

# Traffic Safety Facts

## Research Note

# Passenger Vehicle Occupant Fatalities by Day and Night – A Contrast

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## Summary

The passenger vehicle occupant fatality rate at nighttime is about three times higher than the daytime rate. In 2005, among the fatally injured passenger vehicle occupants, the proportion of unrestrained occupants was much higher during nighttime than daytime. Also during nighttime, among passenger vehicle occupants killed in crashes, alcohol involvement, speeding, and single-vehicle crash fatalities were higher, compared to daytime.

## 1. Introduction

Out of the 43,443 people who died on the Nation's highways in 2005, nearly 73 percent were occupants of passenger vehicles. This data is from National Highway Traffic Safety Administration's Fatality Analysis Reporting System (FARS), which annually collects crash statistics from 50 States, the District of Columbia, and Puerto Rico, and is made available by the National Center for Statistics and Analysis (NCSA). This research note looks at the various patterns among passenger vehicle occupant fatalities based on time of day.

Research has found that using lap/shoulder seat belts reduces the risk of fatal injury to front-seat passenger car occupants by 45 percent and the risk of moderate-to-critical injury by 50 percent. For light-truck occupants, seat belts reduce the risk of fatal injury by 60 percent and moderate-to-critical injury by 65 percent.<sup>1</sup>

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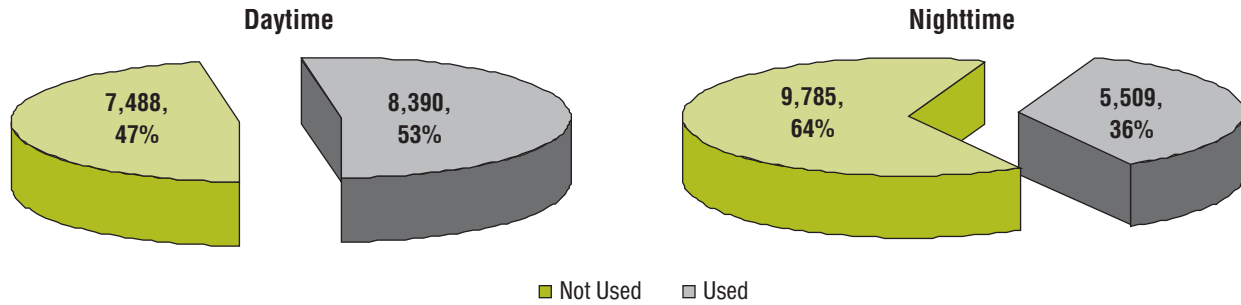
Nationwide almost half (49%) of passenger vehicle occupant fatalities occur during nighttime. This, coupled with the fact that approximately 25 percent of travel occurs during hours of darkness,<sup>2,3</sup> the fatality rate per vehicle mile of travel is about three times higher at night than during the day. These data pose a very relevant question: Is the higher fatality rate at nighttime due to lower belt use? Or is it due to other factors in nighttime and daytime crashes, such as alcohol involvement, speeding, and type of crash (single- versus multiple-vehicle) that suggest drivers during nighttime travel take more risks? Data analysis in the next section might help us understand the reason for this high fatality rate during nighttime crashes.

## 2. Data Analysis

The data analysis in this research note looks at passenger vehicle occupant fatalities by time of day (day/night) and by other factors such as restraint use, alcohol involvement, speeding, and crash type.

### 2.1 Time of Day and Restraint Use

Among the 31,415 passenger vehicle occupants killed in 2005, 15,878 people (nearly 51%) were killed in crashes during daytime, 15,294 people (nearly 49%) were killed in crashes during nighttime, and the rest (less than 1 percent) were killed in crashes at unknown times. Chart 1 shows passenger vehicle occupant fatalities by time of day and restraint use. Out of the 15,294 people killed at nighttime, 9,785 people or almost two-thirds (64%) did not use restraints and 5,509 people (36%) used restraints. In contrast the proportion of unrestrained fatally injured passenger vehicle occupants during daytime crashes was just under 50 percent (47%).

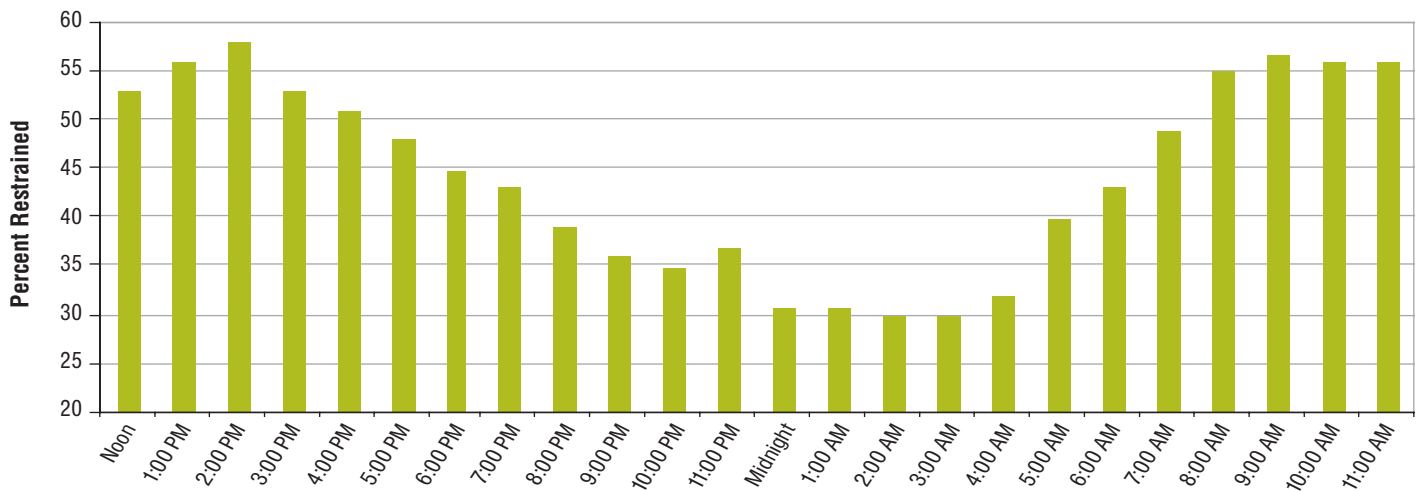
**Chart 1: Passenger Vehicle Occupant Fatalities in 2005 by Time of Day and Restraint Use**

Source: NCSA, FARS 2005 (ARF)

Unknown restraint use is distributed proportionally to the known use categories.

Restraint use among passenger vehicle occupant fatalities by each hour of the day shows that belt use can vary by nearly 30 percentage points between daytime and nighttime – from a high of 58 percent at 2 p.m. to a low of 30 percent at 2 a.m. Chart 2 shows percent restrained

among fatally injured passenger vehicle occupants by hour. The data shows a decline in belt use among fatally injured passenger vehicle occupants as nighttime progresses and increase in belt use as daytime progresses.

**Chart 2: Percent Restrained Among Fatally Injured Passenger Vehicle Occupants by Hour**

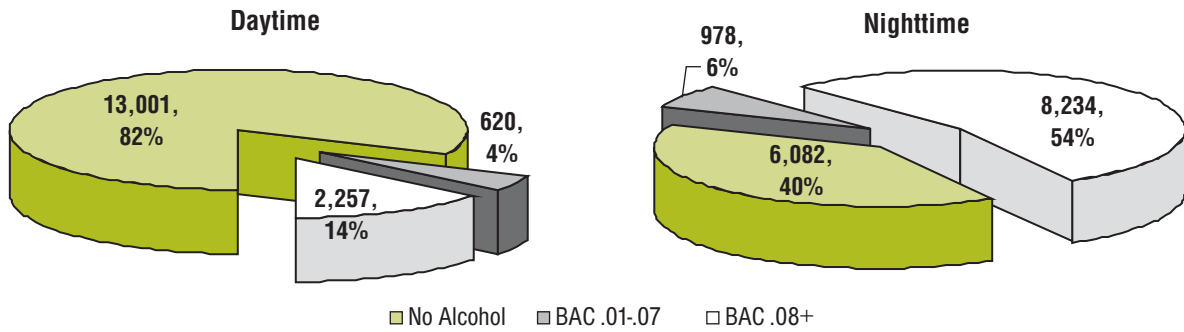
Source: NCSA, FARS 2005 (ARF)

## 2.2 Time of Day and the BAC Level in the Crash

Among the 15,878 passenger vehicle occupants killed in 2005 during daytime, 2,877 (18%) were in alcohol-related crashes (blood alcohol concentration (BAC) .01 g/dL or higher) and of these 2,257 (14%) were in crashes with BAC .08 g/dL or higher. However, of the 15,294 passenger vehicle occupants killed during nighttime, 9,212

(60%) were in crashes with a BAC of .01 g/dL or higher and 8,234 (54%) were in crashes with a BAC of .08 g/dL or higher. This clearly shows a much higher (3.3 times) alcohol involvement in crashes during nighttime. Chart 3 shows passenger vehicle occupant fatalities in 2005 by time of day and BAC level in the crash.

**Chart 3: Passenger Vehicle Occupant Fatalities in 2005 by Time of Day and the BAC Level in the Crash**



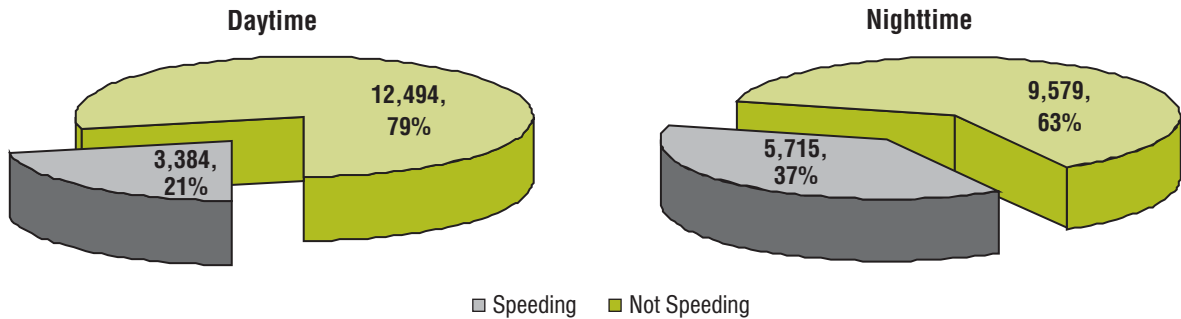
Source: NCSA, FARS 2005 (ARF)

### 2.3 Time of Day and Speeding

Of the 15,878 passenger vehicle occupants killed in motor vehicle crashes in 2005 during daytime, 3,384 (21%) were in speeding-related crashes and of the 15,294 passenger vehicle occupants killed during nighttime 5,715 (37%) were in speeding-related crashes. The data

shows a higher percentage of passenger vehicle occupants killed in speeding-related crashes at nighttime. Chart 4 shows the breakdown of passenger vehicle occupant fatalities in crashes in 2005 by time of day and speeding involvement.

**Chart 4: Passenger Vehicle Occupant Fatalities in 2005 by Time of Day and Speeding**



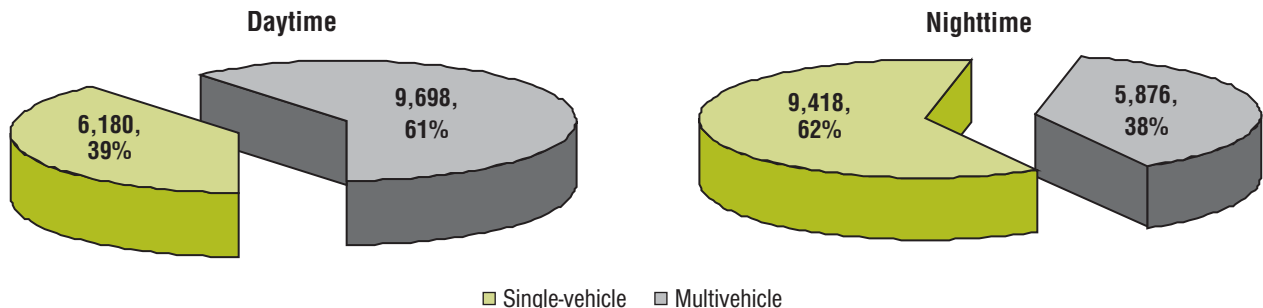
Source: NCSA, FARS 2005 (ARF)

### 2.4 Time of Day and Crash Type

In 2005, among the 15,294 passenger vehicle occupants killed in crashes during nighttime, 9,418 (62%) were in single-vehicle crashes whereas of the 15,878 passenger vehicle occupants killed in crashes during daytime, 9,698 (61%) were in multivehicle crashes. The data shows 6 out

of 10 fatal crashes involve just one vehicle (single-vehicle crash) during nighttime, which is exactly the opposite of during daytime, where 6 out of 10 fatal crashes are multivehicle crashes. Chart 5 shows passenger vehicle occupant fatalities in 2005 by time of day and crash type.

**Chart 5: Passenger Vehicle Occupant Fatalities in 2005 by Time of Day and Crash Type**



Source: NCSA, FARS 2005 (ARF)

### 3. Definitions

The term “occupant” is used for drivers, passengers, and the unknown occupant types of a motor vehicle in transport. The term “passenger vehicle occupant” refers to the drivers, passengers, and unknown occupant type of passenger cars, sport utility vehicles (SUVs), pickup trucks, vans, and other light trucks.

**Classification of Restraint Use:** Restraint usage is classified into three categories.

Classification	Categories Used
Used	Shoulder belt, lap belt, lap and shoulder belt, child safety seat, restraint used – type unknown, seat belt used improperly, child safety seat used improperly
Not Used	None used (vehicle occupant)
Unknown	Unknown if used

#### Classification of Daytime and Nighttime

Daytime: 6 a.m. to 5:59 p.m.

Nighttime: 6 p.m. to 5:59 a.m.

**Speeding:** NHSTA considers a crash to be speeding-related if a 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.

**Alcohol-related:** A motor vehicle crash is considered to be alcohol-related if at least one driver or nonoccupant (such as a pedestrian or pedalcyclist) involved in the crash is determined to have had a blood alcohol concentration (BAC) of .01 gram per deciliter (g/dL) or higher.

### 4. Findings

The reason for higher fatality rates at night could be due to both lower seat belt use and other major factors in nighttime crashes, such as higher alcohol involvement, more speeding-related crashes, and type of crash (more single- versus multiple-vehicle) suggesting that drivers during nighttime travel tend to take more risks. Data

indicate that among other things, lower seat belt use and higher alcohol involvement seem to be the two major contributors to the disproportionate nighttime risk. However, it is very important to use seat belts while riding in vehicles no matter what time of the day, since seat belts are one of the best defenses against injury for vehicle occupants in crashes.

Based on the data presented above, following are some key findings:

- In 2005, unrestrained passenger vehicle occupant fatalities were higher during nighttime (64%) than during daytime (47%).
- Depending on the hour of the day, belt use among passenger vehicle occupant fatalities can vary by nearly 30 percentage points – from a high of 58 percent at 2 p.m. to a low of 30 percent at 2 a.m.
- Alcohol involvement in passenger vehicle occupant fatalities in crashes during nighttime was much higher (3.3 times) than during daytime.
- A higher proportion of passenger vehicle occupants were killed in speeding-related crashes at nighttime.
- During nighttime 62 percent of the passenger vehicle occupant fatalities occurred in single-vehicle crashes.

The following tables show State-by-State breakdown of passenger vehicle occupants killed in 2005 by:

- Table 1: Time of day when the crash occurred and restraint use;
- Table 2: Time of day when the crash occurred and BAC level in the crash; and
- Table 3: Time of day when the crash occurred and speeding.

Table 1: Passenger Vehicle Occupant Fatalities in 2005 by State, Time of Day, and Restraint Use

State	Time of Day												Total
	Night				Day				Unknown				
	Restraint Use				Restraint Use				Restraint Use				
	Not Used		Used		Not Used		Used		Not Used		Used		
	#	%	#	%	#	%	#	%	#	%	#	%	
Alabama	313	72	120	28	264	51	254	49	0	0	0	0	951
Alaska	13	46	15	54	11	43	15	57	0	0	0	0	54
Arizona	213	67	103	33	178	54	151	46	5	71	2	29	652
Arkansas	170	77	51	23	173	61	112	39	3	75	1	25	510
California	663	43	878	57	409	31	902	69	22	54	19	46	2,893
Colorado	153	66	79	34	100	47	111	53	1	100	0	0	444
Connecticut	69	62	41	38	33	44	41	56	0	0	0	0	184
Delaware	36	70	15	30	18	40	27	60	0	0	0	0	96
Dist of Columbia	13	65	7	35	0	0	2	100	0	0	0	0	22
Florida	746	68	355	32	569	51	543	49	9	62	5	38	2,227
Georgia	405	66	209	34	350	48	375	52	2	100	0	0	1,341
Hawaii	31	68	15	32	4	21	15	79	0	0	4	100	69
Idaho	60	62	37	38	65	53	58	47	4	80	1	20	225
Illinois	318	62	195	38	180	40	273	60	1	50	1	50	968
Indiana	203	62	126	38	173	45	207	55	2	100	0	0	711
Iowa	87	59	59	41	78	38	129	63	0	0	1	100	354
Kansas	108	76	35	24	122	61	77	39	0	0	0	0	342
Kentucky	229	72	88	28	281	60	185	40	0	0	0	0	783
Louisiana	260	70	112	30	164	50	164	50	5	50	5	50	709
Maine	34	60	23	40	43	55	35	45	0	0	0	0	135
Maryland	111	52	102	48	73	40	111	60	0	0	0	0	397
Massachusetts	113	72	44	28	87	62	53	38	1	100	0	0	298
Michigan	191	51	185	49	117	27	317	73	1	20	4	80	815
Minnesota	123	66	63	34	107	44	135	56	0	0	0	0	428
Mississippi	271	75	88	25	304	72	119	28	0	0	0	0	782
Missouri	377	77	110	23	292	56	233	44	7	100	0	0	1,019
Montana	92	90	10	10	51	54	42	46	4	100	0	0	199
Nebraska	74	75	25	25	78	60	53	40	12	100	0	0	241
Nevada	80	57	59	43	71	49	73	51	0	0	0	0	283
New Hampshire	38	84	7	16	35	59	25	41	1	100	0	0	106
New Jersey	135	56	105	44	93	38	153	62	1	100	0	0	487
New Mexico	103	55	82	45	84	47	96	53	0	0	0	0	365
New York	226	56	174	44	150	35	284	65	3	60	2	40	839
North Carolina	320	58	227	42	251	43	338	57	0	0	0	0	1,136
North Dakota	34	80	9	20	36	71	15	29	0	0	0	0	94
Ohio	342	69	156	31	244	48	266	52	0	0	0	0	1,008
Oklahoma	207	71	86	29	173	51	165	49	0	0	0	0	631
Oregon	64	40	97	60	48	25	141	75	6	56	5	44	361
Pennsylvania	440	74	157	26	293	52	274	48	6	80	1	20	1,171
Rhode Island	26	66	13	34	12	63	7	37	0	0	0	0	58
South Carolina	356	77	106	23	223	59	157	41	0	0	0	0	842
South Dakota	57	86	9	14	44	63	26	38	2	67	1	33	139
Tennessee	318	70	134	30	278	53	248	47	23	69	10	31	1,010
Texas	743	57	557	43	469	38	752	62	4	80	1	20	2,526
Utah	49	59	34	41	74	53	65	47	1	100	0	0	223
Vermont	15	67	8	33	12	43	17	57	0	0	1	100	53
Virginia	253	75	83	25	218	57	167	43	1	25	3	75	725
Washington	127	54	107	46	85	38	142	62	3	100	0	0	464
West Virginia	92	73	35	28	80	53	70	47	7	70	3	30	287
Wisconsin	214	73	79	27	150	50	150	50	28	77	8	23	628
Wyoming	48	73	18	27	38	59	26	41	0	0	0	0	130
<b>NATIONAL*</b>	<b>9,785</b>	<b>64</b>	<b>5,509</b>	<b>36</b>	<b>7,488</b>	<b>47</b>	<b>8,390</b>	<b>53</b>	<b>164</b>	<b>67</b>	<b>79</b>	<b>33</b>	<b>31,415</b>
Puerto Rico	85	65	46	35	39	48	42	52	0	0	0	0	212

Source: NCSA, FARS 2005 (ARF)

Unknown restraint use is distributed proportionally to the known use categories.

\* Not equal to sum of States due to individual rounding.

Table 2: Passenger Vehicle Occupant Fatalities in 2005 by State, Time of Day, and BAC Level in the Crash

State	Time of Day												Total*
	Night						Day						
	BAC=.08+		BAC=.01+		Total		BAC=.08+		BAC=.01+		Total		
	#	%	#	%	#	%	#	%	#	%	#	%	
Alabama	235	54	256	59	433	100	90	17	104	20	518	100	951
Alaska	14	49	14	51	28	100	7	28	10	37	26	100	54
Arizona	165	52	185	59	316	100	63	19	75	23	329	100	652
Arkansas	111	50	119	54	221	100	56	20	67	24	285	100	510
California	792	51	892	58	1,541	100	187	14	253	19	1,311	100	2,893
Colorado	131	56	148	64	232	100	32	15	39	18	211	100	444
Connecticut	62	57	69	63	110	100	12	16	16	21	74	100	184
Delaware	34	66	37	72	51	100	8	17	9	20	45	100	96
Dist of Columbia	14	70	15	75	20	100	0	0	0	0	2	100	22
Florida	578	52	649	59	1,101	100	163	15	214	19	1,112	100	2,227
Georgia	264	43	299	49	614	100	92	13	114	16	725	100	1,341
Hawaii	33	72	38	83	46	100	2	11	3	16	19	100	69
Idaho	55	56	57	58	97	100	19	15	21	17	123	100	225
Illinois	288	56	335	65	513	100	67	15	91	20	453	100	968
Indiana	154	47	173	53	329	100	50	13	67	18	380	100	711
Iowa	65	45	70	48	146	100	13	6	20	9	207	100	354
Kansas	74	52	87	61	143	100	25	13	36	18	199	100	342
Kentucky	141	45	159	50	317	100	60	13	76	16	466	100	783
Louisiana	205	55	228	61	372	100	54	17	66	20	327	100	709
Maine	30	52	30	52	57	100	11	14	16	21	78	100	135
Maryland	111	52	130	61	213	100	21	11	29	16	184	100	397
Massachusetts	89	56	97	62	157	100	22	16	25	18	140	100	298
Michigan	209	55	232	62	376	100	35	8	52	12	434	100	815
Minnesota	104	56	114	62	186	100	32	13	36	15	242	100	428
Mississippi	213	59	230	64	359	100	64	15	82	19	423	100	782
Missouri	270	55	313	64	487	100	77	15	99	19	525	100	1,019
Montana	72	70	76	75	102	100	21	22	25	27	93	100	199
Nebraska	49	50	56	57	98	100	15	12	18	14	131	100	241
Nevada	75	54	83	59	139	100	22	15	28	20	144	100	283
New Hampshire	31	69	32	71	45	100	4	7	5	8	60	100	106
New Jersey	123	51	143	59	240	100	22	9	34	14	246	100	487
New Mexico	105	57	115	62	185	100	22	12	25	14	180	100	365
New York	211	53	249	62	400	100	48	11	68	16	434	100	839
North Carolina	259	47	283	52	547	100	90	15	111	19	589	100	1,136
North Dakota	30	69	33	76	43	100	10	20	16	32	51	100	94
Ohio	256	51	298	60	498	100	62	12	84	16	510	100	1,008
Oklahoma	154	53	173	59	293	100	46	14	55	16	338	100	631
Oregon	70	44	84	52	161	100	24	13	35	18	189	100	361
Pennsylvania	363	61	395	66	597	100	61	11	75	13	567	100	1,171
Rhode Island	23	59	28	71	39	100	1	6	3	17	19	100	58
South Carolina	247	53	276	60	462	100	69	18	90	24	380	100	842
South Dakota	43	65	44	66	66	100	17	25	19	27	70	100	139
Tennessee	222	49	253	56	452	100	83	16	98	19	525	100	1,010
Texas	783	60	878	68	1,300	100	216	18	258	21	1,221	100	2,526
Utah	13	16	14	16	83	100	15	11	15	11	139	100	223
Vermont	18	78	18	78	23	100	2	6	3	10	29	100	53
Virginia	176	52	203	60	336	100	55	14	73	19	385	100	725
Washington	154	66	168	72	234	100	41	18	54	24	227	100	464
West Virginia	73	57	78	61	127	100	10	7	13	9	150	100	287
Wisconsin	208	71	220	75	293	100	29	10	43	14	299	100	628
Wyoming	37	57	40	61	66	100	8	13	11	18	64	100	130
<b>National</b>	<b>8,234</b>	<b>54</b>	<b>9,212</b>	<b>60</b>	<b>15,294</b>	<b>100</b>	<b>2,257</b>	<b>14</b>	<b>2,877</b>	<b>18</b>	<b>15,878</b>	<b>100</b>	<b>31,415</b>
Puerto Rico	74	57	83	63	131	100	16	20	23	28	81	100	212

Source: NCSA, FARS 2005 (ARF)

\*includes fatalities at unknown time of day

Table 3: Passenger Vehicle Occupant Fatalities in 2005 by State, Time of Day, and Speeding

State	Time of Day												Total #
	Night				Day				Unknown				
	Speeding		Not Speeding		Speeding		Not Speeding		Speeding		Not Speeding		
	#	%	#	%	#	%	#	%	#	%	#	%	
Alabama	221	51	212	49	163	31	355	69	0	0	0	0	951
Alaska	12	43	16	57	8	31	18	69	0	0	0	0	54
Arizona	154	49	162	51	118	36	211	64	0	0	7	100	652
Arkansas	39	18	182	82	36	13	249	87	1	25	3	75	510
California	547	35	994	65	288	22	1,023	78	13	32	28	68	2,893
Colorado	114	49	118	51	48	23	163	77	1	100	0	0	444
Connecticut	54	49	56	51	17	23	57	77	0	0	0	0	184
Delaware	23	45	28	55	13	29	32	71	0	0	0	0	96
Dist of Columbia	11	55	9	45	0	0	2	100	0	0	0	0	22
Florida	98	9	1,003	91	44	4	1,068	96	2	14	12	86	2,227
Georgia	155	25	459	75	97	13	628	87	0	0	2	100	1,341
Hawaii	28	61	18	39	9	47	10	53	2	50	2	50	69
Idaho	37	38	60	62	40	33	83	67	2	40	3	60	225
Illinois	222	43	291	57	102	23	351	77	0	0	2	100	968
Indiana	103	31	226	69	76	20	304	80	1	50	1	50	711
Iowa	18	12	128	88	12	6	195	94	0	0	1	100	354
Kansas	52	36	91	64	44	22	155	78	0	0	0	0	342
Kentucky	83	26	234	74	66	14	400	86	0	0	0	0	783
Louisiana	90	24	282	76	38	12	289	88	4	40	6	60	709
Maine	36	63	21	37	26	33	52	67	0	0	0	0	135
Maryland	93	44	120	56	40	22	144	78	0	0	0	0	397
Massachusetts	79	50	78	50	28	20	112	80	1	100	0	0	298
Michigan	97	26	279	74	82	19	352	81	4	80	1	20	815
Minnesota	69	37	117	63	37	15	205	85	0	0	0	0	428
Mississippi	105	29	254	71	123	29	300	71	0	0	0	0	782
Missouri	235	48	252	52	148	28	377	72	4	57	3	43	1,019
Montana	50	49	52	51	25	27	68	73	4	100	0	0	199
Nebraska	28	29	70	71	15	11	116	89	0	0	12	100	241
Nevada	66	47	73	53	29	20	115	80	0	0	0	0	283
New Hampshire	25	56	20	44	11	18	49	82	0	0	1	100	106
New Jersey	29	12	211	88	18	7	228	93	0	0	1	100	487
New Mexico	81	44	104	56	49	27	131	73	0	0	0	0	365
New York	204	51	196	49	95	22	339	78	1	20	4	80	839
North Carolina	263	48	284	52	149	25	440	75	0	0	0	0	1,136
North Dakota	13	30	30	70	8	16	43	84	0	0	0	0	94
Ohio	137	28	361	72	68	13	442	87	0	0	0	0	1,008
Oklahoma	138	47	155	53	86	25	252	75	0	0	0	0	631
Oregon	66	41	95	59	47	25	142	75	3	27	8	73	361
Pennsylvania	340	57	257	43	194	34	373	66	2	29	5	71	1,171
Rhode Island	23	59	16	41	6	32	13	68	0	0	0	0	58
South Carolina	238	52	224	48	130	34	250	66	0	0	0	0	842
South Dakota	18	27	48	73	29	41	41	59	0	0	3	100	139
Tennessee	130	29	322	71	63	12	462	88	4	12	29	88	1,010
Texas	580	45	720	55	355	29	866	71	4	80	1	20	2,526
Utah	18	22	65	78	33	24	106	76	0	0	1	100	223
Vermont	12	52	11	48	9	31	20	69	0	0	1	100	53
Virginia	156	46	180	54	104	27	281	73	1	25	3	75	725
Washington	120	51	114	49	54	24	173	76	3	100	0	0	464
West Virginia	44	35	83	65	22	15	128	85	0	0	10	100	287
Wisconsin	133	45	160	55	65	22	234	78	21	58	15	42	628
Wyoming	28	42	38	58	17	27	47	73	0	0	0	0	130
<b>National</b>	<b>5,715</b>	<b>37</b>	<b>9,579</b>	<b>63</b>	<b>3,384</b>	<b>21</b>	<b>12,494</b>	<b>79</b>	<b>78</b>	<b>32</b>	<b>165</b>	<b>68</b>	<b>31,415</b>
Puerto Rico	91	69	40	31	35	43	46	57	0	0	0	0	212

Source: NCSA, FARS 2005 (ARF)

## References

- <sup>1</sup> NHTSA. *Traffic Safety Facts 2004 Data: Occupant Protection (US DOT HS 809 909)*. Washington, DC: National Center for Statistics and Analysis, National Highway Traffic Safety Administration. 2005. Available at: [www-nrd.nhtsa.dot.gov/pdf/nrd-30/nca/TSF2004/809909.pdf](http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/nca/TSF2004/809909.pdf)
- <sup>2</sup> Griffith, M.S. *Comparison of the Safety of Lighting Options on Urban Freeways*. FHWA-RD-94-188. 1995. McLean, VA: Federal Highway Administration
- <sup>3</sup> Bureau of Transportation Statistics. *National Household Travel Survey 2001 Highlights Report*, BTS03-05. 2003. Washington, DC: Department of Transportation. Available online at [www.bts.gov/products/national\\_household\\_travel\\_survey/highlights\\_of\\_the\\_2001/pdf/entire.pdf](http://www.bts.gov/products/national_household_travel_survey/highlights_of_the_2001/pdf/entire.pdf)



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### For More Information

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