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Factors Related to the Likelihood Of a Passenger Vehicle Occupant Being Ejected in a Fatal Crash

Technical Report

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Abstract

This report examined issues related to the ejection status of passenger vehicle occupants in fatal crashes. The tables are produced from data from the National Highway Traffic Safety Administration's Fatality Analysis Reporting System (FARS) for the 5-year period from 2003 through 2007.

The relationship between ejection status and the following factors are included in the report: occupant restraint use, occupant injury severity, vehicle model year, speed limit at the location of the crash, rollover status, vehicle type, occupant age, occupant seat position, initial impact point, and number of vehicles involved in the crash (single-vehicle crash versus multivehicle crash).

In fatal crashes from 2003 through 2007, only 2.0 percent of passenger vehicle occupants who were restrained were ejected from their vehicles, while 35.3 percent of unrestrained occupants were ejected. Of the nearly 400,000 occupants in these crashes, almost 14 percent overall were ejected.

The percentage of occupants who were ejected has dropped significantly among newer model year vehicles. Among SUVs of MY 1989 through 1998, roughly 21 to 24 percent of the SUV occupants in fatal crashes were ejected. Starting with MY 1999, this ejection percentage experienced a steep decline as the model year of the SUV became more recent. The percentage ejected dropped to as low as 9.9 percent of the SUVs of MY 2005 and later. The corresponding decline was also large among vans, from 15 percent for vans of MY 1993 down to 8.0 percent for MY 2005 and later. The decline was less steep among passenger cars, dropping from around 11-12 percent among MY 1986 through 2000, down to around 9.0 percent among MY 2005 or later. The gradual decline among pickups was from around 18 to 22 percent up to MY 1994, down to 12.7 percent among MY 2005 or later.

The percentage of occupants who were ejected was roughly twice as high when the speed limit was 60 mph or higher (18.6%) versus when the speed limit was 40 mph or less (9.6%). When the road had "no statutory limit," the percentage of occupants who were ejected was highest, at 23.5 percent.

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I. Executive Summary

NHTSA's National Center for Statistics and Analysis (NCSA) recently completed an examination of data from the Fatality Analysis Reporting System (FARS) that investigates the relationship between restraint use, ejection status, and injury severity in fatal crashes. Passenger vehicle occupants in fatal crashes for the 5-year-period from 2003 through 2007 were examined.

Restraint use is clearly designed to reduce injury severity and prevent occupants from being ejected from their vehicles. This report provides examples of the benefits of restraint use with regard to its relationship with ejection status and injury severity, and examines many other factors and their impact on the likelihood that a passenger vehicle occupant in a fatal crash will be ejected. Factors examined include vehicle model year, speed limit at the location of the crash, rollover status, vehicle type, occupant age, and seat position.

Among fatal crashes involving passenger vehicles of model year (MY) 1985 through 1998, almost 15 percent of the passenger vehicle occupants were partially or totally ejected. Among newer passenger vehicles starting with MY 1999, this percentage declined with later model year vehicles, down to 9.8 percent of the MY 2005 and later vehicles. Among SUVs of MY 1989 through 1998, a higher 21 to 24 percent of the SUV occupants in fatal crashes were ejected. Starting with MY 1999, this ejection percentage experienced a steeper decline as the model year of the vehicle became more recent. The percentage ejected dropped to as low as 9.9 percent of the SUVs of MY 2005 and later. The corresponding decline was also large among vans, from 15 percent for vans of MY 1993 down to 8.0 percent for MY 2005 and later. The decline was less steep among passenger cars, dropping from around 11-12 percent among MY 1986 through 2000, down to around 9.0 percent among MY 2005 or later. The gradual decline among pickups was from around 18-22 percent up to MY 1994, down to 12.7 percent among MY 2005 or later.

Among newer model year passenger vehicles, there has been a decline in the percentage of occupants who are in single-vehicle crashes, as well as the percentage of occupants that are in roadway departure crashes. Another trend among newer model year vehicles is the increase in restraint use among the occupants. These trends are associated with the reduction in the percentage of passenger vehicle occupants ejected among newer model year vehicles

Occupants of passenger cars, pickups, and SUVs were more than 4 times as likely to be ejected when in single-vehicle fatal crashes versus when in a multivehicle fatal crashes. Van occupants were approximately 3 1/2 times more likely to be ejected when in single-vehicle fatal crashes compared to multivehicle fatal crashes. In single-vehicle fatal crashes, SUVs and pickups had more than 30 percent of their occupants ejected.

The percentage of occupants who were ejected was roughly twice as high when the speed limit was 60 mph or higher (18.6%) versus when the speed limit was 40 mph or less (9.6%). When the road had "no statutory limit," the percentage of occupants who were ejected was highest, at 23.5 percent.

Overall, only 2.0 percent of passenger vehicle occupants who were restrained were ejected from their vehicles, while 35.3 percent of unrestrained occupants were ejected. Among the occupants

who were ejected from their passenger vehicles during fatal crashes, more than 10 times as many unrestrained occupants were ejected compared to restrained occupants.

Passenger vehicle occupants in fatal crashes who were ejected from their vehicles were 2.3 times as likely to be fatally injured compared to passenger vehicle occupants who remained inside their vehicles. Over three-quarters of the passenger vehicle occupants who were ejected in fatal crashes were not able to survive the crashes. More than 70 percent of the passenger vehicle occupants who were ejected in fatal crashes were involved in rollovers.

II. Introduction

Passenger vehicle occupants in fatal crashes for the 5-year period from 2003 through 2007 were examined in this report. These occupants include 155,359 fatally injured occupants, 157,440 non-fatally injured occupants, 83,651 occupants who received no injury, and 1,824 occupants whose injury severity was unknown, for a total of 398,274 occupants. Of the 155,359 passenger vehicle occupants who were fatally injured, over one-quarter (27.1%) were ejected. By comparison, only 13.7 percent (54,505 out of 398,274) of the total passenger vehicle occupants in fatal crashes were ejected. Of the 83,651 occupants who received no injury, only 150, or 0.2 percent, were ejected, while over 99.6 percent were not ejected.

Eighty-six percent of the 54,505 ejected occupants were unrestrained, while only 8.5 percent were restrained, and the restraint use of the remaining 5.5 percent was unknown.

Among the 54,505 passenger vehicle occupants who were ejected, more than three-quarters (77.3%) were fatally injured, while 15.1 percent had incapacitating injuries, and only 150 occupants (0.3%) had no injuries.

III. Methodology

For all charts and tables, an occupant was defined as being ejected if the occupant was coded in the FARS database as either totally ejected or partially ejected. The combination of these two ejection categories was due to the variance among fatal crashes of when the police officers arrived at the crash scenes to determine whether or not the occupants were totally or partially ejected, and the heterogeneity among the coding of ejection status on the different police crash reports in the 50 States and the District of Columbia.

Among the 54,505 passenger vehicle occupants who were ejected, nearly 45,000 were coded as totally ejected, and almost 10,000 were coded partially ejected. Among the 4,600 restrained occupants who were ejected, 54 percent were coded as totally ejected, while among the 46,900 unrestrained occupants who were ejected, 85 percent were coded as totally ejected.

Only occupants of passenger vehicles were included in this report. Passenger vehicle occupants in fatal crashes for the 5-year period from 2003 through 2007 were examined. Both fatally injured occupants and surviving occupants were included, and these occupants are listed as

"Passenger Vehicle Occupants in Fatal Crashes" in each table or figure. Passenger vehicles include passenger cars, sport utility vehicles, pickups, and vans.

Occupants coded with any of the following categories of restraint use were considered to be restrained: lap belt, shoulder belt, lap and shoulder belt, child safety seat, or "restraint used, type unknown." Occupants with restraint use types "safety belt used improperly" or "child safety seat used improperly" were also coded as being restrained. These categories of restraint use in the FARS database are aggregated into the definition of "restrained" in most NHTSA publications due to the inability of the police officers completing the police crash reports to be able to spend extensive time examining the restraint use of each occupant in the crashes.

IV. Results

Restraint Use and Ejection Status

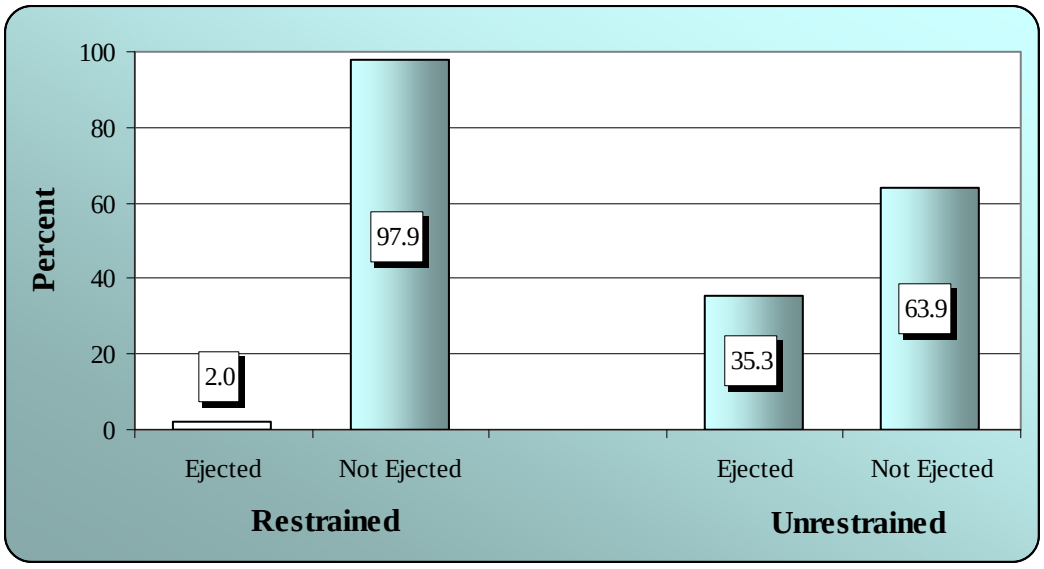
Table 1 shows that 13.7 percent of passenger vehicle occupants in fatal crashes were ejected from their vehicles. This percentage varied tremendously depending on whether the occupant was restrained or unrestrained. In fatal crashes, only 2.0 percent of passenger vehicle occupants who were restrained were ejected from their vehicles, while 35.3 percent of unrestrained occupants were ejected. Among fatal crashes, unrestrained occupants were 17.7 times as likely to be ejected from their vehicles, compared to restrained occupants.

Table 1
Passenger Vehicle Occupants in Fatal Crashes, by Ejection Status and Restraint Use

Ejection Status	Restraint Use						Total	
	Restrained		Unrestrained		Unknown			
	#	Col %	#	Col %	#	Col %	#	Col %
Ejected	4,607	2.0	46,878	35.3	3,020	9.1	54,505	13.7
Not Ejected	227,543	97.9	84,791	63.9	29,054	87.6	341,388	85.7
Unknown	272	0.1	1,020	0.8	1,089	3.3	2,381	0.6
Total	232,422	100	132,689	100	33,163	100	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 1
Passenger Vehicle Occupants in Fatal Crashes, by Ejection Status and Restraint Use



Source: NHTSA, NCSA, FARS 2003-2007

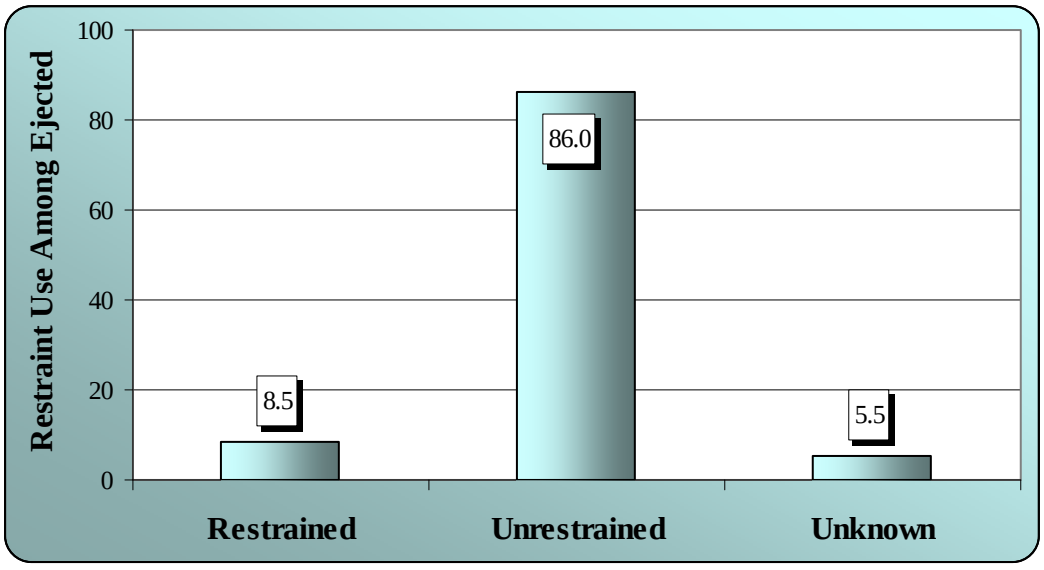
Table 2 shows the percentage of passenger vehicle occupants who were restrained, stratified by their ejection status. Among the 54,505 occupants who were ejected from their passenger vehicles, the number of occupants who were unrestrained (46,878) was more than 10 times larger than the number of occupants who were restrained (4,607). As shown in Figure 2, 8.5 percent of ejected occupants were restrained, while 86.0 percent were unrestrained, with "unknown" restraint use for 5.5 percent of ejected occupants.

Table 2
Passenger Vehicle Occupants in Fatal Crashes, by Restraint Use and Ejection Status

Restraint Use	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Col %	#	Col %	#	Col %	#	Col %
Restrained	4,607	8.5	227,543	66.7	272	11.4	232,422	58.4
Unrestrained	46,878	86.0	84,791	24.8	1,020	42.8	132,689	33.3
Unknown	3,020	5.5	29,054	8.5	1,089	45.7	33,163	8.3
Total	54,505	100	341,388	100	2,381	100	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 2
Passenger Vehicle Occupants in Fatal Crashes, by Restraint Use, Among Ejected Occupants



Source: NHTSA, NCSA, FARS 2003-2007

Injury Severity and Ejection Status

Table 3 shows the distribution of injury severity stratified by ejection status. Over three-quarters (77.3%) of the 54,505 passenger vehicle occupants who were ejected in fatal crashes were not able to survive the crashes, while 15.1 percent of those ejected received incapacitating injuries. Less than half of 1 percent (150 of 54,505) of ejected occupants were coded as having no injury.

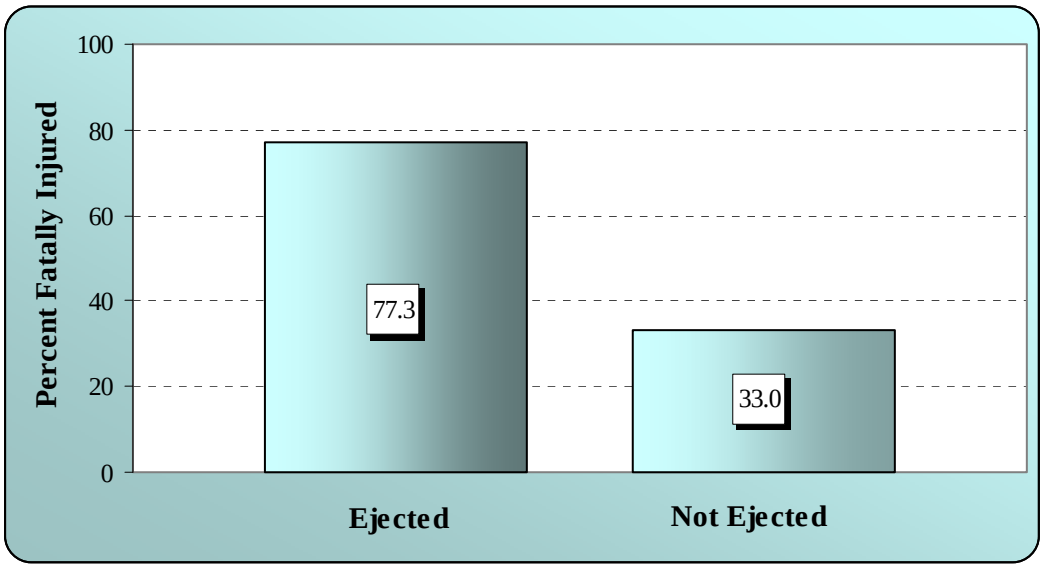
By comparison, only about one-third (33.0%) of occupants in fatal crashes who were not ejected were fatally injured (see Figure 3), and nearly a quarter (24.4%) of the occupants who were not ejected received no injuries in the crashes. Passenger vehicle occupants in fatal crashes who were ejected from their vehicles were 2.3 times as likely to be fatally injured compared to occupants who remained inside their vehicles.

Table 3
Passenger Vehicle Occupants in Fatal Crashes, by Injury Severity and Ejection Status

Injury Severity		Ejection Status						Total
		Ejected		Not Ejected		Unknown		
		#	Col %	#	Col %	#	Col %	#
Fatalities	Fatalities	42,137	77.3	112,515	33.0	707	29.7	155,359
Injuries	Incapacitating (A)	8,220	15.1	51,096	15.0	574	24.1	59,890
	Nonincapacitating (B)	3,132	5.7	56,475	16.5	504	21.2	60,111
	Possible Injury (C)	743	1.4	35,471	10.4	142	6.0	36,356
	Other	97	0.2	901	0.3	85	3.6	1,083
	Total Injuries	12,192	22.4	143,943	42.2	1,305	54.8	157,440
No Injury	No Injury	150	0.3	83,345	24.4	156	6.6	83,651
Unknown	Unknown	26	0.0	1,585	0.5	213	8.9	1,824
Total		54,505	100	341,388	100	2,381	100	398,274

Source: NHTSA, NCSA, FARS 2003-2007

Figure 3
Percent Fatally Injured Passenger Vehicle Occupants, by Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Figure 4 and Table 4 show that the passenger vehicle occupants who were fatally injured were the most likely (27.1%) to have been ejected. As the injury severity decreased, the likelihood that the occupant was ejected also decreased. Only 13.7 percent of occupants with incapacitating injuries were ejected, compared to 5.2 percent of occupants with non-incapacitating injuries, and 2.0 percent of occupants with possible injuries, and 0.2 percent of occupants with no injury.

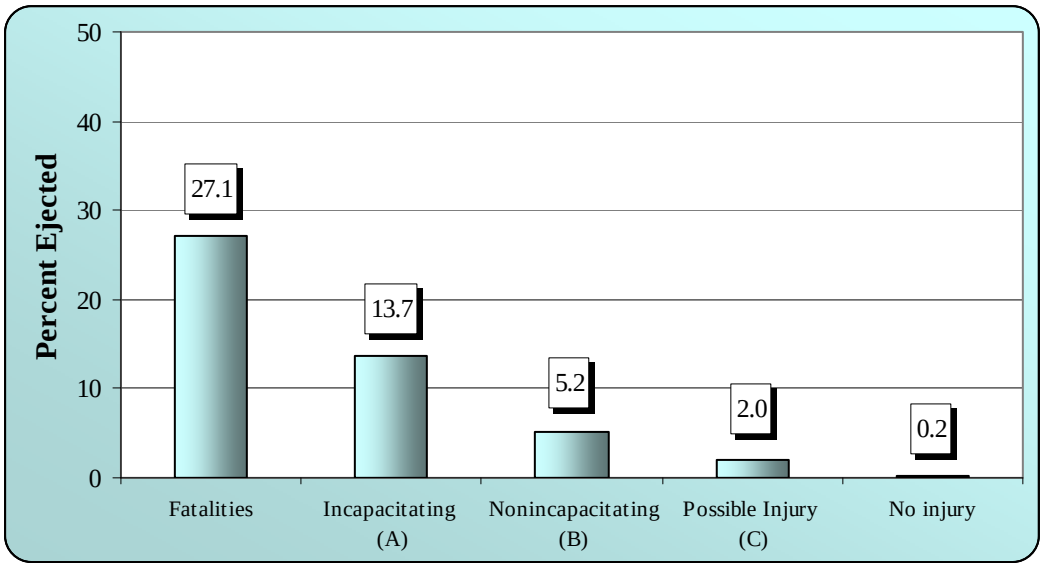
The injury counts displayed in Figure 4 are the same counts as shown in Figure 3. However, the percentages in Figure 4 are row percentages, while the percentages in Figure 3 are column percentages. These Figure 4 percentages, for each injury severity, show the likelihood that the passenger vehicle occupant was ejected.

Table 4
Passenger Vehicle Occupants in Fatal Crashes, by Injury Severity and Ejection Status

Injury Severity		Ejection Status						Total	
		Ejected		Not Ejected		Unknown			
		#	Row %	#	Row %	#	Row %	#	%
Fatalities	Fatalities	42,137	27.1	112,515	72.4	707	0.5	155,359	100
Injuries	Incapacitating (A)	8,220	13.7	51,096	85.3	574	1.0	59,890	100
	Nonincapacitating (B)	3,132	5.2	56,475	94.0	504	0.8	60,111	100
	Possible Injury (C)	743	2.0	35,471	97.6	142	0.4	36,356	100
	Other	97	9.0	901	83.2	85	7.8	1,083	100
	Total Injuries	12,192	7.7	143,943	91.4	1,305	0.8	157,440	100
No Injury	No Injury	150	0.2	83,345	99.6	156	0.2	83,651	100
Unknown	Unknown	26	1.4	1,585	86.9	213	11.7	1,824	100
Total		54,505	13.7	341,388	85.7	2,381	0.6	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 4
Passenger Vehicle Occupants in Fatal Crashes, by Injury Severity and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Injury Severity and Restraint Use

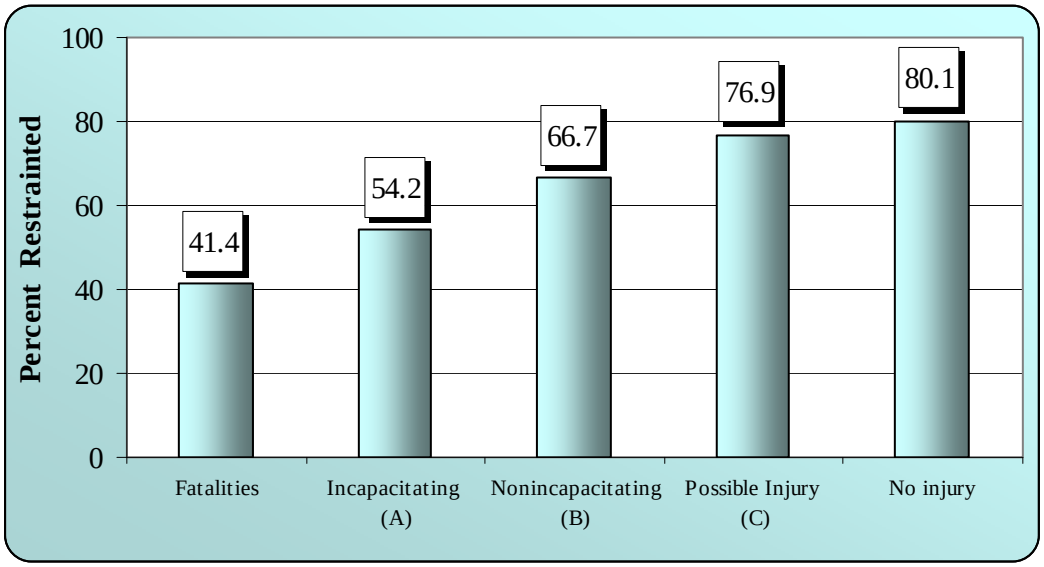
Table 5 and Figure 5 illustrate that the percentage of passenger vehicle occupants who were restrained increases as the severity of their injuries decreases. Only 41.4 percent of occupants fatally injured were restrained, compared to 54.2 percent of occupants with incapacitating injuries, 66.7 percent of occupants with non-incapacitating injuries, and 76.9 percent of occupants with possible injuries. Four out of 5 passenger vehicle occupants (80.1%) in a fatal crash who were not injured in that crash were restrained, with the majority of the remaining occupants having unknown restraint use.

Table 5
Passenger Vehicle Occupants in Fatal Crashes, by Injury Severity and Restraint Use

Injury Severity		Restraint Use						Total	
		Restrained		Unrestrained		Unknown			
		#	Row %	#	Row %	#	Row %	#	%
Fatalities	Fatalities	64,259	41.4	79,501	51.2	11,599	7.5	155,359	100
Injuries	Incapacitating (A)	32,469	54.2	22,910	38.3	4,511	7.5	59,890	100
	Nonincapacitating (B)	40,069	66.7	16,042	26.7	4,000	6.7	60,111	100
	Possible Injury (C)	27,946	76.9	6,047	16.6	2,363	6.5	36,356	100
	Other	429	39.6	271	25.0	383	35.4	1,083	100
	Total Injuries	100,913	64.1	45,270	28.8	11,257	7.2	157,440	100
No Injury	No Injury	67,014	80.1	7,747	9.3	8,890	10.6	83,651	100
Unknown	Unknown	236	12.9	171	9.4	1,417	77.7	1,824	100
Total		232,422	58.4	132,689	33.3	33,163	8.3	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 5
Passenger Vehicle Occupants in Fatal Crashes, by Injury Severity and Restraint Use



Source: NHTSA, NCSA, FARS 2003-2007

Rollover and Ejection Status

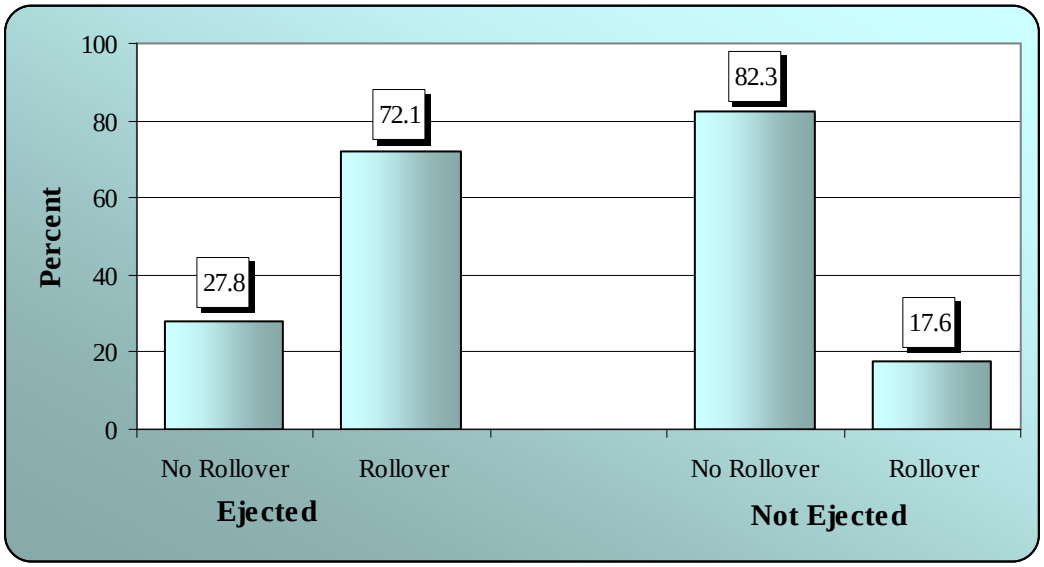
Table 6 shows that of the 54,505 passenger vehicle occupants who were ejected in fatal crashes, 39,312 (72.1%) of these occupants were involved in rollovers. By contrast, only 17.6 percent of occupants who were not ejected were involved in rollovers. Figure 6 shows that the occupants in fatal crashes who were ejected were more than 4 times as likely to be in rollovers, compared to those occupants who were not ejected.

Table 6
Passenger Vehicle Occupants in Fatal Crashes, by Rollover and Ejection Status

Rollover	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Col %	#	Col %	#	Col %	#	Col %
No Rollover	15,178	27.8	281,065	82.3	1,126	47.3	297,369	74.7
Rollover	39,312	72.1	59,980	17.6	1,254	52.6	100,546	25.2
Other/Unknown	15	0.0	343	0.1	2	.	358	0.1
Total	54,505	100	341,388	100	2,382	100	398,273	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 6
Passenger Vehicle Occupants in Fatal Crashes, by Rollover and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Point of Impact and Ejection Status

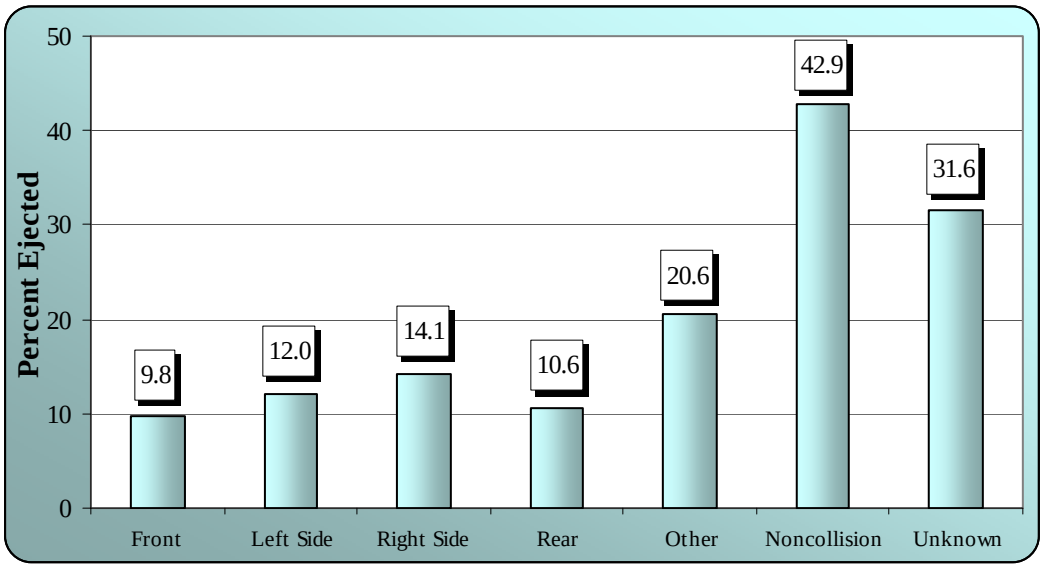
When the initial point of impact in a fatal crash was in the front, left side, right side, or rear of a passenger vehicle (as opposed to an underride, override, or noncollision), only 9.8 to 14.1 percent of occupants were ejected, as shown in Table 7. An occupant was mostly likely to be ejected, 42.9 percent of the time, when the crash was initiated with a noncollision. One example of an event that is coded as a noncollision is a rollover, as many rollovers occur without being initiated by an impact with other vehicles or fixed objects. Noncollisions accounted for 23.4 percent (12,736 of 54,505) of the occupants who were ejected in fatal crashes

Table 7
Passenger Vehicle Occupants in Fatal Crashes, by Point of Impact and Ejection Status

Initial Point of Impact	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	%
Front	23,024	9.8	211,238	89.8	905	0.4	235,167	100
Left Side	5,431	12.0	39,572	87.5	199	0.4	45,202	100
Right Side	6,028	14.1	36,353	85.3	225	0.5	42,606	100
Rear	2,987	10.6	25,138	89.1	103	0.4	28,228	100
Other	2,225	20.6	8,506	78.6	90	0.8	10,821	100
Noncollision	12,736	42.9	16,331	55.0	624	2.1	29,691	100
Unknown	2,074	31.6	4,250	64.8	235	3.6	6,559	100
Total	54,505	13.7	341,388	85.7	2,381	0.6	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 7
Passenger Vehicle Occupants in Fatal Crashes, by Point of Impact and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Age Group and Ejection Status

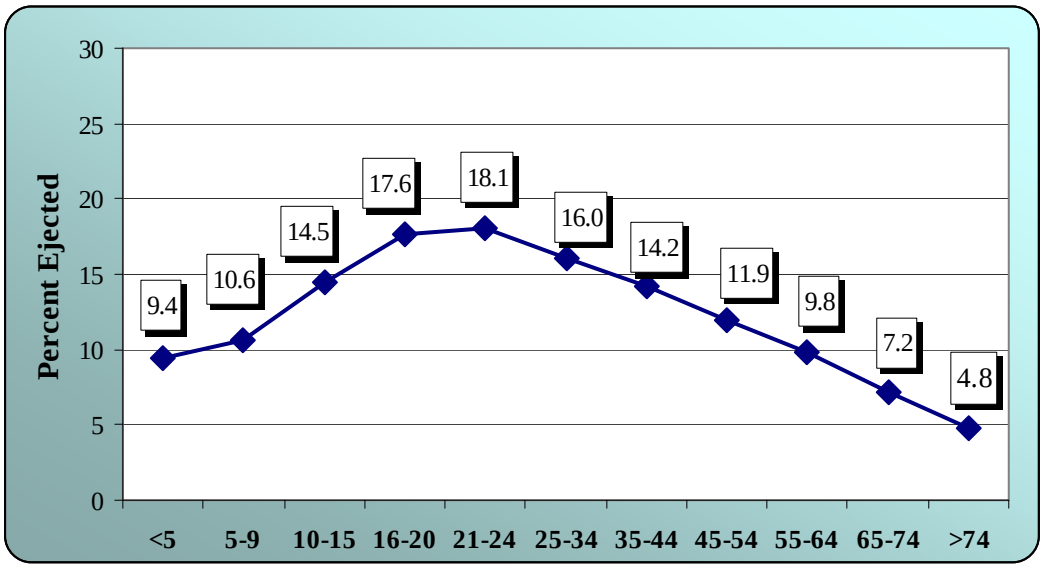
While 13.7 percent of all passenger vehicle occupants in fatal crashes were ejected from their vehicles, combining two of the age groups in Table 8 indicates that 16- to 24-year-old occupants (17.8%) were the most likely to be ejected. By contrast, occupants 75 and older (4.8%) were the least likely to be ejected. Figure 8 shows that the probability that an occupant was ejected climbed from the 0-to-4 age range (9.4%) up to the 21-to-24 age range (18.1%), and then dropped consistently as the age approached the 75-and older-category (4.8%).

Table 8
Passenger Vehicle Occupants in Fatal Crashes, by Age Group and Ejection Status

Age Group	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	%
<5	1,160	9.4	11,126	89.9	89	0.7	12,375	100
5-9	1,183	10.6	9,893	88.8	67	0.6	11,143	100
10-15	2,828	14.5	16,488	84.7	157	0.8	19,473	100
16-20	11,833	17.6	54,898	81.7	463	0.7	67,194	100
21-24	8,215	18.1	36,904	81.2	331	0.7	45,450	100
25-34	10,682	16.0	55,593	83.4	411	0.6	66,686	100
35-44	7,645	14.2	46,127	85.4	249	0.5	54,021	100
45-54	5,298	11.9	39,029	87.7	153	0.3	44,480	100
55-64	2,884	9.8	26,465	89.9	75	0.3	29,424	100
65-74	1,390	7.2	17,899	92.6	50	0.3	19,339	100
>74	1,065	4.8	20,952	94.9	64	0.3	22,081	100
Unknown	322	4.9	6,014	91.0	272	4.1	6,608	100
Total	54,505	13.7	341,388	85.7	2,381	0.6	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 8
Passenger Vehicle Occupants in Fatal Crashes, by Age Group and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Vehicle Type, Restraint Use, and Ejection Status

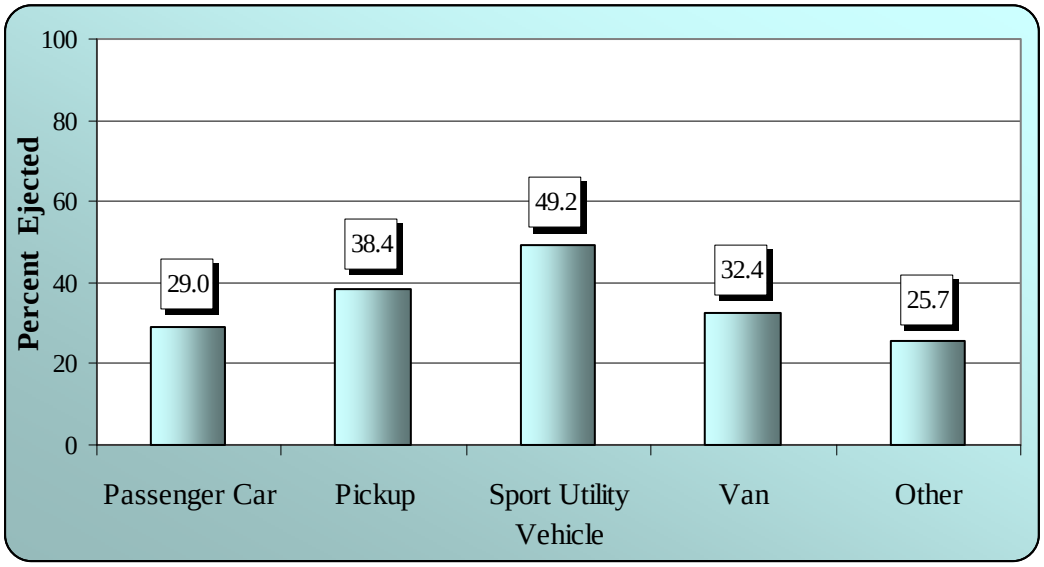
While overall nearly 35.3 percent of unrestrained passenger vehicle occupants in fatal crashes were ejected from their vehicles, Table 9 shows that this percentage varied largely according to the type of vehicle in which the occupant was traveling. Among unrestrained occupants in sport utility vehicles, 49.2 percent were ejected, compared to 38.4 percent of unrestrained pickup occupants, 32.4 percent of unrestrained van occupants, and 29.0 percent of unrestrained passenger car occupants. Only 11.1 percent of all van occupants and 11.1 percent of all passenger car occupants in fatal crashes were ejected, while a larger percentage of all pickup occupants (16.7%) and all sport utility vehicle occupants (18.9%) were ejected.

Table 9
Passenger Vehicle Occupants in Fatal Crashes, By Vehicle Type, Restraint Use, and Ejection Status

Passenger Vehicle Type		Ejection Status						Total	
		Ejected		Not Ejected		Unknown			
		#	Row %	#	Row %	#	Row %	#	Row %
Passenger Car	Restrained	2,350	2.0	117,757	97.9	138	0.1	120,245	100
	Unrestrained	18,631	29.0	45,390	70.5	324	0.5	64,345	100
	Unknown	1,511	8.3	16,283	89.0	505	2.8	18,299	100
	Total	22,492	11.1	179,430	88.4	967	0.5	202,889	100
Pickup	Restrained	674	1.6	42,445	98.3	41	0.1	43,160	100
	Unrestrained	12,395	38.4	19,607	60.8	244	0.8	32,246	100
	Unknown	507	8.6	5,125	86.7	281	4.8	5,913	100
	Total	13,576	16.7	67,177	82.6	566	0.7	81,319	100
SUV	Restrained	1,176	2.7	43,080	97.2	53	0.1	44,309	100
	Unrestrained	12,214	49.2	12,372	49.8	236	1.0	24,822	100
	Unknown	694	12.9	4,531	84.4	143	2.7	5,368	100
	Total	14,084	18.9	59,983	80.5	432	0.6	74,499	100
Van	Restrained	406	1.7	23,827	98.2	40	0.2	24,273	100
	Unrestrained	3,592	32.4	7,289	65.7	216	1.9	11,097	100
	Unknown	302	8.6	3,066	87.0	155	4.4	3,523	100
	Total	4,300	11.1	34,182	87.9	411	1.1	38,893	100
Other	Restrained	1	0.2	434	99.8	0	0.0	435	100
	Unrestrained	46	25.7	133	74.3	0	0.0	179	100
	Unknown	6	10.0	49	81.7	5	8.3	60	100
	Total	53	7.9	616	91.4	5	0.7	674	100
Total	Restrained	4,607	2.0	227,543	97.9	272	0.1	232,422	100
	Unrestrained	46,878	35.3	84,791	63.9	1,020	0.8	132,689	100
	Unknown	3,020	9.1	29,054	87.6	1,089	3.3	33,163	100
	Total	54,505	13.7	341,388	85.7	2,381	0.6	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 9
Unrestrained Passenger Vehicle Occupants in Fatal Crashes, By Vehicle Type and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Seat Position and Ejection Status

Before stratifying by seat position, it has been shown that 13.7 percent of passenger vehicle occupants in fatal crashes were ejected from their vehicles. Table 10 shows that this percentage varied according to the occupant's seating position. Almost 31,000 of the 54,505 passenger vehicle occupants who were ejected were seated in the driver's seats, while over 10,000 were seated in the front-right passenger seats. More occupants were ejected from the front-right passenger seat than from the second, third, and fourth rows of the vehicle combined.

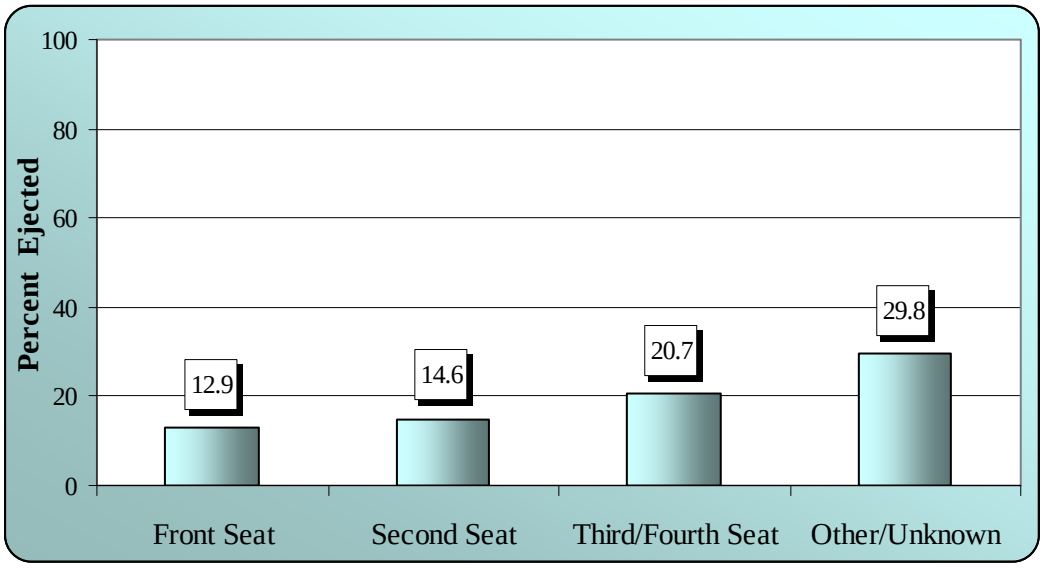
Figure 10 shows that occupants of the front row of seats were the least likely to be ejected (12.9%), while 14.6 percent of the second row occupants, and 20.7 percent of the third/fourth rows were ejected in these fatal crashes. A higher percentage of the occupants in the middle of the front seat (17.6%) and second seat (17.3%) were ejected, compared to those in the driver's seat (13.1%), front right passenger seat (12.0%), or second seat outboard seat positions (almost 14%).

Table 10
Passenger Vehicle Occupants in Fatal Crashes, By Seating Row and Ejection Status

Seating Row	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	Col %
Front Seat	41,617	12.9	280,713	86.7	1,297	0.4	323,627	100
Second Seat	8,662	14.6	50,304	84.9	307	0.5	59,273	100
Third/Fourth Seat	804	20.7	3,016	77.8	55	1.4	3,875	100
Other/Unknown	3,422	29.8	7,355	64.0	722	6.3	11,499	100
Total	54,505	13.7	341,388	85.7	2,381	0.6	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 10
Passenger Vehicle Occupants in Fatal Crashes, By Seating Row and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Speed Limit and Ejection Status

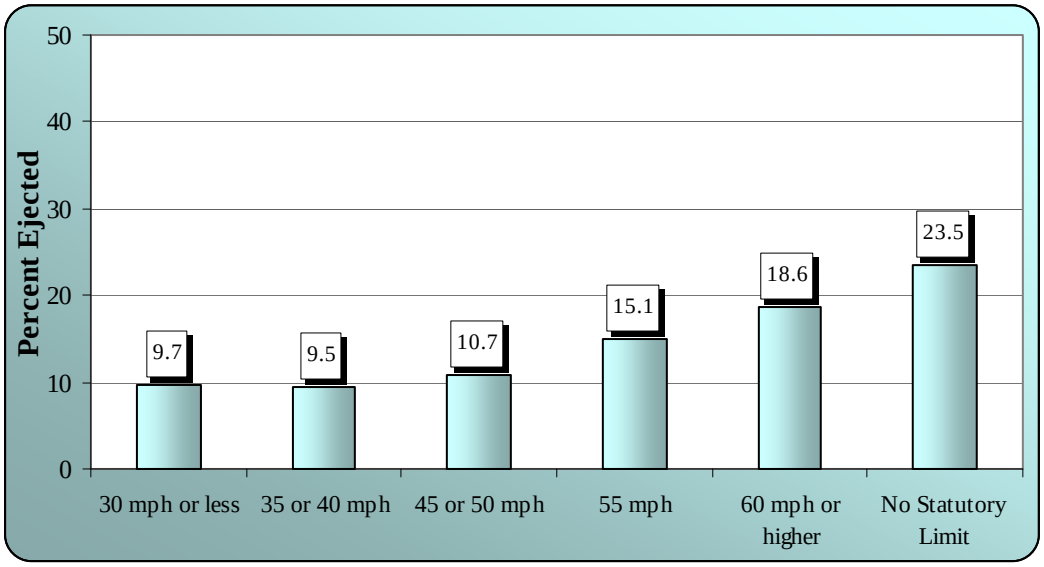
Table 11 shows the relationship between speed limit and the probability that a passenger vehicle occupant in a fatal crash is ejected. Figure 11 shows that as the speed limit increases, the percentage of passenger vehicle occupants who are ejected increases. The percentage of occupants who are ejected is roughly twice as high when the speed limit is 60 mph or higher (18.6%) versus when the speed limit is 30 mph or less (9.6%) or "35 or 40 mph" (9.5%). Among the nearly 1,000 occupants in fatal crashes when the road has "no statutory limit," the percentage of occupants who are ejected is highest, at 23.5 percent. Two-thirds of ejections in fatal crashes occurred when the speed limit was 55 mph (18,427) or 60 mph or higher (17,652).

Table 11
Passenger Vehicle Occupants in Fatal Crashes,
By Speed Limit and Ejection Status

Speed Limit	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	%
30 mph or Less	3,180	9.7	29,543	89.7	228	0.7	32,951	100
35 or 40 mph	6,084	9.5	57,835	90.0	364	0.6	64,283	100
45 or 50 mph	8,090	10.7	66,903	88.8	332	0.4	75,325	100
55 mph	18,427	15.1	103,227	84.4	594	0.5	122,248	100
60 mph or Higher	17,652	18.6	76,510	80.7	615	0.6	94,777	100
No Statutory Limit	214	23.5	663	72.9	32	3.5	909	100
Unknown	858	11.0	6,707	86.2	216	2.8	7,781	100
Total	54,505	13.7	341,388	85.7	2,381	0.6	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007
Note: Only Passenger Car, Pickup, Sport Utility Vehicle, Van, and Other Light Truck

Figure 11
Passenger Vehicle Occupants in Fatal Crashes,
By Speed Limit and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Year and Ejection Status

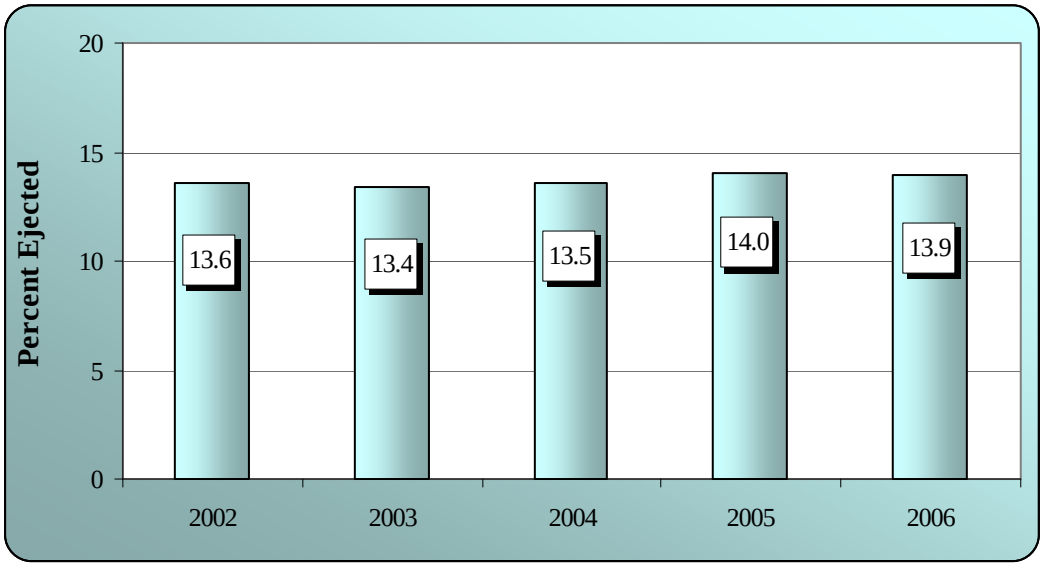
This majority of this report aggregates the five years of fatal crashes from 2003 through 2007. As shown below in Table 12 and Figure 12, the percentage of passenger vehicle occupants who were ejected has not changed significantly over this time period, staying between 13.4 percent and 14.0 percent.

Table 12
Passenger Vehicle Occupants in Fatal Crashes,
By Year and Ejection Status

Year	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	%
2003	11,316	13.6	71,439	85.8	546	0.7	83,301	100
2004	10,959	13.4	70,290	86.0	487	0.6	81,736	100
2005	10,963	13.5	69,610	86.0	404	0.5	80,977	100
2006	10,968	14.0	66,866	85.4	457	0.6	78,291	100
2007	10,299	13.9	63,183	85.4	487	0.7	73,969	100
Total	54,505	13.7	341,388	85.7	2,381	0.6	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007
Note: Only Passenger Car, Pickup, Sport Utility Vehicle, Van, and Other Light Truck

Figure 12
Passenger Vehicle Occupants in Fatal Crashes,
By Year and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Model Year, Vehicle Type, and Ejection Status

Tables 13 through 17 examine the relationship between the model year of the vehicle and the percentage of occupants ejected. Table 13 consists of passenger vehicles, which account for 54,505 occupants who were ejected in fatal crashes, and Table 14 focuses on sport utility vehicles, which account for 14,084 (out of the total of 54,505) occupants who were ejected in fatal crashes. Table 15 focuses on passenger cars, which account for 22,492 occupants who were ejected in fatal crashes, while the corresponding Tables 16 and 17 are for vans (4,300 occupants) and pickups (13,576 occupants).

Figures 13 through 17 graphically display the declines in the percentage of occupants in fatal crashes who were ejected, among more recent model year vehicles. These declines are seen for passenger vehicles overall (Figure 13), sport utility vehicles specifically (Figure 14), passenger cars specifically (Figure 15), vans specifically (Figure 16), and pickups specifically (Figure 17).

Table 13 shows that among passenger vehicles of model year (MY) 1985 through 1998, around 14 to 15 percent of the passenger vehicle occupants were ejected. Starting with MY 1999, this percentage showed a downward trend, dropping to 11.9 percent of MY 2004 vehicles, and ending up with 9.8 percent of the MY 2005 and later vehicles. This trend is displayed graphically in Figure 13.

Table 14 shows that among sport utility vehicles (SUVs) of MY 1989 through 1998, around 21 to 24 percent of the SUV occupants in fatal crashes were ejected. Starting with MY 1999, this percentage was lower for newer model years. Some 19.6 percent of occupants of SUVs of MY

1999 were ejected, compared to 15.6 percent of occupants of MY 2002 SUVs, 12.7 percent of MY 2004 SUVs, and 9.9 percent SUVs of MY 2005 and later. See Figure 14 for a graphical display of this relationship between the model year of the SUVs and the percentage of occupants ejected.

Table 15 shows that among passenger cars of MY 1986 through 2000, the percentage of occupants in fatal crashes who were ejected hovered around 11 to 12 percent. Starting with MY 2001, the percentage declined below 11 percent for newer model years, dropping to 9.0 percent of occupants of MY 2005 or later. This downward trend was much less than the downward trend seen among SUVs.

While a comparison of Figures 14 and 15 shows that SUVs had a higher percentage ejected for almost every model year, compared to passenger cars, we see that among vehicles of MY 2005 and later the percentage ejected is essentially equivalent among passenger cars (9.0%) and SUVs (9.9%). Given that the percentage of SUV occupants in fatal crashes who were ejected hovered around 21 to 24 percent for MY 1989 through 1998, which was roughly twice the percentage of passenger cars from MY 1986 through 2000 (11 to 12%), we see that the decline in percentage ejected among newer vehicles was greater among SUVs compared to passenger cars.

Table 16 shows that among vans of MY 1988 through 1993, around 13 to 16 percent of the van occupants were ejected. This percentage declined to below 10 percent among vehicles of MY 2002 and later, and dropped to 8.0 percent of the MY 2005 and later vehicles. This trend is displayed graphically in Figure 16.

Table 17 shows that among pickups up to model year (MY) 1994, around 18 to 22 percent of pickup occupants were ejected. This percentage declined to around 15-17 percent for MY 1994 through 2004, before dropping to 12.7 percent of MY 2005 and later vehicles. This trend is displayed graphically in Figure 17.

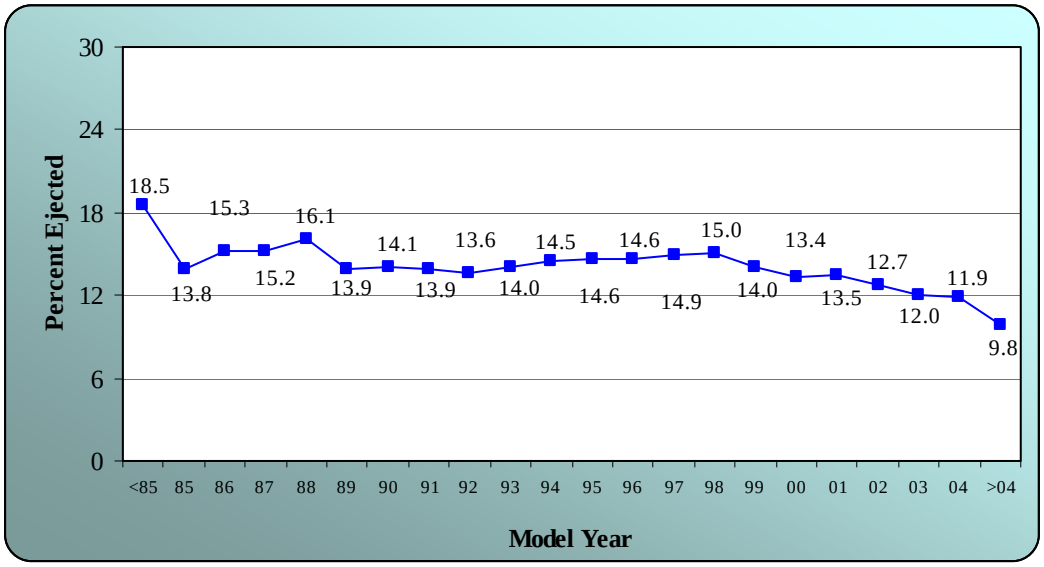
Figure 18 displays the percentage of occupants in fatal crashes who were ejected, by vehicle type, and combines the data from Tables 13 through 17. Figure 18 shows that while the percentage of SUV occupants in fatal crashes who were ejected declined the most, the percentage of passenger car occupants, van occupants, and pickup occupants ejected in fatal crashes also showed a downward trend.

Table 13
Passenger Vehicle Occupants in Fatal Crashes, By Model Year and Ejection Status

Model Year	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	%
< 1985	1,883	18.5	8,244	80.9	60	0.6	10,187	100
1985	440	13.8	2,729	85.9	9	0.3	3,178	100
1986	672	15.3	3,707	84.2	25	0.6	4,404	100
1987	836	15.2	4,621	84.0	46	0.8	5,503	100
1988	1,218	16.1	6,292	83.3	45	0.6	7,555	100
1989	1,321	13.9	8,127	85.5	53	0.6	9,501	100
1990	1,570	14.1	9,485	85.1	94	0.8	11,149	100
1991	1,799	13.9	11,000	85.3	101	0.8	12,900	100
1992	2,048	13.6	12,991	86.0	73	0.5	15,112	100
1993	2,558	14.0	15,592	85.3	129	0.7	18,279	100
1994	2,975	14.5	17,326	84.7	147	0.7	20,448	100
1995	3,462	14.6	20,069	84.6	191	0.8	23,722	100
1996	3,180	14.6	18,493	84.7	154	0.7	21,827	100
1997	3,759	14.9	21,381	84.6	146	0.6	25,286	100
1998	3,865	15.0	21,699	84.5	127	0.5	25,691	100
1999	3,958	14.0	24,064	85.4	170	0.6	28,192	100
2000	3,904	13.4	25,129	86.1	142	0.5	29,175	100
2001	3,654	13.5	23,357	86.0	142	0.5	27,153	100
2002	3,393	12.7	23,225	86.9	103	0.4	26,721	100
2003	3,023	12.0	22,003	87.6	104	0.4	25,130	100
2004	2,303	11.9	17,022	87.6	98	0.5	19,423	100
>2004	2,590	9.8	23,615	89.7	126	0.5	26,331	100
Unknown	94	6.7	1,217	86.5	96	6.8	1,407	100
Total	54,505	13.7	341,388	85.7	2,381	0.6	398,274	100

Source: NHTSA, NCSA, FARS 2003-2007
Note: Only Sport Utility Vehicle, Passenger Car, Van, Pickup, and Other Light Truck

Figure 13
Passenger Vehicle Occupants in Fatal Crashes,
By Model Year and Ejection Status



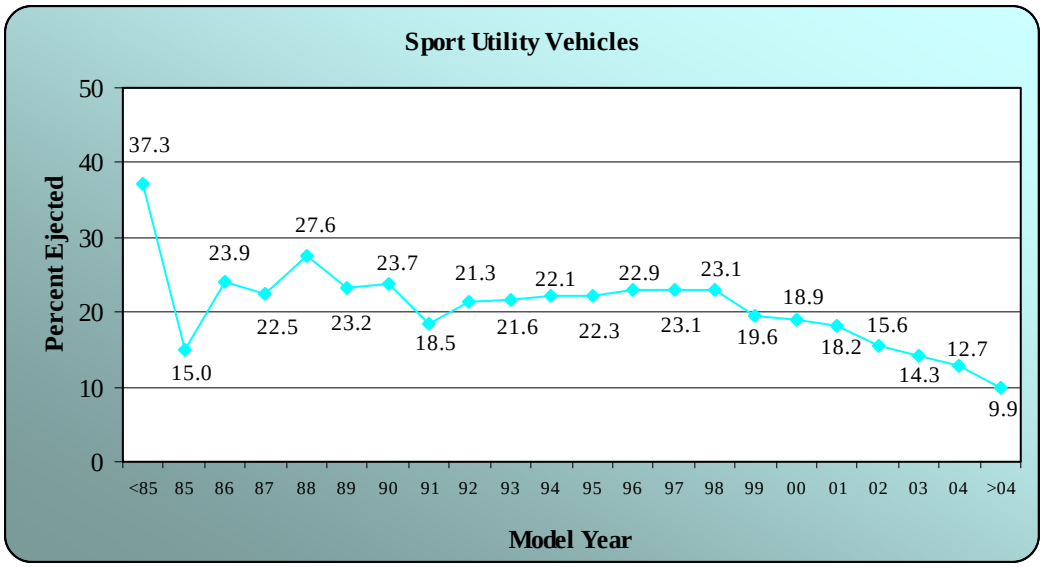
Source: NHTSA, NCSA, FARS 2003-2007
Note: Only Sport Utility Vehicle, Passenger Car, Van, Pickup, and Other Light Truck

Table 14
Sport Utility Vehicle Occupants in Fatal Crashes, By Model Year and Ejection Status

Model Year	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	%
< 1985	328	37.3	546	62.0	6	0.7	880	100
1985	50	15.0	283	85.0	0	0.0	333	100
1986	91	23.9	280	73.7	9	2.4	380	100
1987	131	22.5	436	74.8	16	2.7	583	100
1988	197	27.6	507	71.0	10	1.4	714	100
1989	206	23.2	674	75.9	8	0.9	888	100
1990	213	23.7	675	75.0	12	1.3	900	100
1991	288	18.5	1,247	80.2	20	1.3	1,555	100
1992	360	21.3	1,326	78.3	7	0.4	1,693	100
1993	513	21.6	1,837	77.4	23	1.0	2,373	100
1994	670	22.1	2,357	77.6	10	0.3	3,037	100
1995	867	22.3	2,974	76.5	47	1.2	3,888	100
1996	942	22.9	3,129	76.1	43	1.0	4,114	100
1997	1,195	23.1	3,956	76.3	31	0.6	5,182	100
1998	1,388	23.1	4,601	76.4	32	0.5	6,021	100
1999	1,298	19.6	5,281	79.8	35	0.5	6,614	100
2000	1,170	18.9	5,000	80.7	22	0.4	6,192	100
2001	1,069	18.2	4,796	81.5	22	0.4	5,887	100
2002	1,075	15.6	5,774	84.0	25	0.4	6,874	100
2003	901	14.3	5,382	85.4	17	0.3	6,300	100
2004	605	12.7	4,140	87.1	8	0.2	4,753	100
>2004	515	9.9	4,634	89.5	29	0.6	5,178	100
Unknown	12	7.5	148	92.5	0	0.0	160	100
Total	14,084	18.9	59,983	80.5	432	0.6	74,499	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 14
Sport Utility Vehicle Occupants in Fatal Crashes,
By Model Year and Ejection Status



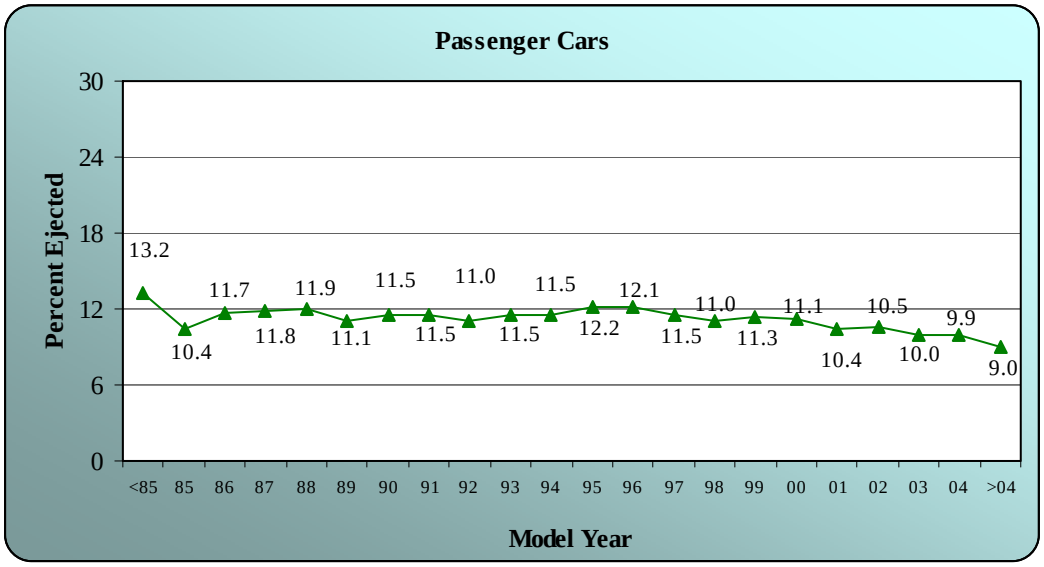
Source: NHTSA, NCSA, FARS 2003-2007

Table 15
Passenger Car Occupants in Fatal Crashes, By Model Year and Ejection Status

Model Year	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	%
< 1985	619	13.2	4,041	86.3	20	0.4	4,680	100
1985	164	10.4	1,412	89.4	4	0.3	1,580	100
1986	281	11.7	2,104	87.9	8	0.3	2,393	100
1987	384	11.8	2,841	87.6	19	0.6	3,244	100
1988	521	11.9	3,823	87.6	20	0.5	4,364	100
1989	657	11.1	5,229	88.4	32	0.5	5,918	100
1990	837	11.5	6,401	87.9	48	0.7	7,286	100
1991	950	11.5	7,246	88.0	40	0.5	8,236	100
1992	1,071	11.0	8,575	88.5	48	0.5	9,694	100
1993	1,293	11.5	9,828	87.8	75	0.7	11,196	100
1994	1,311	11.5	10,021	88.1	49	0.4	11,381	100
1995	1,652	12.2	11,859	87.2	83	0.6	13,594	100
1996	1,441	12.1	10,410	87.4	65	0.5	11,916	100
1997	1,444	11.5	11,090	88.2	45	0.4	12,579	100
1998	1,321	11.0	10,597	88.6	40	0.3	11,958	100
1999	1,445	11.3	11,263	88.2	57	0.4	12,765	100
2000	1,512	11.1	12,002	88.4	64	0.5	13,578	100
2001	1,266	10.4	10,827	89.1	55	0.5	12,148	100
2002	1,209	10.5	10,263	89.2	32	0.3	11,504	100
2003	1,084	10.0	9,753	89.6	46	0.4	10,883	100
2004	819	9.9	7,414	89.8	26	0.3	8,259	100
>2004	1,167	9.0	11,691	90.6	42	0.3	12,900	100
Unknown	44	5.3	740	88.8	49	5.9	833	100
Total	22,492	11.1	179,430	88.4	967	0.5	202,889	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 15
Passenger Car Occupants in Fatal Crashes,
By Model Year and Ejection Status



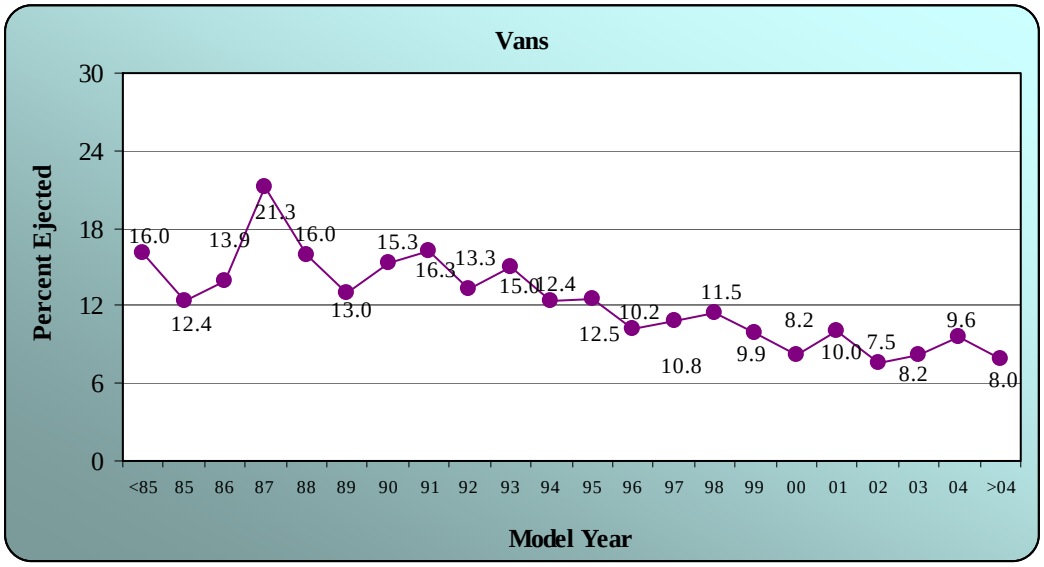
Source: NHTSA, NCSA, FARS 2003-2007

Table 16
Van Occupants in Fatal Crashes,
By Model Year and Ejection Status

Model Year	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	%
< 1985	90	16.0	464	82.7	7	1.2	561	100
1985	34	12.4	240	87.6	0	0.0	274	100
1986	48	13.9	296	85.5	2	0.6	346	100
1987	108	21.3	400	78.7	0	0.0	508	100
1988	106	16.0	547	82.4	11	1.7	664	100
1989	105	13.0	696	86.5	4	0.5	805	100
1990	160	15.3	866	82.6	22	2.1	1,048	100
1991	181	16.3	898	80.7	34	3.1	1,113	100
1992	187	13.3	1,211	85.9	12	0.9	1,410	100
1993	308	15.0	1,730	84.0	21	1.0	2,059	100
1994	291	12.4	1,988	85.0	61	2.6	2,340	100
1995	327	12.5	2,253	86.0	40	1.5	2,620	100
1996	216	10.2	1,879	88.9	19	0.9	2,114	100
1997	239	10.8	1,962	88.3	22	1.0	2,223	100
1998	333	11.5	2,532	87.3	35	1.2	2,900	100
1999	291	9.9	2,604	88.9	33	1.1	2,928	100
2000	268	8.2	2,991	91.0	27	0.8	3,286	100
2001	257	10.0	2,299	89.4	16	0.6	2,572	100
2002	169	7.5	2,079	92.4	3	0.1	2,251	100
2003	191	8.2	2,117	91.3	11	0.5	2,319	100
2004	153	9.6	1,422	89.4	15	0.9	1,590	100
>2004	226	8.0	2,602	91.7	10	0.4	2,838	100
Unknown	12	9.7	106	85.5	6	4.8	124	100
Total	4,300	11.1	34,182	87.9	411	1.1	38,893	100

Source: NHTSA, NCSA, FARS 2003-2007

Figure 16
Van Occupants in Fatal Crashes,
By Model Year and Ejection Status



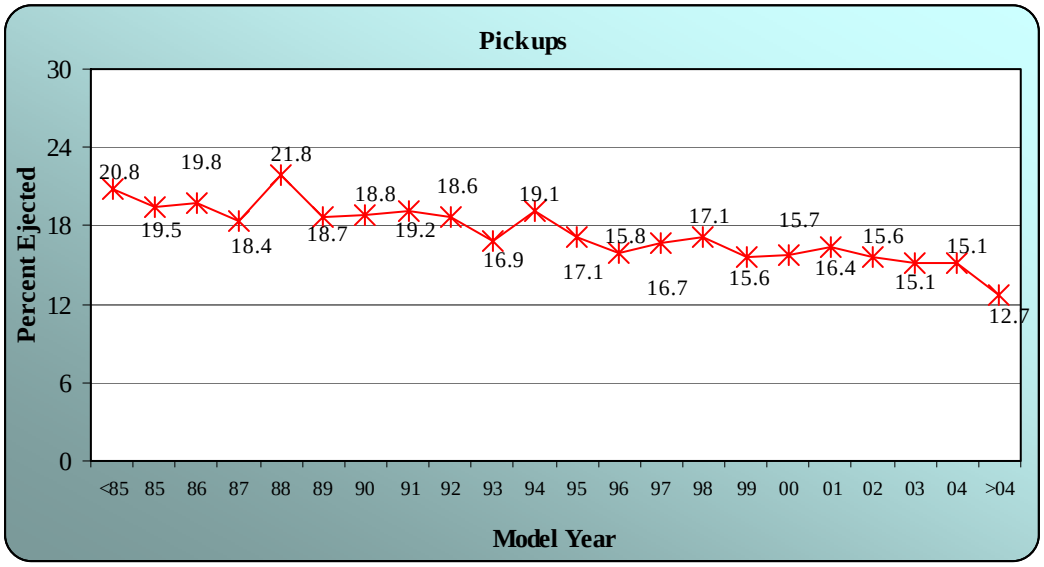
Source: NHTSA, NCSA, FARS 2003-2007

Table 17
Pickup Occupants in Fatal Crashes,
By Model Year and Ejection Status

Model Year	Ejection Status						Total	
	Ejected		Not Ejected		Unknown			
	#	Row %	#	Row %	#	Row %	#	%
< 1985	836	20.8	3,151	78.5	27	0.7	4,014	100
1985	192	19.5	787	80.0	5	0.5	984	100
1986	252	19.8	1,014	79.7	6	0.5	1,272	100
1987	213	18.4	936	80.7	11	0.9	1,160	100
1988	394	21.8	1,407	78.0	4	0.2	1,805	100
1989	352	18.7	1,518	80.8	9	0.5	1,879	100
1990	356	18.8	1,521	80.5	12	0.6	1,889	100
1991	380	19.2	1,595	80.5	7	0.4	1,982	100
1992	430	18.6	1,873	81.1	6	0.3	2,309	100
1993	444	16.9	2,181	82.8	10	0.4	2,635	100
1994	700	19.1	2,941	80.2	27	0.7	3,668	100
1995	615	17.1	2,959	82.3	21	0.6	3,595	100
1996	580	15.8	3,054	83.4	27	0.7	3,661	100
1997	881	16.7	4,341	82.4	48	0.9	5,270	100
1998	821	17.1	3,952	82.5	20	0.4	4,793	100
1999	905	15.6	4,858	83.6	45	0.8	5,808	100
2000	953	15.7	5,083	83.8	29	0.5	6,065	100
2001	1,062	16.4	5,381	82.9	49	0.8	6,492	100
2002	939	15.6	5,046	83.7	43	0.7	6,028	100
2003	846	15.1	4,723	84.4	30	0.5	5,599	100
2004	723	15.1	4,002	83.8	49	1.0	4,774	100
>2004	679	12.7	4,644	86.5	43	0.8	5,366	100
Unknown	23	8.5	210	77.5	38	14.0	271	100
Total	13,576	16.7	67,177	82.6	566	0.7	81,319	100

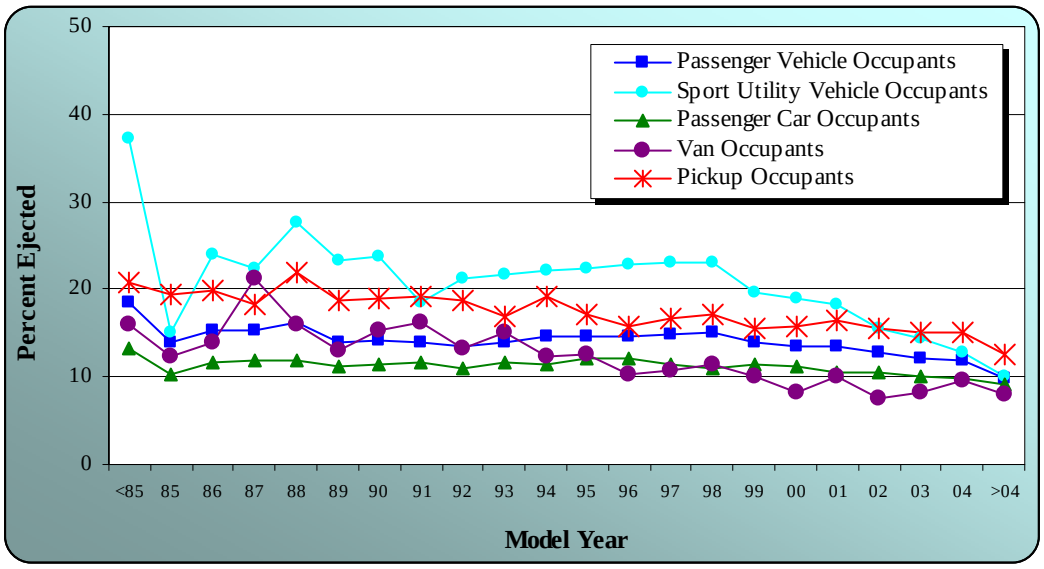
Source: NHTSA, NCSA, FARS 2003-2007

Figure 17
Pickup Occupants in Fatal Crashes,
By Model Year and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Figure 18
Passenger Vehicle Occupants in Fatal Crashes,
By Vehicle Type, Model Year and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

Note: Passenger vehicles include passenger cars, sport utility vehicles, vans, and pickup trucks.

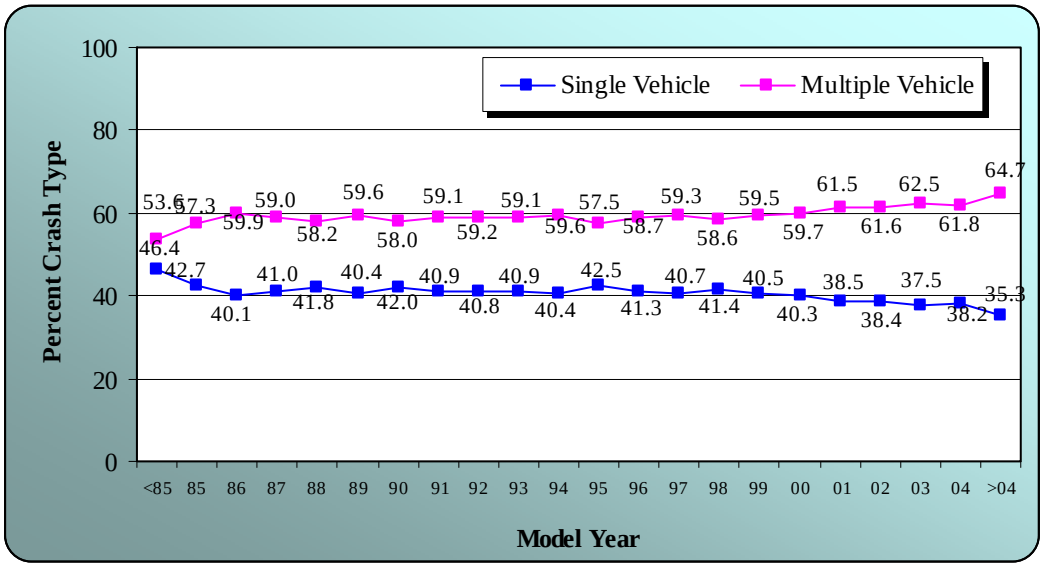
Model Year and Crash Type

Among passenger vehicles occupants of fatal crashes from 2003 through 2007, the percentage of those occupants in single-vehicle fatal crashes has shown a downward trend among newer vehicles. For passenger vehicles of model year (MY) prior to 1985, 46 percent of the occupants were in single-vehicle crashes. This percentage hovered around 40 to 42 percent for vehicles of MY 1985 through 2000, and then dropped and remained around 38 percent among MY 2001 through 2004 vehicles. Only 35 percent of passenger vehicle occupants in vehicle of MY later than 2004 were in single-vehicle crashes. This trend is displayed graphically in Figure 19.

The decline in the percentage of passenger vehicle occupants who were in single-vehicle crashes among newer model year passenger vehicles is associated with the reduction in the percentage of passenger vehicle occupants ejected among newer model year vehicles

Out of the 54,505 occupants of passenger vehicles who were ejected in fatal crashes from 2003 through 2007, 75 percent of these ejections (40,795) occurred in single-vehicle crashes, while only a quarter of the ejections (13,710) were in multiple-vehicle crashes. This shows how much more likely an ejection is to occur in a single-vehicle fatal crash (40,795 out of 159,805, or 25.5%) compared to a multiple-vehicle crash (13,710 out of 238,469, or 5.7%).

Figure 19
Passenger Vehicle Occupants in Fatal Crashes,
By Model Year and Crash Type



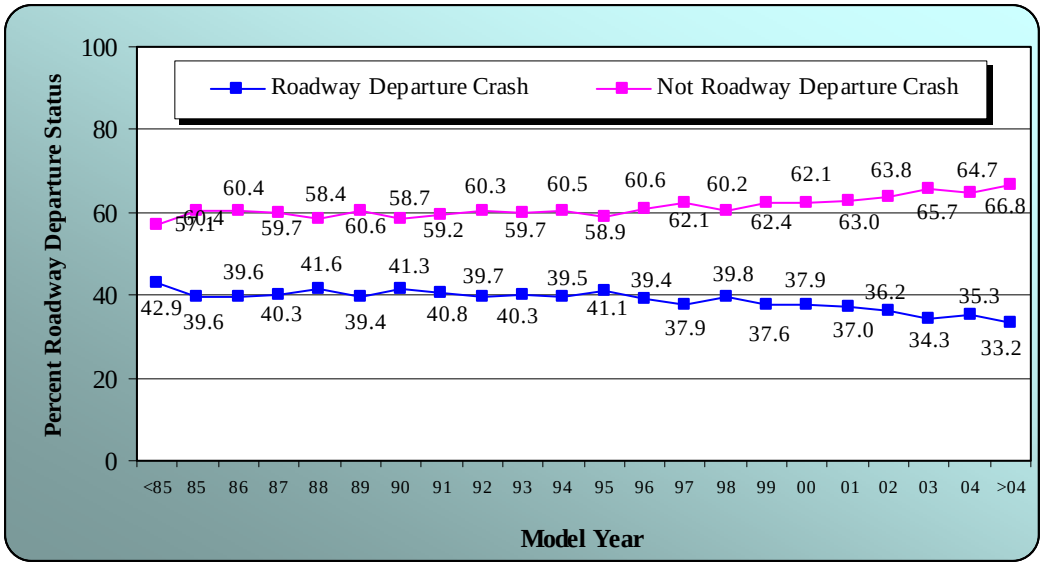
Source: NHTSA, NCSA, FARS 2003-2007

Model Year and Roadway Departure Status

Among passenger vehicle occupants in fatal crashes, the percentage of these occupants who have been in vehicles that departed the roadway has shown a downward trend among newer vehicles. This trend is displayed graphically in Figure 20. For passenger vehicles of model year prior to 1985, 43 percent of the occupants were in roadway departure crashes. This percentage remained near 40 percent for vehicles of MY 1985 through 1998 (with the exception of 38% in 1997), and then showed a downward trend, from 40 percent of MY 1998, down to where only 33 percent of passenger vehicle occupants in vehicles of model year later than 2004 were in roadway departure crashes.

The decline in the percentage of passenger vehicle occupants who are in roadway departure crashes among newer model year passenger vehicles is associated with the reduction in the percentage of passenger vehicle occupants ejected among newer model year vehicles

Figure 20
Passenger Vehicle Occupants in Fatal Crashes,
By Model Year and Roadway Departure Status



Source: NHTSA, NCSA, FARS 2003-2007

Model Year and Restraint Use

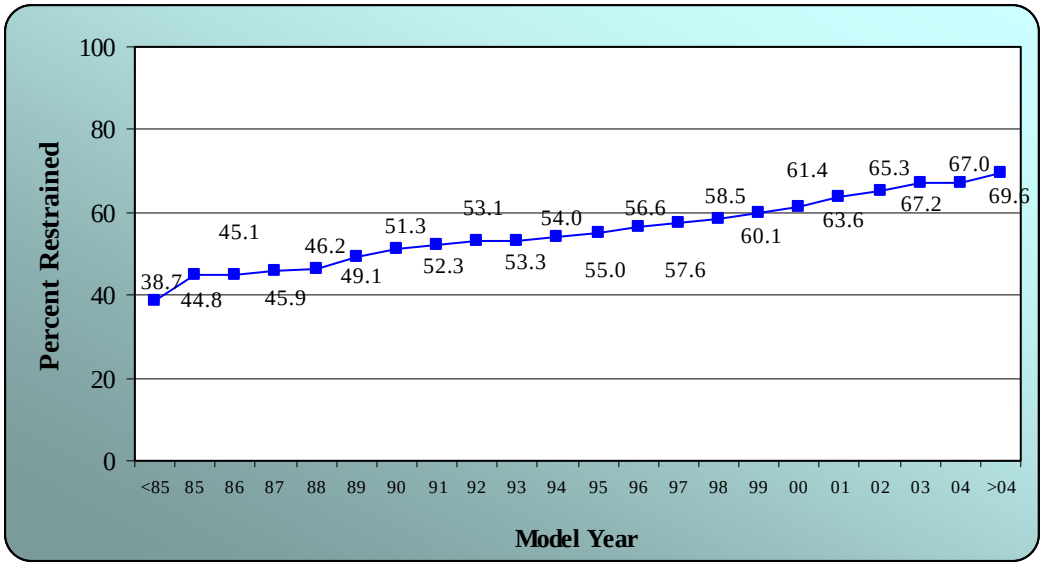
Restraint use has improved greatly over time in the last quarter-century. Figure 21 displays the relationship between passenger vehicle occupants' restraint use and the model year of the passenger vehicles in fatal crashes occurring from 2003 through 2007. This figure is similar to, but should not be confused with, the improvement in restraint use that has occurred over time (i.e., percentage restrained in calendar year 1985 to calendar year 2005 and later). Figure 21 is based on fatal crashes that occurred from 2003 through 2007, and displays restraint use in the fatal crashes over this 5-year time frame, and its association with the model year of the vehicle that the occupant was traveling in at the time of the fatal crash.

Among vehicles of MY prior to 1985, only 39 percent of occupants in fatal crashes were coded by police officers as restrained. This percentage increased to 45 percent among vehicles of MY 1985, and increased every year from 45 percent in MY 1985 to 67 percent in MY 2003, before reaching 70 percent among occupants of vehicles of MY 2005 and later.

The increase in the percentage of restrained occupants among newer model year passenger vehicles is associated with the reduction in percentage ejected among newer model year vehicles

Note: Unknown restraint use is not included here, as Figure 21 only displays the percentage of passenger vehicle occupants who were coded by the police officer as being restrained. Between 7 percent and 10 percent of passenger vehicle occupants in fatal crashes were coded as having "unknown" restraint use during the years displayed in Figure 21. There has been a slight drop in the percentage of occupants with unknown restraint use in vehicles of recent model years.

Figure 21
Passenger Vehicle Occupants in Fatal Crashes,
By Model Year and Restraint Use



Source: NHTSA, NCSA, FARS 2003-2007

Crash Type, Vehicle Type, and Ejection Status

A single-vehicle fatal crash is far more likely to involve an ejection (and potentially a rollover) than a multivehicle crash. The relationship between crash type, vehicle type, and ejection status is shown below in Table 18 and Figure 22.

In single-vehicle fatal crashes, SUVs and pickups respectively had 31.6 and 30.4 percent of occupants ejected. Passenger cars (21.5%) and vans (20.9%) were less likely to have their occupants ejected from the vehicles.

By comparison, occupants involved in multivehicle fatal crashes were much less likely to have been ejected from their vehicles. SUVs and pickups respectively had only 7.8 and 6.8 percent of occupants ejected. Only 4.7 percent of occupants of passenger cars were ejected from their vehicles, among multivehicle fatal crashes.

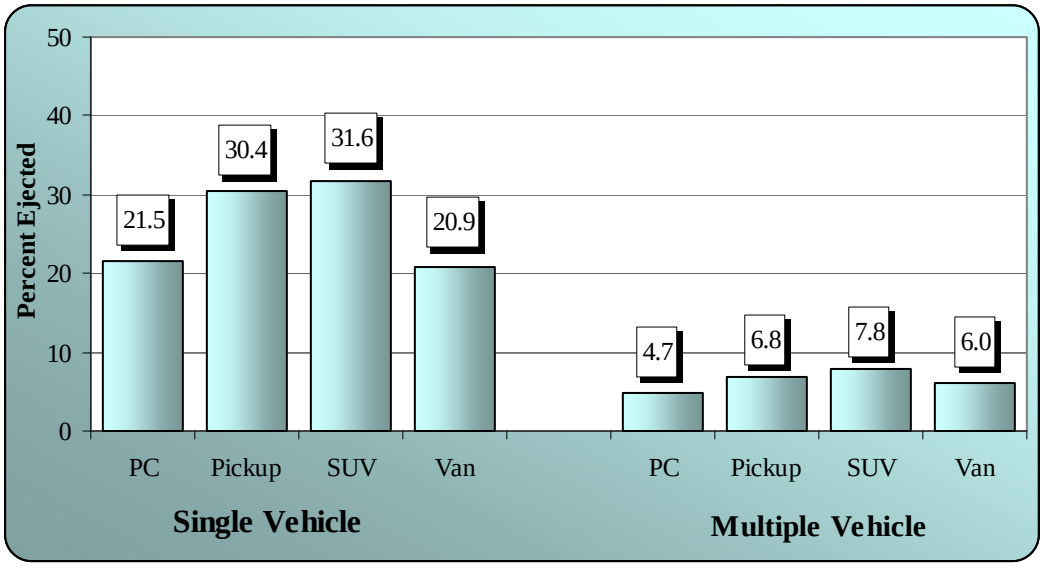
Among all passenger vehicles, 25.5 percent of occupants in single-vehicle fatal crashes were ejected, compared to 5.7 percent of occupants in multivehicle fatal crashes. Figure 22 shows that occupants of passenger cars, pickups, and SUVs were between 4 and 5 times more likely to be ejected when in a single-vehicle fatal crash versus when in a multivehicle fatal crash. Van occupants were approximately 3 1/2 times more likely to be ejected when in a single-vehicle fatal crash compared to a multivehicle fatal crash.

Table 18
Passenger Vehicle Occupants in Fatal Crashes, By Crash Type, Vehicle Type, and Ejection Status

Crash Type and Vehicle Type		Ejection Status						Total
		Ejected		Not Ejected		Unknown		
		#	Row %	#	Row %	#	Row %	#
Crash Type	**Vehicle Type**							
Single Vehicle	**Passenger Car**	16,668	21.5	60,470	77.8	554	0.7	77,692
	Pickup	10,371	30.4	23,343	68.4	405	1.2	34,119
	SUV	10,969	31.6	23,378	67.4	313	0.9	34,660
	Van	2,753	20.9	10,134	76.9	286	2.2	13,173
	Other	34	21.1	125	77.6	2	1.2	161
	Total	40,795	25.5	117,450	73.5	1,560	1.0	159,805
Multiple Vehicle	**Passenger Car**	5,824	4.7	118,960	95.0	413	0.3	125,197
	Pickup	3,205	6.8	43,834	92.9	161	0.3	47,200
	SUV	3,115	7.8	36,605	91.9	119	0.3	39,839
	Van	1,547	6.0	24,048	93.5	125	0.5	25,720
	Other	19	3.7	491	95.7	3	0.6	513
	Total	13,710	5.7	223,938	93.9	821	0.3	238,469
Total	**Passenger Car**	22,492	11.1	179,430	88.4	967	0.5	202,889
	Pickup	13,576	16.7	67,177	82.6	566	0.7	81,319
	SUV	14,084	18.9	59,983	80.5	432	0.6	74,499
	Van	4,300	11.1	34,182	87.9	411	1.1	38,893
	Other	53	7.9	616	91.4	5	0.7	674
	Total	54,505	13.7	341,388	85.7	2,381	0.6	398,274

Source: NHTSA, NCSA, FARS 2003-2007

Figure 22
Passenger Vehicle Occupants in Fatal Crashes,
By Crash Type, Vehicle Type, and Ejection Status



Source: NHTSA, NCSA, FARS 2003-2007

V. Conclusions

In fatal crashes from 2003 through 2007, only 2.0 percent of passenger vehicle occupants who were restrained were ejected from their vehicles, while 35.3 percent of unrestrained occupants were ejected. Unrestrained occupants were therefore 17.7 times as likely to be ejected from their vehicles, compared to restrained occupants.

Among the 54,505 occupants who were ejected from their passenger vehicle during a fatal crash, the number of occupants who were unrestrained was more than 10 times the number of occupants who were restrained.

Among passenger vehicles of model year 1985 through 1998, around 14 to 15 percent of the passenger vehicle occupants were ejected. Starting with MY 1999, this percentage showed a downward trend as the model year became newer, down to 9.8 percent of the MY 2005 and later vehicles. Among SUVs of MY 1989 through 1998, around 21 to 24 percent of the SUV occupants in fatal crashes were ejected. Starting with MY 1999, this ejection percentage was also lower for newer model years, as low as 9.9 percent of the SUVs of MY 2005 and later. The percentage ejected in passenger cars remained around 11 to 12 percent from MY 1986 through 1999, then showed a downward trend to 9.0 percent among MY 2005 and later. A much smaller decline in the percentage ejected among fatal crashes occurred in passenger cars (from 11 to 12 percent down to 9.0 percent among MY 2005 or later) compared to SUVs (from 21 to 24 percent, down to 9.9 percent among MY 2005 or later). The corresponding decline was large among vans, from the range of 13 to 16 percent for vans of MY 1998 through 1993 down to 8.0 percent for MY 2005 and later. The decline among pickups was from 18 to 22 percent up to MY 1994, down to 12.7 percent among MY 2005 or later.

Among newer model year passenger vehicles, there has been a decline in the percentage of the occupants who are in single-vehicle crashes, as well as the percentage of occupants who are in roadway departure crashes. Another trend among newer model year vehicles is the increase in restraint use among the occupants. These trends are associated with the reduction in the percentage of passenger vehicle occupants ejected among newer model year vehicles

Occupants of passenger cars, pickups, and SUVs were between 4 and 5 times more likely to be ejected when in single-vehicle fatal crashes versus when in multivehicle fatal crashes. Van occupants were approximately 3 1/2 times more likely to be ejected when in single-vehicle fatal crashes compared to multivehicle fatal crashes. In single-vehicle fatal crashes, SUVs and pickups had over 30 percent of their occupants ejected.

The percentage of occupants who were ejected was roughly twice as high when the speed limit was 60 mph or higher (18.6%) versus when the speed limit was 40 mph or less (9.6%). When the road had “no statutory limit,” the percentage of occupants who were ejected was highest, at 23.5 percent. Two-thirds of ejections occurred when the speed limit was 55 mph or higher.

Passenger vehicle occupants in fatal crashes who were ejected from their vehicles were 2.3 times as likely to be fatally injured compared to passenger vehicle occupants who remained inside their vehicles. Over three-quarters (77.3%) of the passenger vehicle occupants who were ejected in fatal crashes were not able to survive the crashes.

Nearly three-quarters (72.1%) of the passenger vehicle occupants who were ejected in fatal crashes were involved in rollovers.

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