was higher involving motorcycles with engine size between 1,001 to 1,500 cc. Alcohol involvement was less for motorcycle operators involving engine size 501-1,000 cc. Chart 5 shows motorcycle operator fatalities in 2004 by engine size and alcohol level.



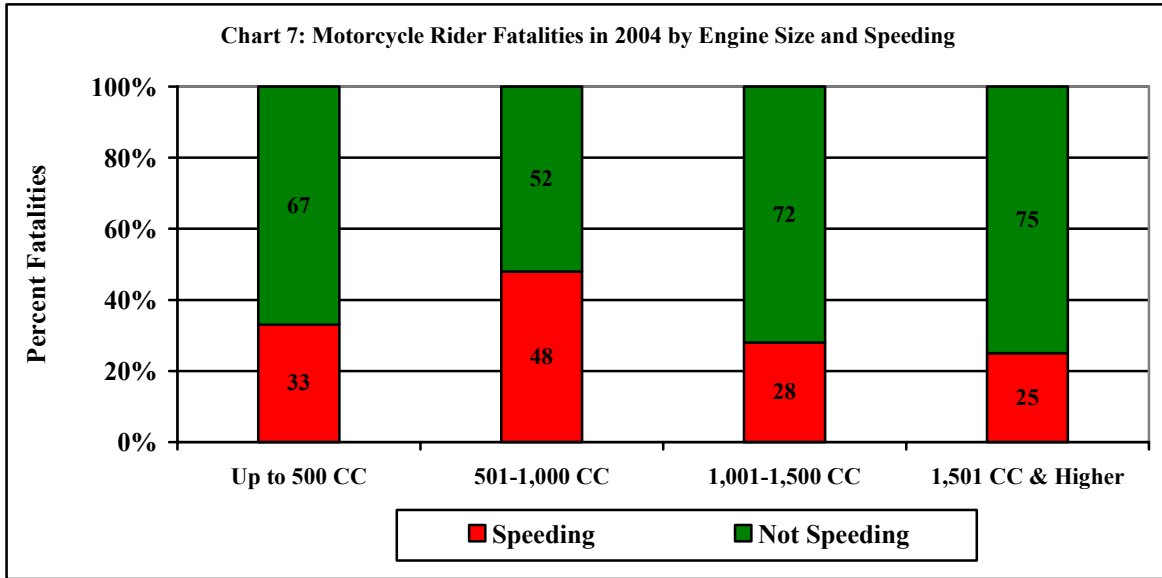
Motorcycle Rider Fatalities by Age Group and Speeding

Among the motorcycle riders who were fatally injured in 2004 in crashes when speeding was a contributing factor, higher percentages were in the under 40 age group category. The highest percentage of speeding related motorcycle rider fatalities was in the age group of 20-29 followed by the under 20 age group. Chart 6 shows motorcycle rider fatalities by age group and speeding.



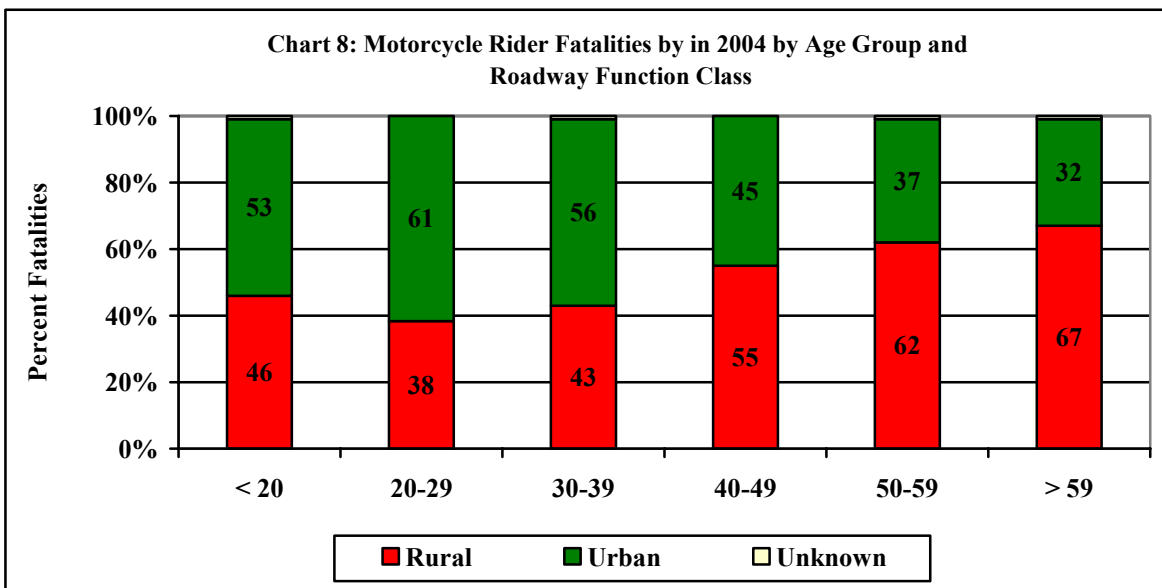
Motorcycle Rider Fatalities by Engine Size cc and Speeding

A higher percentage of speeding related motorcycle rider fatalities in 2004 was seen involving 501-1,000 cc engine size motorcycles. Speeding was less among motorcycle rider fatalities involving 1,001-1,500 cc engine sizes. Chart 7 shows motorcycle rider fatalities by engine size and speeding.



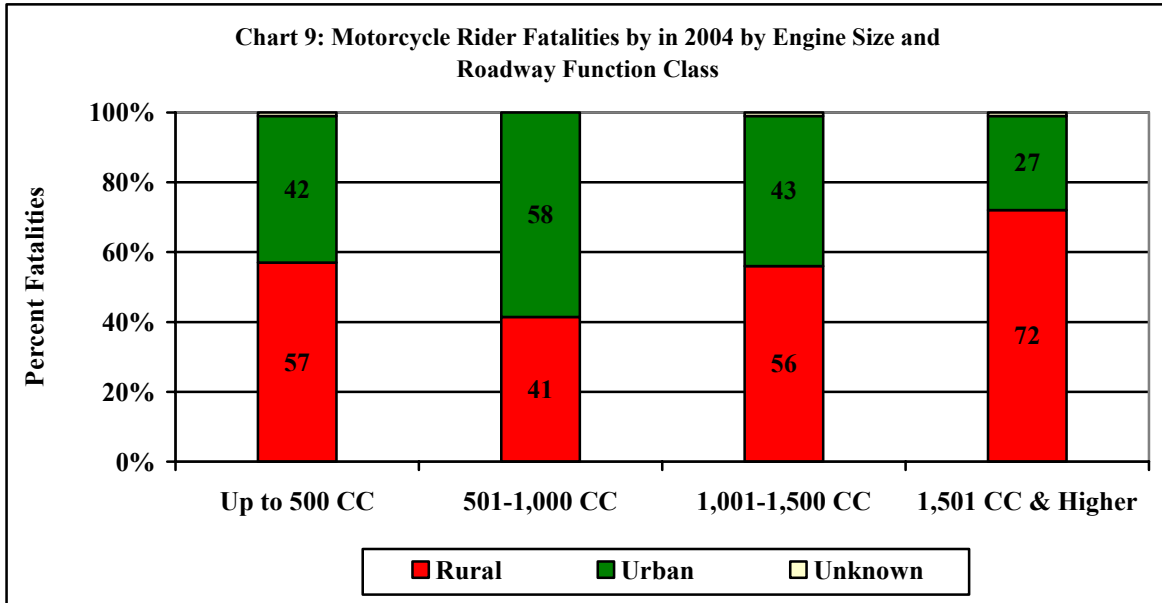
Motorcycle Rider Fatalities by Age Group and Roadway Function Class

Motorcycle rider fatalities in 2004 in the under 40 age groups was seen more on urban roadways and in the 40 and above age groups was more on rural roadways. Majority of the fatally injured motorcycle riders on rural roadways are ages 40 and older which could indicate leisure driving among 40 and older drivers. Chart 8 shows motorcycle rider fatalities by age group and roadway function class.



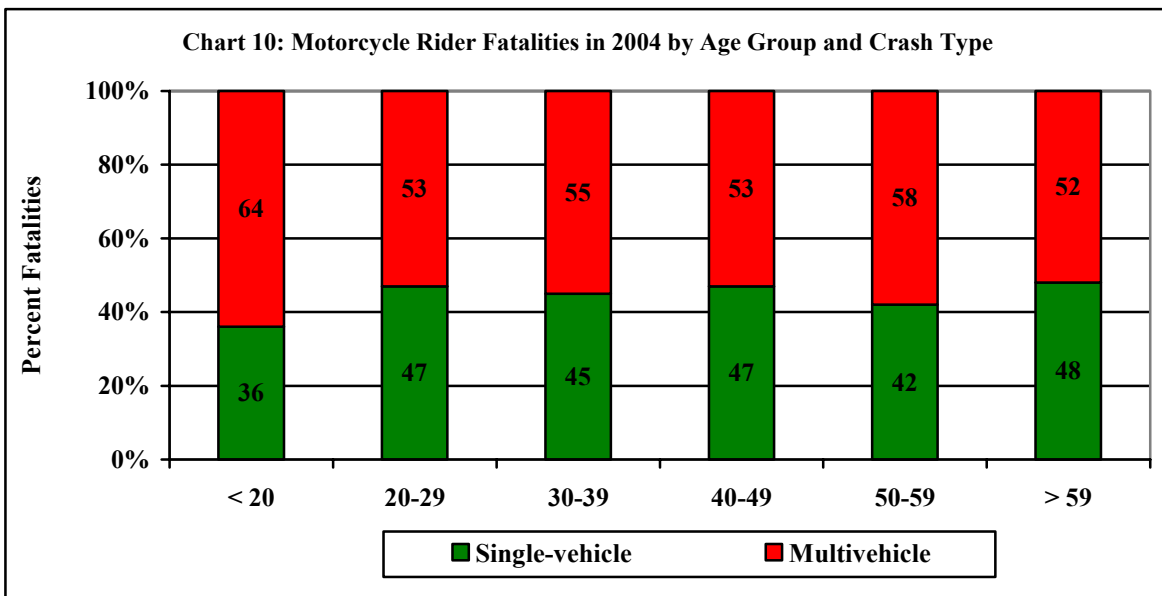
Motorcycle Rider Fatalities by Engine Size cc and Roadway Function Class

Motorcycle rider fatalities on urban roadways were seen mostly involving motorcycles with engine size between 501-1,000 cc and on rural roadways involving up to 500 cc engines and 1,001 and above engine sizes. Chart 9 shows motorcycle rider fatalities in 2004 by engine size and roadway function class.



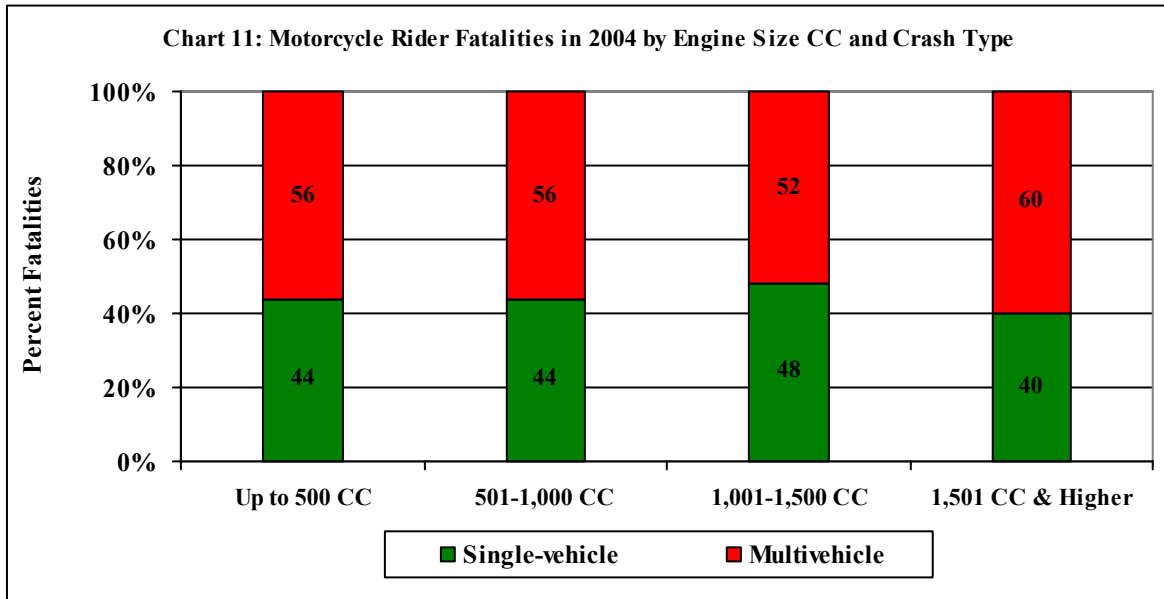
Motorcycle Rider Fatalities by Age Group and Crash Type

Motorcycle rider fatalities in 2004 when looked by crash type show that nearly two-thirds of the under 20 age group was in multivehicle crashes and a higher percentage in the above 59 age group was in single vehicle crashes. Chart 10 shows motorcycle rider fatalities in 2004 by age group and crash type.



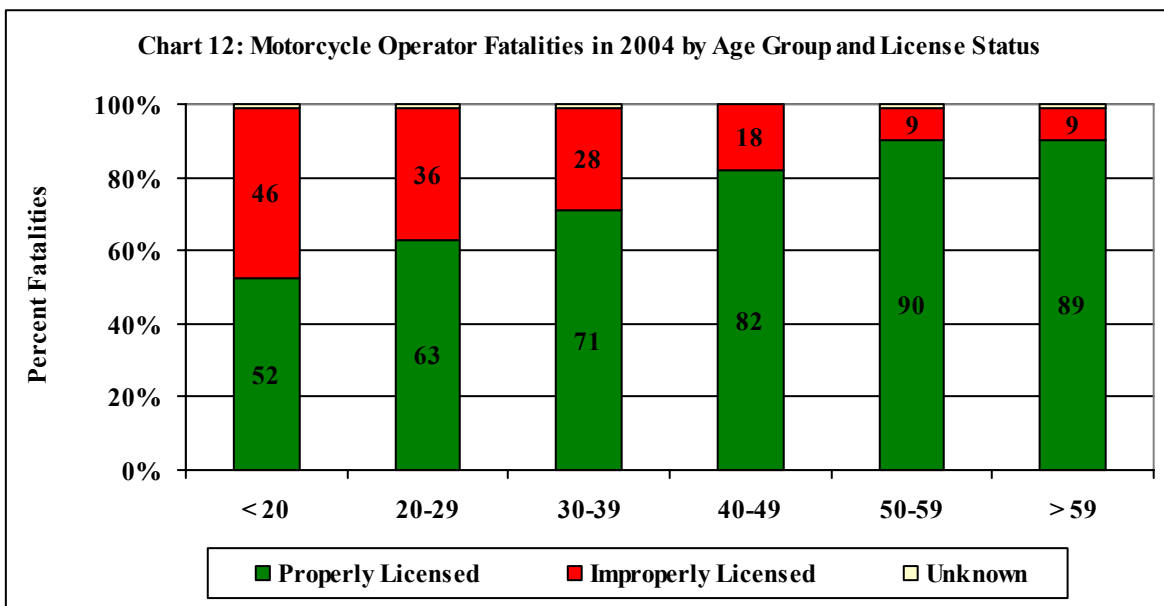
Motorcycle Rider Fatalities by Engine Size cc and Crash Type

Motorcycle rider fatalities in 2004 involving 1,501 cc and higher engine sizes were higher in multivehicle crashes compared to other engine size groups. The proportion of multivehicle to single-vehicle fatalities for all engine sizes is similar to the overall trend. Chart 11 shows motorcycle rider fatalities in by engine size and crash type.



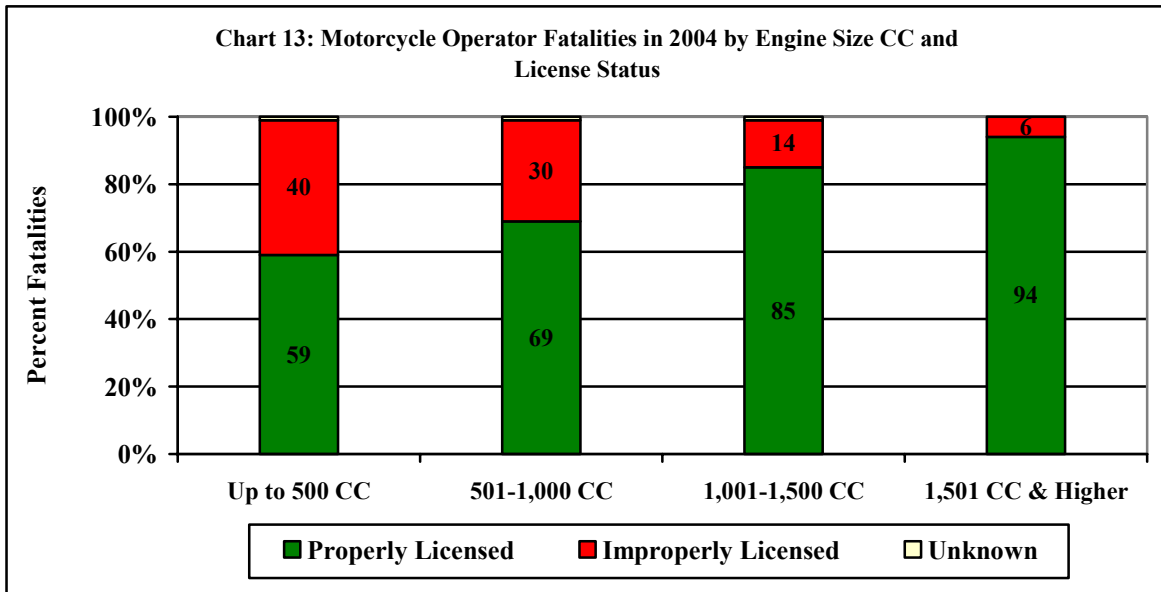
Motorcycle Operator Fatalities by Age Group and License Status

Among motorcycle operators fatally injured in crashes in 2004 a higher percentage of improperly licensed operators were in the under 20 age group. The percentage of properly licensed drivers was higher in all other age groups with the highest being in the above 50 age group category. Chart 12 shows motorcycle operator fatalities by age group and license status.



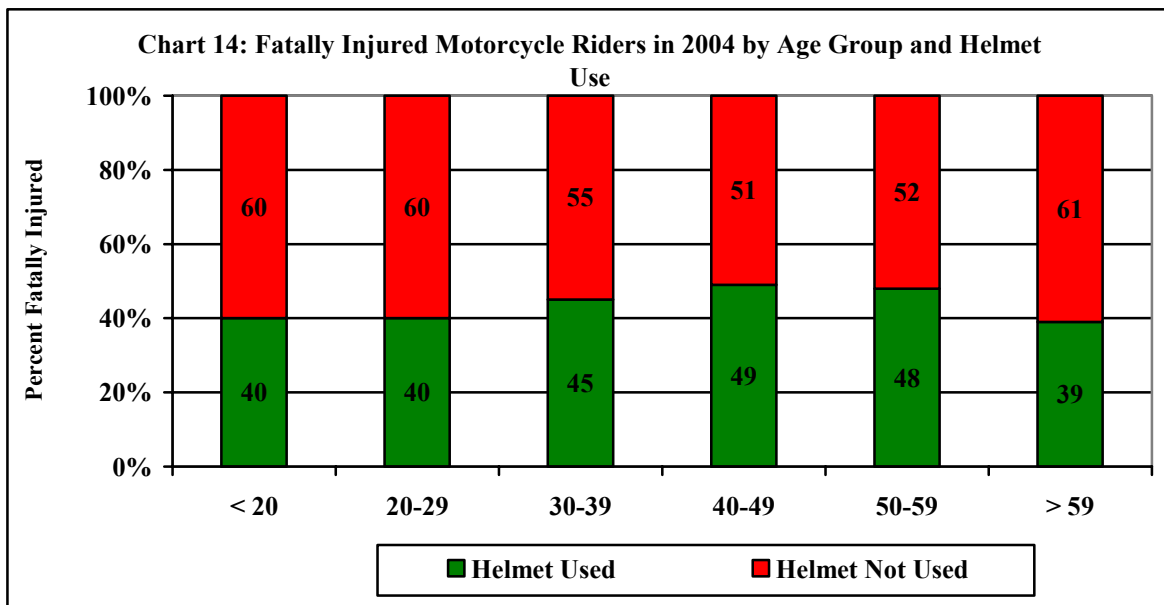
Motorcycle Operator Fatalities by Engine Size cc and License Status

Among motorcycle operators fatally injured in crashes in 2004 a higher percentage of improperly licensed operators were in the 500cc and below engine category. Increases in properly licensed motorcycle operators were seen with increase in motorcycle engine size. Chart 13 shows motorcycle operator fatalities in 2004 by engine size cc and motorcycle operator license status.



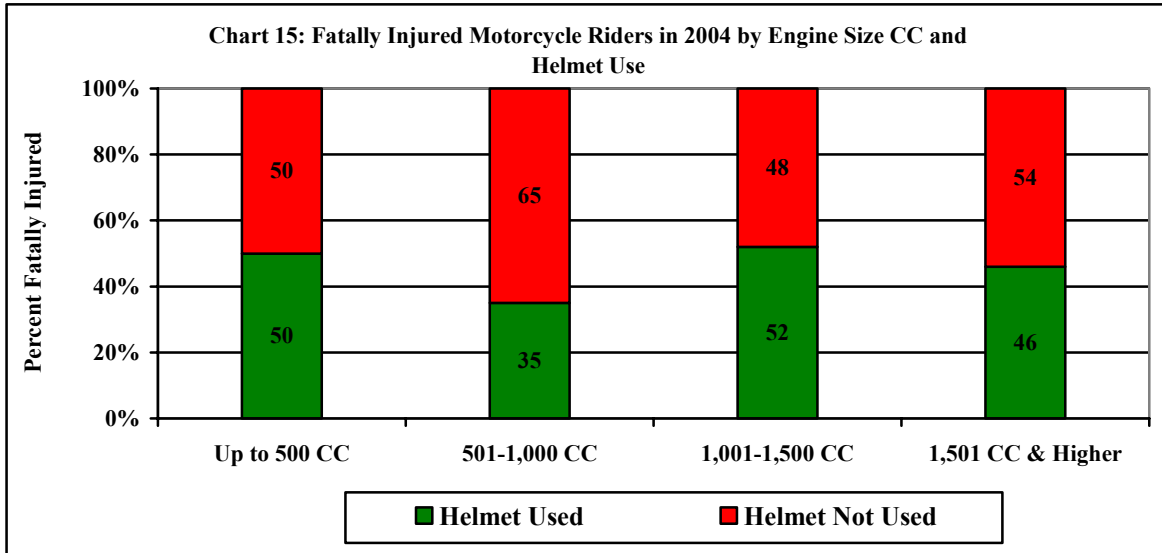
Fatally Injured Motorcycle Riders by Age Group and Helmet Use

Among all age groups, helmet use among fatally injured motorcycle riders in 2004 was higher in the 30-59 age groups and was less for the under 30 age groups and the 60 and above age groups. Chart 14 shows fatally injured motorcycle riders by age group and helmet use.



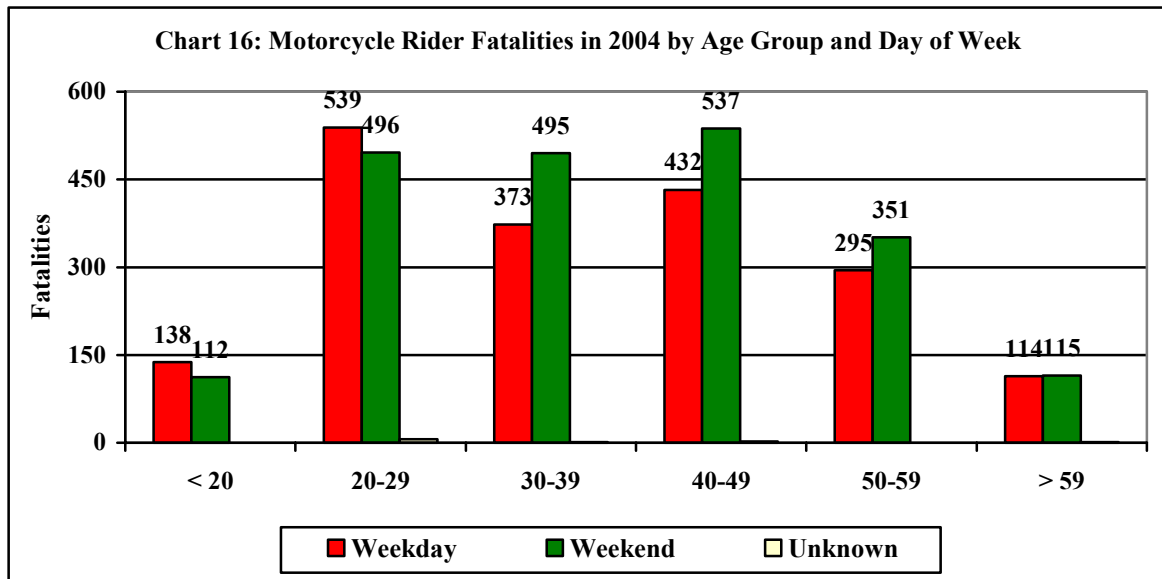
Fatally Injured Motorcycle Riders by Engine Size cc and Helmet Use

Among fatally injured motorcycle riders in 2004, helmet use was less for the 501-1,000cc engine size group. Helmet use was about one-third in the 501-1,000 cc engine sizes compared to nearly 50 percent in the other engine sizes. Chart 15 shows fatally injured motorcycle riders by engine size cc and helmet use in 2004.



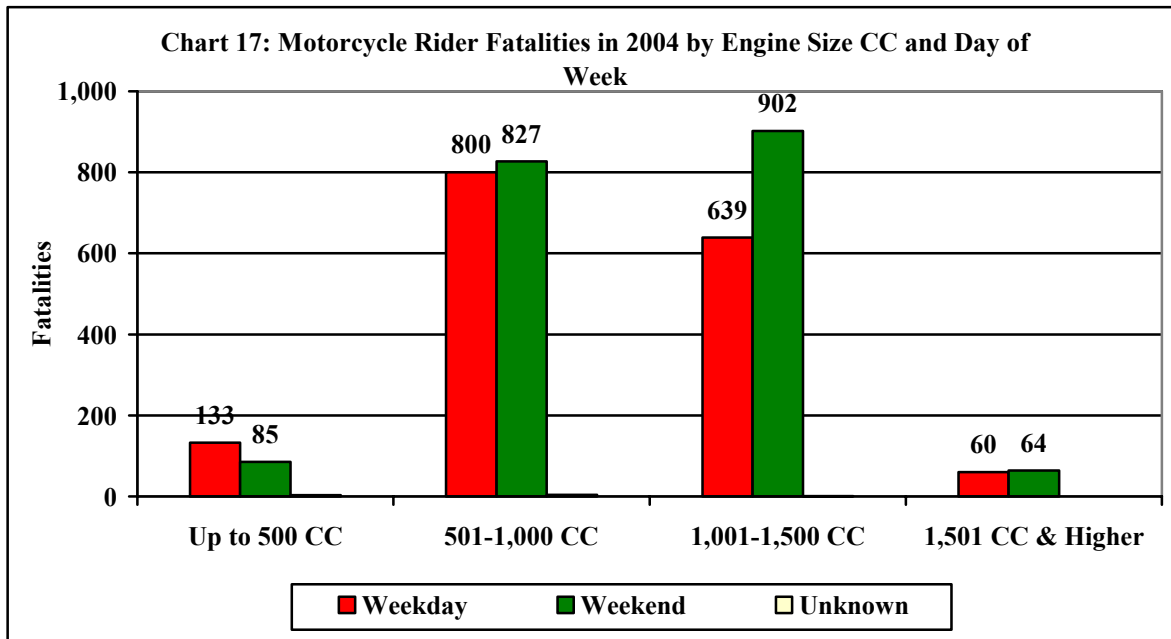
Motorcycle Rider Fatalities by Age Group and Day of Week

Motorcycle rider fatalities in 2004 during weekdays were higher for the under 30 age groups. However, for the 30 and above age groups there were more fatalities during weekends than weekdays. Based on the time definition of weekday/weekend in the trends section, in the 30 and above age groups there were more than twice as many fatalities during weekends than during weekdays, once again indicating leisure driving in the 30 and above age groups during weekends. Chart 16 shows motorcycle rider fatalities in 2004 by age groups and day of week.



Motorcycle Rider Fatalities by Engine Size cc and Day of Week

Among motorcycle rider fatalities in 2004, weekday fatalities were higher for riders in the below 500 cc engine sizes and weekend fatalities were higher for riders in the 1,001-1,500 cc engine sizes. This might indicate that larger engine size motorcycles are being used for leisure driving during weekends. Chart 17 shows motorcycle rider fatalities in 2004 by engine size and day of week.



FINDINGS:

Findings from this research are provided below. The findings are placed into different categories based on the analyses done.

Exposure

- Motorcycle registration data from Federal Highway Administration (FHWA) show more number of registered motorcycles.
- Motorcycle Industry Council (MIC) data show increasing sales in the number of new on-highway motorcycles.
- Majority of the new motorcycles sold are with large engine sizes, according to MIC.
- MIC data show increase in motorcycle ownership in the 40 and above ages.
- Among all ages, greater increases in US resident population were seen in the 40 and above age groups.

Trends

- FARS data show increase in motorcycle rider fatalities in the age group of 40 and above in the last 10 years.
- Mean age of motorcycle rider killed and mean engine size of motorcycle involved in fatal crashes is increasing.
- FARS data shows more number of motorcycle rider fatalities involving a motorcycle with a larger engine size.
- The proportion of motorcycle riders killed in either single-vehicle or multivehicle crashes have been relatively constant.
- Among the fatally injured motorcycle operators, one-fourth are still improperly licensed.
- Helmet use among fatally injured motorcycle riders in crashes has remained the same, above 50 percent in the last ten years.
- Motorcycle rider fatalities during weekends are twice the fatalities during weekdays.
- Speeding continues to be a contributing factor in about a third of the motorcycle rider fatalities.
- Motorcycle operators with blood alcohol concentration (BAC) 0.8g/dL or higher continue to be a major problem.

Crash Characteristics

Two significant findings from the analysis were increase in fatalities among age groups and engine size, findings in crash characteristics are based on these two variables.

Age Group

- Most of the motorcycle rider fatalities on larger engine size motorcycles were in the 40 and above age groups.
- Alcohol involvement among motorcycle operators was higher among operators in the age group of 40-49.
- Speeding is one of the major contributing factors in motorcycle crashes especially among motorcycle riders under the age of 30.
- More number of motorcycle rider fatalities in the 40 and above ages was seen on rural roadways.

- Among motorcycle operators of all ages, the percentage of properly licensed increased with increase in operator age.
- Helmet use among fatally injured motorcycle riders was higher for the 30-59 age groups.
- Motorcycle rider fatalities in the above 30 age groups during weekends were more than twice as much during weekdays.

Engine Size

- Alcohol involvement among motorcycle operators was higher among operators involving 1,001-1,500 cc engine sizes.
- Speeding related motorcycle rider fatalities was higher in 501-1,000 cc engine size motorcycles.
- More number of motorcycle rider fatalities on 1,001-1,500 cc engine size motorcycles was seen on rural roadways.
- Increase in the percentage of properly licensed was seen with the increase in motorcycle engine size.
- Helmet use among fatally injured motorcycle riders was less for motorcycle riders in the 501-1,000 cc engine sizes.
- Motorcycle rider fatalities in the 1,001-1,500 cc engine size were higher in crashes during weekends.

REFERENCES:

1. Department of Transportation, National Highway Traffic Safety Administration, *“Motorcycle Helmet Use in 2005 – Overall Results (DOT HS 809 937)”*.
2. Department of Transportation, National Highway Traffic Safety Administration, *“Traffic Safety Facts 2004 – Motorcycles (DOT HS 809 908)”*.
3. Department of Transportation, National Highway Traffic Safety Administration, *“Recent Trends in Fatal Motorcycle Crashes (DOT HS 809 271)”*.
4. Department of Transportation, National Highway Traffic Safety Administration, *“A Method of Estimating Posterior BAC Distributions for Persons Involved in Fatal Traffic Accidents (DOT HS 807 094)”*.
5. Motorcycle Industry Council, *“2004 Motorcycle Statistical Annual”*.
6. Department of Transportation, Federal Highway Administration, *“Motorcycle Vehicle Miles Traveled – 1995-2003”*.

7. Department of Transportation, Federal Highway Administration, “Registered Motorcycles – 1995-2003”.
8. U.S. Bureau of the Census, “Historical National Population Estimates Internet Release Date, April 11, 2000 (revised June 28, 2000), 2000-2004 Population data are the July 1 estimates from the 2000 Census; Release Date: December 22, 2004”.

DATA TABLES

Data from the following data tables were used to create charts in the ‘Common Crash Characteristics’ section. The data tables follow the same order as in the common crash characteristics section.

Table 18: Motorcycle Rider Fatalities in 2004 by Age Group and Engine Size											
Age Group	Engine Size CC										Total
	Up to 500 CC		501-1,000 CC		1,001-1,500 CC		1,501 CC & Higher		Unknown		
	#	%	#	%	#	%	#	%	#	%	
< 20	50	20	129	52	13	5	0	0	58	23	250
20-29	71	7	759	73	105	10	6	1	100	10	1,041
30-39	48	6	380	44	310	36	20	2	111	13	869
40-49	24	2	217	22	575	59	44	5	111	11	971
50-59	14	2	111	17	413	64	33	5	75	12	646
> 59	14	6	34	15	126	55	21	9	35	15	230
Unknown	0	0	1	100	0	0	0	0	0	0	1
Total	221	6	1,631	41	1,542	38	124	3	490	12	4,008

Source: NCSA, FARS 2004(ARF)

Table 17: Motorcycle Operator Fatalities in 2004 by Age Group and Alcohol Level

Age Group	No Alcohol		BAC = .01- .07		BAC = .08+		Alcohol Related: BAC = .01+		Total Killed
	#	%	#	%	#	%	#	%	
< 20	194	89	5	2	20	9	24	11	218
20-29	675	69	67	7	232	24	299	31	974
30-39	475	59	59	7	278	34	337	41	812
40-49	502	57	59	7	314	36	373	43	875
50-59	423	70	36	6	142	24	178	30	601
59 +	160	75	14	7	38	18	52	25	212
Unknown	1	50	0	0	1	50	1	50	1
Total	2,429	66	239	6	1,025	28	1,264	34	3,693

Source: NCSA, FARS 2004(ARF)

Table 19: Motorcycle Operator Fatalities in 2004 by Engine Size and Alcohol Level

Engine Size CC	No Alcohol		BAC =0.01-0.07		BAC = .08+		Alcohol Related: BAC = .01+		Total Killed
	#	%	#	%	#	%	#	%	
Up to 500 CC	146	69	7	3	59	28	66	31	212
501-1,000 CC	1,095	71	97	6	348	23	445	29	1,540
1,001-1,500 CC	816	59	93	7	468	34	561	41	1,377
1,501 CC & Higher	76	70	4	4	28	26	32	30	108
Unknown	297	65	37	8	122	27	159	35	456
Total	2,429	66	239	6	1,025	28	1,264	34	3,693

Source: NCSA, FARS 2004(ARF)

Table 20: Motorcycle Rider Fatalities in 2004 by Age Group and Speeding

Age Group	Speeding Related				Total	
	Speeding		Not Speeding			
	Number	Percent	Number	Percent	Number	Percent
< 20	113	45	137	55	250	100
20-29	541	52	500	48	1,041	100
30-39	374	43	495	57	869	100
40-49	274	28	697	72	971	100
50-59	137	21	509	79	646	100
> 59	57	25	173	75	230	100
Unknown	1	100	0	0	1	100
Total	1,497	37	2,511	63	4,008	100

Source: NCSA, FARS 2004(ARF)

Table 26: Motorcycle Rider Fatalities in 2004 by Engine Size and Speeding Involvement

Engine Size	Speeding Involvement				Total	
	Speeding		Not Speeding			
	Number	Percent	Number	Percent	Number	Percent
Up to 500 CC	73	33	148	67	221	100
501-1,000 CC	789	48	842	52	1,631	100
1,001-1,500 CC	432	28	1,110	72	1,542	100
1,501 CC & Higher	31	25	93	75	124	100
Unknown	172	35	318	65	490	100
Total	1,497	37	2,511	63	4,008	100

Source: NCSA, FARS 2004(ARF)

Table 22: Motorcycle Rider Fatalities in 2004 by Age Group and Roadway Function Class

Age Group	Roadway Function Class						Total	
	Rural		Urban		Unknown			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
< 20	116	46	132	53	2	1	250	100
20-29	398	38	640	61	3	0	1,041	100
30-39	376	43	485	56	8	1	869	100
40-49	535	55	433	45	3	0	971	100
50-59	403	62	239	37	4	1	646	100
59+	154	67	74	32	2	1	230	100
Unknown	0	0	1	100	0	0	1	100
Total	1,982	49	2,004	50	22	1	4,008	100

Source: NCSA, FARS 2994(ARF)

Table 23: Motorcycle Rider Fatalities in 2004 by Engine Size and Roadway Function Class

Engine Size	Roadway Function Class						Total
	Rural		Urban		Unknown		
	Number	Percent	Number	Percent	Number	Percent	
Up to 500 CC	126	57	93	42	2	1	221
501-1,000 CC	671	41	952	58	8	0	1,631
1,001-1,500 CC	867	56	665	43	10	1	1,542
1,501 CC & Higher	89	72	34	27	1	1	124
Unknown	229	47	260	53	1	0	490
Total	1,982	49	2,004	50	22	1	4,008

Source: NCSA, FARS 2004(ARF)

Table 21: Motorcycle Rider Fatalities in 2004 by Age Group and Crash Type						
Age Group	Crash Type				Total	
	Single-vehicle		Multivehicle		Number	Percent
	Number	Percent	Number	Percent		
< 20	89	36	161	64	250	100
20-29	486	47	555	53	1,041	100
30-39	395	45	474	55	869	100
40-49	459	47	512	53	971	100
50-59	269	42	377	58	646	100
59 +	110	48	120	52	230	100
Unknown	0	0	1	100	1	100
Total	1,808	45	2,200	55	4,008	100

Source: NCSA, FARS 2004(ARF)

Table 22: Motorcycle Rider Fatalities in 2004 by Engine Size and Crash Type						
Engine Size CC	Crash Type				Total	
	Single-vehicle		Multivehicle		Number	Percent
	Number	Percent	Number	Percent		
Up to 500 CC	97	44	124	56	221	100
501-1,000 CC	711	44	920	56	1,631	100
1,001-1,500 CC	739	48	803	52	1,542	100
1,501 CC & Higher	49	40	75	60	124	100
Unknown	212	43	278	57	490	100
Total	1,808	45	2,200	55	4,008	100

Source: NCSA, FARS 2004(ARF)

Table 24: Motorcycle Operator Fatalities in 2004 by Age Group and License Status

Age Group	License Status						Total
	Properly Licensed		Improperly Licensed		Unknown		
	Number	Percent	Number	Percent	Number	Percent	
< 20	114	52	101	46	3	1	218
20-29	616	63	353	36	5	1	974
30-39	575	71	228	28	9	1	812
40-49	717	82	154	18	4	0	875
50-59	542	90	53	9	6	1	601
> 59	189	89	20	9	3	1	212
Unknown	0	0	0	0	1	100	1
Total	2,753	75	909	25	31	1	3,693

Source: NCSA, FARS 2004(ARF)

Table 25: Motorcycle Operator Fatalities in 2004 by Engine Size CC and License Status

Engine Size CC	License Status						Total
	Properly Licensed		Improperly Licensed		Unknown		
	Number	Percent	Number	Percent	Number	Percent	
Up to 500 CC	126	59	84	40	2	1	212
501-1,000 CC	1,069	69	463	30	8	1	1,540
1,001-1,500 CC	1,174	85	187	14	16	1	1,377
1,501 CC & Higher	101	94	7	6	0	0	108
Unknown	283	62	168	37	5	1	456
Total	2,753	75	909	25	31	1	3,693

Source: NCSA, FARS 2004(ARF)

Table 25: Fatally Injured Motorcycle Riders in 2004 by Age Group and Helmet Use

Age Group	Helmet Use				Total	
	Not Used		Used		Number	Percent
	Number	Percent	Number	Percent		
< 20	100	40	150	60	250	100
20-29	419	40	622	60	1,041	100
30-39	393	45	476	55	869	100
40-49	479	49	492	51	971	100
50-59	313	48	333	52	646	100
> 59	89	39	141	61	230	100
Unknown	1	100	0	0	1	100
Total	1,794	45	2,214	55	4,008	100

Source: NCSA, FARS 2004(ARF)

Table 26: Fatally Injured Motorcycle Riders in 2004 by Engine Size CC and Helmet Use

Engine Size CC	Helmet Use				Total	
	Not Used		Used		Number	Percent
	Number	Percent	Number	Percent		
Up to 500 CC	109	50	112	50	221	100
501-1,000 CC	567	35	1,064	65	1,631	100
1,001-1,500 CC	806	52	736	48	1,542	100
1,501 CC & Higher	57	46	67	54	124	100
Unknown	254	52	236	48	490	100
Total	1,794	45	2,214	55	4,008	100

Source: NCSA, FARS 2004(ARF)

Table 27: Motorcycle Rider Fatalities in 2004 by Age Group and Day of Week							
Age Group	Day of Week						Total
	Weekday		Weekend		Unknown		
	Number	Percent	Number	Percent	Number	Percent	
< 20	138	55	112	45	0	0	250
20-29	539	52	496	48	6	1	1,041
30-39	373	43	495	57	1	0	869
40-49	432	44	537	55	2	0	971
50-59	295	46	351	54	0	0	646
> 59	114	50	115	50	1	0	230
Unknown	0	0	1	100	0	0	1
Total	1,891	47	2,107	53	10	0	4,008

Source: NCSA, FARS 2004(ARF)

Table 28: Motorcycle Rider Fatalities in 2004 by Engine Size and Day of Week							
Engine Size CC	Day of Week						Total
	Weekday		Weekend		Unknown		
	#	%	#	%	#	%	
Up to 500 CC	133	60	85	38	3	1	221
501-1,000 CC	800	49	827	51	4	0	1,631
1,001-1,500 CC	639	41	902	58	1	0	1,542
1,501 CC & Higher	60	48	64	52	0	0	124
Unknown	259	53	229	47	2	0	490
Total	1,891	47	2,107	53	10	0	4,008

Source: NCSA, FARS 2004(ARF)