U.S. Department of Transportation
National Highway Traffic Safety Administration

TRAFFIC SAFETY FACTS
Research Note

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Fatalities in Traffic Crashes Involving All-Terrain Vehicles

Summary

Traffic fatalities related to on-road all-terrain vehicles (ATVs) represented 1 percent of total motor vehicle traffic fatalities each year from 2004 to 2013. The yearly ATV-related fatality counts from 2004 to 2013 ranged from a low of 307 in 2012 to a high of 381 in 2008.

- Most of these ATV-related fatalities were ATV occupants who were (in no particular order and mutually exclusive): ATV operators (drivers), unhelmeted, killed in single-vehicle crashes, male, killed in rural areas, killed during the weekend, killed during nighttime, and killed between May and September.
- The majority of ATV occupant fatalities (operators and passengers) were 15 to 24 years old.
- From 2004 to 2013, an estimated 39 percent of ATV operators involved in fatal crashes were legally alcohol-impaired with blood alcohol concentrations (BACs) of .08 grams per deciliter (g/dL) or higher, compared to 28 percent for motorcycle operators, 23 percent for passenger car drivers, and 22 percent for light-truck drivers.
- The States with the highest number of ATV occupant fatalities from 2004 to 2013 were West Virginia, Kentucky, Pennsylvania, Florida, and Texas.

Introduction

ATVs are defined as off-road recreational vehicles that may or may not be permitted for use on public roadways depending on a wide range of State regulations. An ATV generally has three or more low-pressure tires, a straddle seat, a handlebar for steering, and hand controls for braking and acceleration. As with any vehicle, proper training and education are important when operating an ATV. Because licensing requirements for on-road use of ATVs vary widely across States and because ATVs are manufactured in various sizes for both children and adults, the National Highway Traffic Safety Administration believes that education about ATV crashes is vital for safety even if they represented only 1 percent of all motor vehicle traffic fatalities from 2004 to 2013. This research note uses data from NHTSA's Fatality Analysis Reporting System (FARS) to analyze the crash characteristics and factors associated with many of the ATV-related fatalities, such as alcohol use, not wearing helmets, and unsafe ATV-driving behaviors.

ATVs are not intended for on-road usage; however, they are ridden on public roads illegally in some jurisdictions and legally in others. FARS captures data on all fatal motor vehicle traffic crashes, including on-road ATV fatal crashes. FARS does *not* capture ATV-related fatal crashes that occur off-road. However, the Consumer Product Safety Commission reports annually on any ATV-related fatalities and injuries, including both on-road and off-road incidents.[1]

FARS Data and Limitations

FARS is a census of fatal traffic crashes in the 50 States, the District of Columbia, and Puerto Rico. To be included in FARS, a crash must involve a motor vehicle traveling on a roadway and must result in the death of at least one person (a vehicle occupant (operator or passenger) or a nonoccupant (pedestrian, bicyclist, or other)) within 30 days of the crash. The FARS final files from 2004 to 2012 and the FARS annual report file (ARF) for 2013 were used for this research note. Beginning with 2012, the FARS ATV body type attribute excludes side-by-side ATVs (ATVs with steering wheels and automobile-type seats).

BAC test results are not known for all operators involved in ATV-related fatal crashes. Missing data can result for a number of reasons – the most frequent is that operators are not always tested for alcohol. Each State or local jurisdiction has its own guidelines of when to administer BAC tests in fatal crashes. To address the missing data issue, NHTSA uses a statistical model called "multiple imputation" to estimate the BAC of the operator at the time

[1] www.cpsc.gov/en/Safety-Education/Safety-Education-Centers/ATV-Safety-Information-Center/

of the crash. For more information on multiple imputation, see NHTSA's Technical Report (DOT HS 809 403, www-nrd.nhtsa.dot.gov/Pubs/809-403.pdf), "Transitioning to Multiple Imputation – A New Method to Impute Missing Blood Alcohol Concentration (BAC) Values in FARS." The statistical model was developed at the national level using all available known data and applied to each individual operator with missing or unknown BAC test results.

This research note focuses on ATV-related fatalities that occurred on public roadways; any ATV-related fatalities that occurred off-road were excluded.

Analysis Discussion

ATV-Related Fatalities

Table 1 presents a yearly distribution of fatalities in motor vehicle traffic crashes that involved an ATV by person type (ATV occupants (operators and passengers), other vehicle occupants, and nonoccupants (pedestrians, pedal-cyclists, and others)) from 2004 to 2013. Of the 3,411 ATV-related fatalities between 2004 and 2013, a total of 3,360 (98.5%) were ATV occupants, 36 (1.1%) were other vehicle occupants, and 15 (0.4%) were nonoccupants.

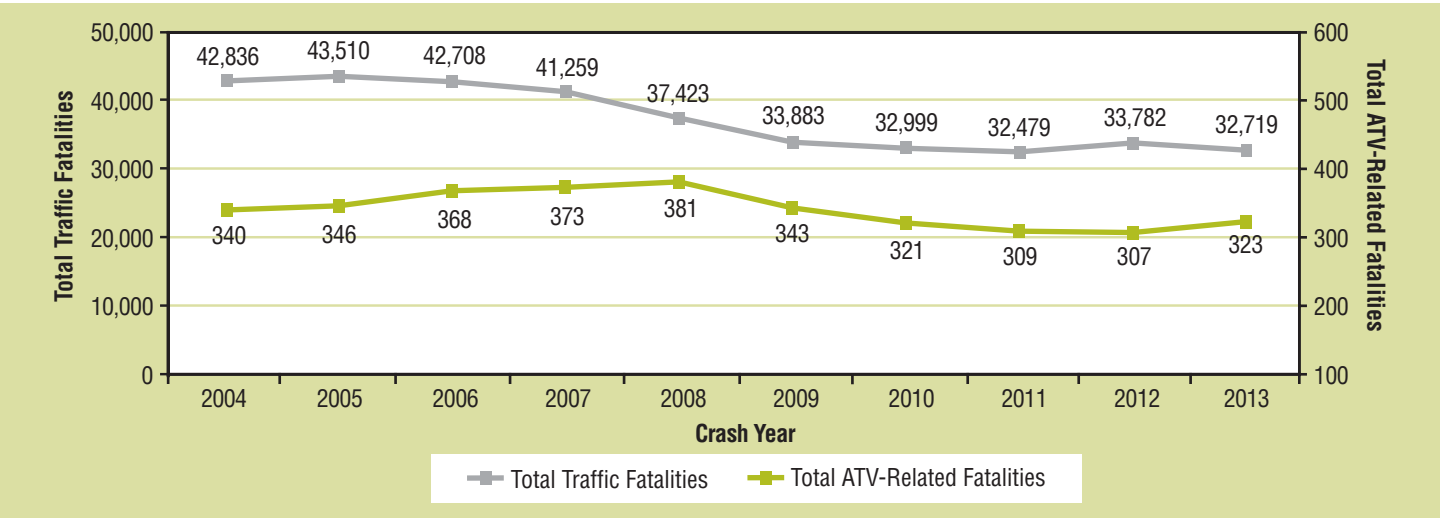
Table 1
Fatalities in Traffic Crashes That Involved an ATV, by Crash Year and Person Type, 2004–2013

Crash Year	Person Type						Total ATV-Related Fatalities
	ATV Occupants		Other Vehicle Occupants		Nonoccupants		
	Number	Percent	Number	Percent	Number	Percent	
2004	337	99.1%	2	0.6%	1	0.3%	340
2005	337	97.4%	8	2.3%	1	0.3%	346
2006	362	98.4%	4	1.1%	2	0.5%	368
2007	368	98.7%	3	0.8%	2	0.5%	373
2008	377	99.0%	4	1.0%	0	0.0%	381
2009	335	97.7%	7	2.0%	1	0.3%	343
2010	316	98.4%	4	1.2%	1	0.3%	321
2011	305	98.7%	1	0.3%	3	1.0%	309
2012	304	99.0%	1	0.3%	2	0.7%	307
2013	319	98.8%	2	0.6%	2	0.6%	323
2004–2013	3,360	98.5%	36	1.1%	15	0.4%	3,411

Source: FARS 2004–2012 Final File, 2013 ARF

Figure 1 displays the 10-year trends of total traffic fatalities and total ATV-related fatalities from 2004 to 2013. The number of total ATV-related fatalities increased by 12 percent from 340 fatalities in 2004 to 381 in 2008, decreased by 19 percent from 381 fatalities in 2008 to 307 in 2012, and increased by 5 percent from 307 fatalities in 2012 to 323 in 2013.

Figure 1
Total Traffic Fatalities and Total ATV-Related Fatalities in Motor Vehicle Traffic Crashes, 2004–2013



Source: FARS 2004–2012 Final File, 2013 ARF

ATV Operators and Alcohol

Table 2 presents the alcohol involvement of ATV operators involved in fatal traffic crashes from 2004 to 2013.

- Of the 3,472 ATV operators *involved* in fatal crashes, an estimated 1,632 operators (47%) had some alcohol in their systems (.01+ g/dL) and an estimated 1,364 operators (39%) were legally alcohol-impaired with BACs of .08 g/dL or higher. Eighty-four percent of ATV operators involved with some alcohol in their systems (1,364 of 1,632) had BACs of .08 g/dL or higher.
- Of the 2,918 ATV operators *killed* in fatal crashes, an estimated 1,426 operators (49%) had some alcohol in their systems (.01+ g/dL) and an estimated 1,220 operators (42%) were legally alcohol-impaired with BACs of .08 g/dL or higher. Of these 1,426 ATV operators killed with some alcohol in their systems, 86 percent (1,220) had BACs of .08 g/dL or higher.
- Of the 554 ATV operators who *survived* in fatal crashes, an estimated 206 operators (37%) had some alcohol in their systems (.01+ g/dL) and an estimated 144 operators (26%) were legally alcohol impaired with BACs of .08 g/dL or higher. Of these 206 ATV operators who survived with some alcohol in their systems, 70 percent (144) had BACs of .08 g/dL or higher.

From 2004 to 2013, an estimated 39 percent of ATV operators involved in fatal crashes were legally alcohol-impaired with BACs of .08 g/dL or higher, compared to 28 percent for motorcycle operators, 23 percent for passenger car drivers, and 22 percent for light-truck drivers.

Table 2
Alcohol Involvement of ATV Operators Involved in Fatal Crashes, by Operator Status, 2004–2013

Operator Status	Number of ATV Operators	BAC = .00 g/dL		BAC = .01+ g/dL		BAC = .08+ g/dL	
		Number	Percent	Number	Percent	Number	Percent
Survived	554	349	63%	206	37%	144	26%
Killed	2,918	1,492	51%	1,426	49%	1,220	42%
Total Involved	3,472	1,841	53%	1,632	47%	1,364	39%

Source: FARS 2004–2012 Final File, 2013 ARF

Table 3 presents the distribution of alcohol involvement of ATV operators involved in fatal traffic crashes by age group from 2004 to 2013. The 35-to-44 age group had the highest percentage of ATV operators involved in fatal traffic crashes with BACs of .08 g/dL or higher at 62 percent, followed by the 45-to-54 age group (59%), the 25-to-34 age group (53%), and the 21-to-24 age group (42%).

From 2004 to 2013, the 35-to-44 age group had the highest percentage of legally impaired ATV operators involved in fatal crashes with BACs of .08 g/dL or higher at 62 percent, compared with the 35-to-44 age group for motorcycle operators (37%), the 25-to-34 age group for passenger car drivers (33%), and the 25-to-34 age group for light-truck drivers (29%).

Table 3
Alcohol Involvement of ATV Operators Involved in Fatal Crashes, by Age Group, 2004–2013

Age Group	Number of ATV Operators	BAC = .00 g/dL		BAC = .01+ g/dL		BAC = .08+ g/dL	
		Number	Percent	Number	Percent	Number	Percent
<15	279	259	93%	20	7%	12	4%
15–24	1,144	748	65%	396	35%	300	26%
15–20	*705*	*544*	*77%*	*161*	*23%*	*117*	*17%*
21–24	*439*	*204*	*47%*	*235*	*53%*	*183*	*42%*
25–34	698	256	37%	442	63%	370	53%
35–44	559	171	31%	388	69%	348	62%
45–54	372	124	33%	248	67%	219	59%
55–64	211	112	53%	99	47%	83	39%
65–74	114	82	72%	32	28%	28	24%
75+	87	80	92%	7	8%	5	6%
Unknown	8	7	89%	1	11%	0	5%
Total Involved	3,472	1,841	53%	1,632	47%	1,364	39%

Source: FARS 2004–2012 Final File, 2013 ARF

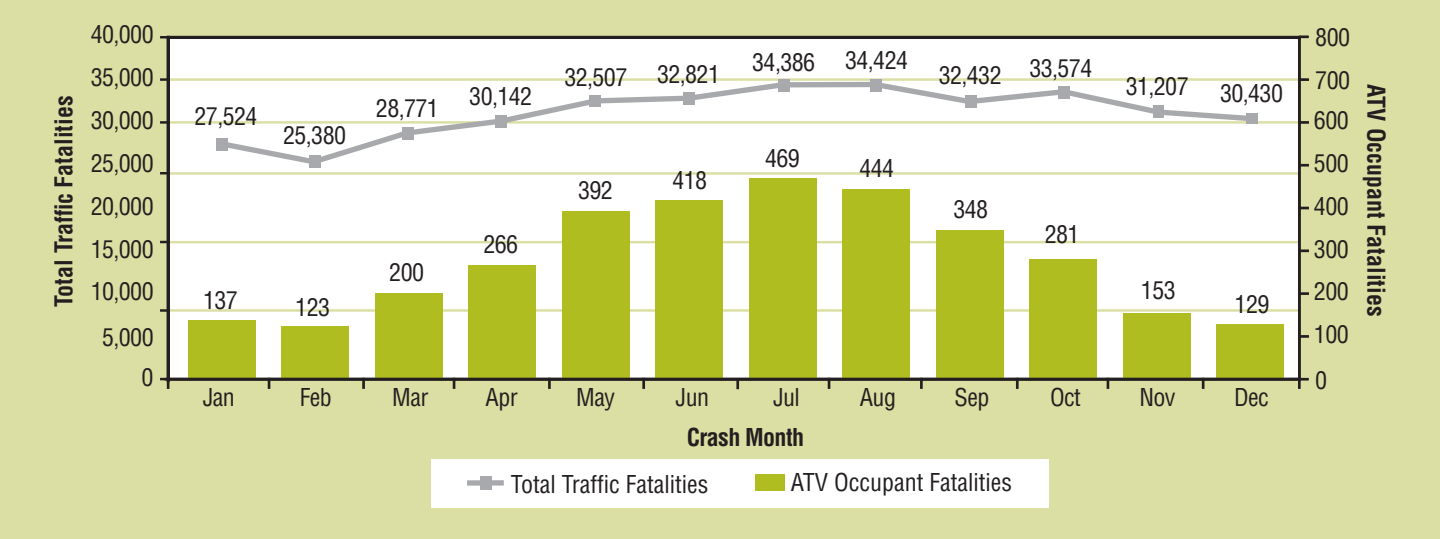
ATV Occupant Fatalities

From 2004 to 2013, a total of 3,360 people were ATV occupant fatalities. Of these fatalities:

- 2,918 (87%) were operators and 442 (13%) were passengers.
- 405 (12%) were helmeted, 2,847 (85%) were unhelmeted, and 108 (3%) were unknown. Some States have laws for requiring helmet use for operating ATVs.[2]
- 2,476 (74%) were killed in single-vehicle crashes and 884 (26%) were killed in multiple-vehicle crashes.
- 2,859 (85%) were male occupants and 501 (15%) were female occupants.
  - Of the male occupants, 2,647 (93%) were operators and 212 (7%) were passengers.
  - Of the female occupants, 271 (54%) were operators and 230 (46%) were passengers.
- 2,895 (86%) were killed in rural areas, 443 (13%) were killed in urban areas, and 22 (1%) were killed in unknown areas.[3]
- 1,920 (57%) were killed during the weekend (from 6 p.m. Friday to 5:59 a.m. Monday), 1,431 (43%) were killed during the weekday (6 a.m. Monday to 5:59 p.m. Friday), and 9 (<1%) were unknowns.
- 1,809 (54%) were killed during nighttime (from 6 p.m. to 5:59 a.m.), 1,481 (44%) were killed during daytime (from 6 a.m. to 5:59 p.m.), and 70 (2%) were unknowns.
  - Of the 1,809 nighttime fatalities, 1,186 (66%) were weekend fatalities and 623 (34%) were weekday fatalities.
  - Of the 1,481 daytime fatalities, 790 (53%) were weekday fatalities and 691 (47%) were weekend fatalities.

Figure 2 displays the distributions of total traffic fatalities and ATV occupant fatalities by crash month from 2004 to 2013. The month with the highest number of ATV occupant fatalities was July (469), followed by August (444), June (418), May (392), and September (348). In short, more ATV occupant fatalities occurred in warmer months than colder months.

Figure 2
Total Traffic Fatalities and ATV Occupant Fatalities in Traffic Crashes, by Crash Month, 2004–2013



Source: FARS 2004–2012 Final File, 2013 ARF

[2] www.cpsc.gov/en/Safety-Education/Safety-Education-Centers/ATV-Safety-Information-Center/State-ATV-Information/
[3] See the U.S. Census Bureau link to define urban and rural areas: www.census.gov/geo/reference/ua/urban-rural-2010.html.

Table 4 presents a distribution of ATV occupant fatalities by age group and person type (operator or passenger) from 2004 to 2013. The 15-to-24 age group had the largest percentage of ATV occupant fatalities (31%), followed by the 25-to-34 age group (19%) and the 35-to-44 age group (16%).

Table 4
ATV Occupant Fatalities in Traffic Crashes, by Age Group and Person Type, 2004–2013

Age Group	Person Type			Percentage of Overall Total
	Operators	Passengers	Total	
<15	204	118	322	10%
15–24	883	172	1,055	31%
15–20	*531*	*126*	*657*	*20%*
21–24	*352*	*46*	*398*	*12%*
25–34	593	62	655	19%
35–44	500	43	543	16%
45–54	346	30	376	11%
55–64	195	10	205	6%
65–74	113	6	119	4%
75+	84	1	85	3%
Overall Total	2,918	442	3,360	100%

Source: FARS 2004–2012 Final File, 2013 ARF

For each State, the District of Columbia, and Puerto Rico, Table 5 presents the number of ATV occupant fatalities for each year from 2004 to 2013. Puerto Rico is not included in the overall U.S. total. The States with the highest number of ATV occupant fatalities from 2004 to 2013 were West Virginia (209), Kentucky (204), Pennsylvania (189), Florida (182), and Texas (172).

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U.S. Department of Transportation
National Highway Traffic Safety Administration

This research note and other general information on highway traffic safety may be accessed by Internet users at: www-nrd.nhtsa.dot.gov/CATS/index.aspx

Table 5
ATV Occupant Fatalities in Motor Vehicle Traffic Crashes, by State and Crash Year, 2004–2013

State	Crash Year										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2004–2013
Alabama	5	7	8	12	11	20	6	6	10	6	91
Alaska	5	4	4	2	3	4	1	0	1	5	29
Arizona	7	9	12	11	17	7	4	13	6	6	92
Arkansas	10	7	11	8	15	7	10	10	14	11	103
California	10	14	21	20	24	16	7	12	5	10	139
Colorado	2	1	0	0	0	1	1	0	0	1	6
Connecticut	4	1	2	1	1	0	1	2	0	0	12
Delaware	0	2	0	1	0	0	1	0	0	0	4
District of Columbia	0	0	0	0	0	0	0	0	0	0	0
Florida	26	23	26	27	14	12	12	9	16	17	182
Georgia	13	16	10	7	19	12	13	11	14	12	127
Hawaii	0	1	2	1	1	1	1	0	1	0	8
Idaho	3	1	3	4	5	6	5	8	7	5	47
Illinois	8	6	11	11	7	7	8	6	9	8	81
Indiana	6	8	3	3	1	4	2	2	5	8	42
Iowa	5	5	4	3	3	4	6	10	3	2	45
Kansas	2	7	6	0	3	7	3	6	1	4	39
Kentucky	16	21	20	29	26	18	21	28	15	10	204
Louisiana	5	9	7	7	13	7	8	5	13	12	86
Maine	6	4	4	3	1	5	3	4	4	3	37
Maryland	2	3	2	3	3	1	0	2	4	2	22
Massachusetts	4	1	1	0	0	2	0	0	0	0	8
Michigan	14	8	12	7	11	9	16	9	7	7	100
Minnesota	4	7	3	4	9	9	8	8	8	7	67
Mississippi	4	12	9	11	17	9	6	4	7	4	83
Missouri	13	17	14	12	14	19	18	6	8	20	141
Montana	5	3	1	3	5	6	3	6	2	5	39
Nebraska	4	0	5	4	1	5	3	4	1	3	30
Nevada	2	0	0	0	1	1	0	2	1	1	8
New Hampshire	1	1	0	0	0	0	0	0	0	2	4
New Jersey	2	5	2	2	3	3	3	2	3	1	26
New Mexico	3	4	3	1	3	6	1	2	2	5	30
New York	14	16	18	15	10	8	13	12	15	13	134
North Carolina	6	3	2	3	3	10	9	4	10	9	59
North Dakota	0	4	3	2	2	3	0	3	3	3	23
Ohio	18	3	20	10	16	13	13	13	15	12	133
Oklahoma	7	7	9	9	8	3	8	5	5	7	68
Oregon	5	5	3	6	5	5	2	1	2	1	35
Pennsylvania	20	19	18	17	20	17	20	23	18	17	189
Rhode Island	1	0	0	1	0	0	0	0	0	0	2
South Carolina	2	0	1	1	5	0	2	0	0	1	12
South Dakota	2	2	2	1	2	0	1	1	4	1	16
Tennessee	15	12	14	12	20	12	11	12	10	15	133
Texas	13	16	16	23	20	22	17	13	16	16	172
Utah	1	0	1	2	3	1	10	4	3	3	28
Vermont	2	2	1	7	1	2	1	0	1	4	21
Virginia	8	5	9	2	4	5	3	3	3	1	43
Washington	5	8	3	8	5	3	4	4	0	8	48
West Virginia	17	18	30	32	10	16	18	20	27	21	209
Wisconsin	9	8	4	13	10	5	8	7	4	9	77
Wyoming	1	2	2	7	2	2	5	3	1	1	26
U.S. Total	337	337	362	368	377	335	316	305	304	319	3,360
Puerto Rico	2	0	0	0	0	6	0	0	4	3	15

Source: FARS 2004–2012 Final File, 2013 ARF