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Research Note

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Driver Alcohol Involvement in Fatal Crashes by Age Group and Vehicle Type

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Overview

The data in this research note demonstrate that while the overall proportion of passenger vehicle drivers with alcohol in fatal crashes is lower in older age groups, the median blood alcohol concentration (BAC) is generally higher for those age groups. However, for motorcycle operators the age groups with the highest level of alcohol involvement also have the highest median BAC levels. This research note identifies differences between age groups and within vehicle types, based on the proportion of drivers with positive BACs (BAC≥.01) by showing differences between passenger vehicle (passenger cars, SUVs, pickup trucks, and vans) driver and motorcycle operator BAC levels across age groups. Passenger vehicle drivers in the age groups 20-29 and 30-39 had the highest proportion of drivers with positive BAC levels. However, motorcycle operators in the age groups 30-39 and 40-49 had the highest proportion of drivers with positive BAC levels.

Background

The findings presented in "Alcohol Involvement in Fatal Motor Vehicle Traffic Crashes, 2003" provided the initial background for this research note. While that technical report focused on the BAC distribution by vehicle type, this research note focuses on BAC distribution by age group and vehicle type interaction. Furthermore, it complements research done in "Alcohol Involvement in Fatal Motorcycle Crashes" by extending the analysis to vehicle types other than motorcycles while using the same age groups. As an extension of the previous studies, it examines the distribution of BAC levels within certain age groups, vehicle types, and age groups within vehicle types.

Methodology

This analysis uses data from the National Highway Traffic Safety Administration's (NHTSA) Fatality Analysis Reporting System (FARS). FARS data are collected and maintained by NHTSA's National Center for Statistics and Analysis (NCSA). The vehicle types and driver/operator ages were clustered into the following groups:

- **Vehicle Types** – passenger cars, SUVs, pickup trucks, vans, and motorcycles.
- **Age Groups** – under 20, 20-29, 30-39, 40-49, 50-59, and over 59.

Drivers with unknown ages were excluded from this analysis. The statistical analysis centered on the computation of the passenger vehicle driver or motorcycle operator median BAC (where BAC≥ .01) for the different age groups and vehicle types. This study used the existing multiple imputation procedure to compute alcohol estimates for all possible BAC values. Once these estimates were made, a median was calculated for each group of interest. Since extreme values can distort the mean, the median provides a better measure of central tendency.

Data Analysis

In order to understand the relationship between alcohol involvement in fatal crashes and the median BAC levels of the drivers involved, this study examines FARS data at several different levels, including the level of alcohol involvement, the median driver/operator age, the median BAC by age group within vehicle type, and the median BAC by year and vehicle type, across all age groups. Data from 2004 are presented in the main body of the report, and data for 2000-2003 are included as a comparison for trends at the end of this report.

1. Alcohol Involvement

Table 1 demonstrates that the 20-29 and 30-39 age groups are those with the highest rates of alcohol involvement for drivers of passenger cars, SUVs, pickups, and vans. However for motorcycle operators, the age groups with the highest rates of alcohol involvement were 30-39 and 40-49. This table shows only the data from the year 2004, but data from years 2000-2003 (provided at the end of the report) demonstrate the same pattern with alcohol involvement across the age groups and vehicle types.

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Table 1: Drivers/Operators Involved in Fatal Crashes by Vehicle Type and Age Group

Age Group	Passenger Cars		SUVs		Pickups		Vans		Motorcycles	
	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01
< 20	3,955	20%	774	19%	1,008	21%	170	19%	237	12%
20-29	7,188	39%	1,987	36%	2,471	37%	581	22%	1,070	31%
30-39	3,644	32%	1,697	27%	2,106	33%	789	18%	889	41%
40-49	3,277	28%	1,521	24%	2,166	30%	837	16%	988	41%
50-59	2,398	19%	951	20%	1,416	24%	556	11%	667	29%
> 59	4,726	8%	776	13%	1,488	13%	685	6%	237	24%
Unknown	205	27%	40	31%	60	20%	32	20%	7	27%
Total	25,393	26%	7,746	26%	10,715	28%	3,650	15%	4,095	34%

Source: NCSA, FARS 2004 (ARF)

2. Median BAC by Age Group within Vehicle Type

Table 2 shows that the median BAC levels for drivers (with BAC ≥ .01) of passenger vehicles varies by age group and year. For example, passenger car drivers in the 40-49 age group had a median BAC level of .18, demonstrating that half of all passenger car drivers with alcohol in that age group had BAC levels less than .18 and half had BAC levels greater than .18. Motorcycle operators in the 30-39 and 40-49 age groups appear to have had higher median BAC levels in 2004, but this was not a consistent pattern across the five years of the study data. For motorcycle operators the age groups with the greatest proportion of alcohol involvement are also the age groups with the higher median BAC levels. It is important to note that for passenger vehicle drivers, the age groups with the highest proportion of alcohol involvement are *not* those with the highest median BAC levels.

Table 2: Median BAC of Drivers/Operators in Fatal Crashes by Age Group and Vehicle Type

Age Group	Passenger Cars	SUVs	Pickups	Vans	Motorcycles
<20	.12	.13	.13	.14	.14
20-29	.15	.16	.16	.15	.13
30-39	.17	.18	.18	.17	.15
40-49	.18	.17	.17	.18	.15
50-59	.18	.17	.18	.18	.14
>59	.13	.14	.15	.14	.13

Source: NCSA, FARS 2004 (ARF)

3. BAC Percentiles by Vehicle Type

Table 3 gives more details about the BAC levels of drivers in fatal crashes by vehicle type across all age groups. Without separating the drivers by age groups, motorcycle operators still had the lowest median BAC level. The 25th and 75th percentiles show that motorcycle operators generally had a lower BAC level than drivers of other vehicle types at all levels. This might indicate that motorcycle operators have a lower BAC threshold for fatal crashes than do drivers of passenger cars. As a further example, for SUVs the 75th percentile (the third quartile) is .22, indicating that one-quarter of SUV drivers with alcohol had BAC levels equal to or greater than .22, which is slightly less than three times the legal limit for intoxication (BAC≥ .08) in all States, the District of Columbia, and Puerto Rico. Table 3 also shows that the 25th percentile of BAC is greater than .08 for all vehicle types. Thus across all vehicle types, more than 75 percent of drivers/operators with alcohol had BACs greater than .08. Furthermore, examining the 75th percentile of BAC for each vehicle type shows that they range from .19 (for motorcycle operators) to .23 (for vans). Since a BAC level of .16 is twice the legal limit in all States, the District of Columbia, and Puerto Rico, the 75th percentile of BAC for each vehicle type demonstrates that more than 25 percent of drivers with alcohol in fatal crashes have BAC levels greater than twice the legal limit.

Table 3: BAC of Drivers/Operators in Fatal Crashes by Vehicle Type

Body	P25	Median (P50)	P75
Passenger Cars	.10	.16	.21
SUVS	.11	.16	.22
Pickups	.11	.17	.22
Vans	.11	.16	.23
Motorcycles	.09	.14	.19

Note: P25, P50 and P75 refer to the 25th, 50th, and the 75th percentiles, respectively.

Source: NCSA, FARS 2004 (ARF)

4. Summary

This research note highlights some important facts about the rates of alcohol involvement by age group and vehicle type and the corresponding median BAC levels. This study also demonstrates that there are differences in median BAC levels between age groups within vehicle types. Some important points are summarized below:

- The age groups with the largest driver alcohol involvement in fatal crashes for passenger vehicle drivers were 20-29 and 30-39, whereas for motorcycle operators it was 30-39 and 40-49.
- The motorcycle operator age groups with the highest proportion of alcohol involvement in fatal crashes are also those with the highest median BAC levels. In this respect, motorcycle operators are distinctly different from passenger vehicle drivers.
- For passenger vehicle drivers involved in fatal crashes, the age groups with the highest proportion of alcohol involvement do not correspond to the age groups with the highest median BAC levels. The age groups with the highest proportion of alcohol involvement for passenger vehicle drivers were generally younger than the age groups with the highest median BAC levels.
- Without respect to age, motorcycle operators with alcohol in fatal crashes had a lower median BAC level than other vehicle type operators.
- Three-fourths (75%) of drivers with alcohol in fatal crashes had BAC levels of .10 or .11 which is greater than the legal limit in all States, the District of Columbia, and Puerto Rico.
- One-fourth (25%) of drivers with alcohol in fatal crashes had BAC levels of .21 which is more than twice the legal limit in all States, the District of Columbia, and Puerto Rico.
- Motorcycle operators with alcohol in fatal crashes had lower BAC levels overall.

Additional Data

Drivers/Operators Involved in Fatal Crashes by Vehicle Type and Age Group - 2000

Age Group	Passenger Cars		SUVs		Pickups		Vans		Motorcycles	
	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01
< 20	4,321	22%	638	22%	1,128	21%	203	15%	167	20%
20-29	7,323	40%	1,493	34%	2,564	36%	600	24%	850	34%
30-39	4,492	39%	1,340	28%	2,365	36%	979	19%	732	49%
40-49	3,566	31%	1,073	22%	1,977	34%	884	17%	698	51%
50-59	2,482	21%	587	16%	1,291	24%	565	14%	360	35%
> 59	5,218	8%	388	14%	1,436	14%	638	8%	159	14%
Unknown	259	34%	25	31%	59	36%	33	25%	5	54%
Total	27,661	28%	5,544	26%	10,820	30%	3,902	17%	2,971	40%

Drivers/Operators Involved in Fatal Crashes by Vehicle Type and Age Group - 2001

Age Group	Passenger Cars		SUVs		Pickups		Vans		Motorcycles	
	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01
< 20	4,190	21%	671	18%	1,137	25%	189	14%	193	11%
20-29	7,414	39%	1,507	34%	2,423	41%	574	22%	942	33%
30-39	4,339	38%	1,417	29%	2,318	34%	909	18%	828	44%
40-49	3,647	30%	1,128	27%	2,119	33%	856	18%	753	47%
50-59	2,483	19%	677	20%	1,383	25%	544	14%	387	34%
> 59	5,106	7%	490	13%	1,496	13%	627	8%	154	17%
Unknown	265	31%	33	32%	61	39%	37	24%	4	23%
Total	27,444	27%	5,923	26%	10,937	31%	3,736	16%	3,261	37%

Drivers/Operators Involved in Fatal Crashes by Vehicle Type and Age Group - 2002

Age Group	Passenger Cars		SUVs		Pickups		Vans		Motorcycles	
	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01
< 20	4,351	20%	775	22%	1,104	24%	163	17%	159	13%
20-29	7,388	39%	1,704	35%	2,573	40%	536	27%	897	35%
30-39	4,174	35%	1,585	28%	2,262	36%	889	20%	806	49%
40-49	3,540	30%	1,303	26%	2,204	31%	854	19%	808	48%
50-59	2,416	19%	805	20%	1,370	24%	567	15%	509	31%
> 59	5,075	7%	547	7%	1,431	15%	670	7%	180	14%
Unknown	292	28%	41	30%	63	41%	29	35%	4	55%
Total	27,236	27%	6,760	26%	11,007	30%	3,708	18%	3,363	39%

Drivers/Operators Involved in Fatal Crashes by Vehicle Type and Age Group - 2003

Age Group	Passenger Cars		SUVs		Pickups		Vans		Motorcycles	
	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01	Total No.	Percent BAC ≥ .01
< 20	4,051	23%	825	21%	952	20%	172	13%	204	13%
20-29	7,171	38%	1,785	34%	2,550	37%	561	23%	969	29%
30-39	3,953	32%	1,619	28%	2,178	33%	829	18%	871	46%
40-49	3,498	28%	1,452	26%	2,251	33%	869	18%	916	48%
50-59	2,500	20%	888	17%	1,495	25%	584	13%	614	33%
> 59	4,981	8%	651	11%	1,582	11%	679	7%	222	10%
Unknown	268	31%	46	32%	64	26%	33	25%	4	50%
Total	26,422	26%	7,266	25%	11,072	29%	3,727	16%	3,800	36%

Source: NCSA, FARS 2000-2003 (Final)

Median BAC of Drivers/Operators in Fatal Crashes by Age Group and Vehicle Type

2000						2001				
Age Group	Passenger Cars	SUVs	Pickups	Vans	Motorcycles	Passenger Cars	SUVs	Pickups	Vans	Motorcycles
<20	.12	.13	.13	.14	.13	.12	.12	.13	.12	.11
20-29	.15	.15	.16	.17	.13	.15	.16	.16	.15	.13
30-39	.17	.16	.17	.17	.14	.17	.17	.17	.16	.14
40-49	.18	.17	.18	.17	.17	.18	.18	.18	.17	.15
50-59	.16	.14	.18	.17	.13	.17	.19	.18	.17	.14
>59	.12	.14	.15	.18	.09	.12	.16	.17	.13	.16
2002						**2003**				
Age Group	Passenger Cars	SUVs	Pickups	Vans	Motorcycles	Passenger Cars	SUVs	Pickups	Vans	Motorcycles
<20	.12	.12	.12	.14	.09	.13	.13	.14	.14	.13
20-29	.15	.16	.16	.17	.12	.15	.15	.16	.15	.13
30-39	.17	.17	.17	.18	.14	.17	.16	.18	.17	.14
40-49	.18	.18	.19	.15	.15	.17	.17	.18	.17	.15
50-59	.17	.17	.20	.15	.14	.17	.16	.18	.15	.14
>59	.13	.13	.16	.16	.12	.14	.16	.15	.15	.13

Source: NCSA, FARS 2000-2003 (Final)

BAC of Drivers/Operators in Fatal Crashes
By Vehicle Type

Body	2000			2001		
	P25	Median (P50)	P75	P25	Median (P50)	P75
Passenger Cars	.10	.15	.21	.10	.16	.21
SUVs	.10	.15	.21	.10	.16	.22
Pickups	.11	.17	.22	.11	.17	.22
Vans	.11	.17	.22	.09	.16	.22
Motorcycles	.09	.14	.20	.08	.14	.19
Body	**2002**			**2003**		
	P25	**Median (P50)**	**P75**	**P25**	**Median (P50)**	**P75**
Passenger Cars	.10	.16	.21	.10	.16	.21
SUVs	.11	.16	.22	.10	.16	.21
Pickups	.11	.17	.22	.11	.17	.22
Vans	.10	.16	.22	.10	.16	.22
Motorcycles	.09	.14	.19	.09	.14	.20

Note: P25, P50 and P75 refer to the 25th, 50th, and the 75th percentiles, respectively.

Source: NCSA, FARS 2000-2003 (Final)

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