HIGHWAY LOSS DATA INSTITUTE

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Young teen crash risk by vehicle type

Previous HLDI studies have shown that collision claim frequencies are highest for young drivers. The purpose of this analysis is to explore the extent to which collision claim frequencies vary by vehicle size and type for 15–17-year-old drivers relative to 35–50-year-old drivers. Thirty-two different vehicle size and type groups were examined and, in all but one, claim frequencies were higher for young teens than for prime-age drivers. Midsize sports cars had the highest claim frequency ratio of 2.6, indicating that claim rates for young teens are 2.6 times as high as prime-age drivers. Twenty-one of the 32 vehicle size and type groups had claim frequency ratios that were at least 1.5. Ten of the vehicle size and type groups had claim frequency ratios that were 2.0 or higher. Drivers age 15 to 17 are over-represented in the exposure of small two- and four-door passenger cars; these two vehicle size/classes have claim frequency ratios of at least 2.0, meaning teens are twice as likely as older drivers to have a crash driving these vehicles.

Introduction

When choosing a vehicle for their children, parents of teenagers often factor in things like price and fuel efficiency but may lack information on which vehicles are safest for young drivers. To help guide parents in these decisions, studies were performed comparing driver deaths and insurance losses of young teens and adults their parents' age. Teens typically learn to drive between the ages of 15 and 17, while their parents would be expected to be between 35 and 50. These two age groups were selected for analysis.

An analysis of the Fatality Analysis Reporting System (FARS) was conducted by the Insurance Institute for Highway Safety (IIHS) comparing the distribution of driver deaths by vehicle type and size. The analysis examined the extent to which the fatality distribution for 15–17 year-olds differed from that for 35–50 year-olds in several vehicle size and type categories. The FARS analysis showed young teen drivers were more likely to die in cars than older drivers. Twenty-nine percent of teen driver deaths occured in small or mini cars.

This Highway Loss Data Institute (HLDI) study was conducted simultaneously with the IIHS analysis to determine if collision claim frequencies for young teenagers relative to 35–50-year-old drivers varied similarly by vehicle size and class. To ensure comparability, model years, and calendar years were identical to those in the IIHS and HLDI analyses. These two studies work together to provide a more complete picture of vehicle safety to parents and can provide guidance in selecting a vehicle for young teenagers to operate when they first learn to drive.

Methods

Study vehicles included 2000–13 models during calendar years 2008–12. For each calendar year, only the 10 most current model years were included in the study (e.g., 2000–09 models in calendar year 2008). Vehicles in this study included thirty-eight vehicle type and size categories. Six of these size and class categories could not be examined for the young teen drivers, as they did not meet the minimum 1,000 years of exposure reporting threshold, yielding 32 categories.

Two rated driver age groups were used for this study: 15–17 (young teens) and 35–50 (hereafter referred to as prime-age drivers). The teen age group was selected to focus on the safety behavior of young teenagers at their initial driving years. The comparison ages of 35–50 were chosen as they are the most likely ages of the parents of these new drivers. The rated driver is the driver who is considered to represent the greatest loss potential for the insured vehicle. In a multiple-vehicle/driver household, how a driver is assigned to a vehicle can vary by insurance company and state. A limitation of this study is that information on the actual driver at the time of a loss is not available in the HLDI database. Among the rated drivers within the study, young teenagers represented just 1.3 percent of the total collision exposure.

The primary metric used to evaluate differences in crash risk by vehicle type for teens relative to prime-age drivers was the ratio of young teenagers' collision claim frequencies over prime-age drivers' collision claim frequencies. Collision claim frequencies are measured in claims per 100 insured vehicle years. The use of these ratios provides a control for different use patterns by vehicle sizes and types. Losses were reported for data points that have at least 1,000 insured vehicle years. For the entire study population, the collision claim frequency was 5.9 claims per 100 insured vehicle years based upon 127,169,680 vehicle years and 7,544,895 collision claims.

Results

Table 1 shows the exposure, claims, and claim frequencies for the two study age groups during the study period. Young teens represented 1.3 percent of collision exposure, yet were responsible for 2.4 percent of the collision claims. Figure 1 shows how the claim frequency for the two groups compare. The collision claim frequency for the young teen group was nearly twice that of the prime age group.

Table 1: Collision exposure and claim frequency by age group in calendar year 2008-12 period

	Exposure	Claims	Claim frequency
Drivers age 15-17	1,667,704	178,523	10.7
Drivers age 35-50	125,501,976	7,366,372	5.9
Total	**127,169,680**	**7,544,895**	**5.9**

Figure 1: Collision claim frequencies by driver age group, 2000-13 models

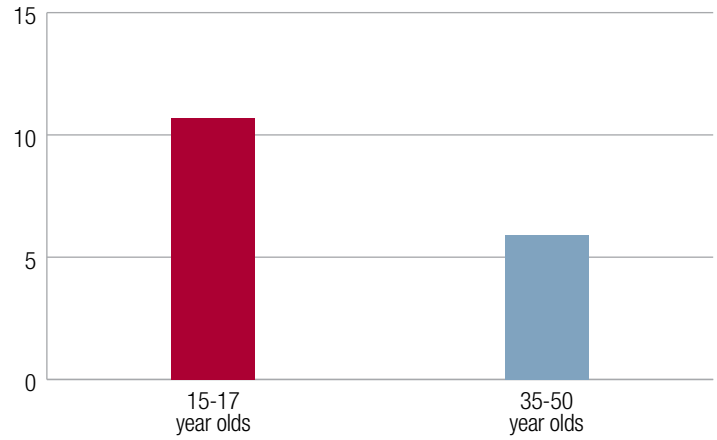


Figure 2 shows collision claim frequencies for young teens by vehicle size and class. Claim frequencies ranged from a high of 15.4 for small two-door cars to 3.2 for large cargo/passenger vans. The frequency for small cars was nearly 5 times the lowest frequency. The six categories with the highest collision claim frequencies were all cars. In general, collision claim frequencies decrease as vehicle size increases. This can clearly be seen within cars, pickups, and SUVs. For passenger cars, with the exception of mini cars, the 2-door versions had higher collision claim frequencies than their 4-door counterpart.

Figure 2: Collision claim frequency for young teenage drivers by vehicle size and class, 2000-13 models

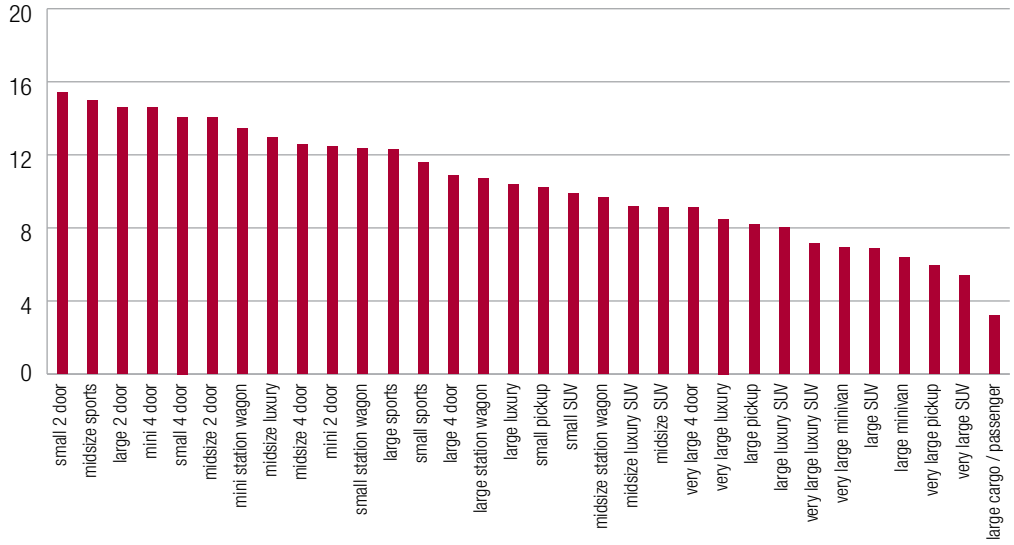
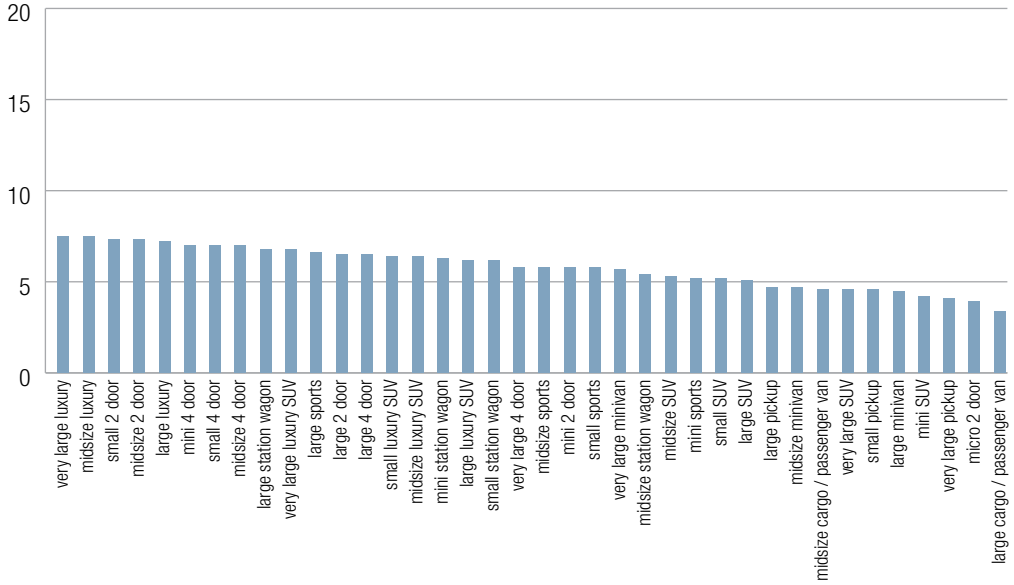


Figure 3 shows collision claim frequencies for prime-age drivers by vehicle size and class. Claim frequencies ranged from a high of 7.5 for very large luxury cars to 3.4 for large cargo/passenger vans. The frequency for very large luxury cars was more than twice the lowest frequency. There is less variation in the claim frequencies for prime-age drivers than for young teens, measured either within vehicle types or across vehicle types. In Figure 2, there is a fairly clear pattern of results, where claim frequencies decrease with vehicle size. That same pattern is not evident in Figure 3 for drivers 35–50 years old.

Figure 3: Collision claim frequency for prime-age drivers by vehicle size and class, 2000-13 models



In order to allow for more meaningful comparisons between vehicle categories, the claim frequency ratio of young teens to prime-age drivers was used. The claim frequency for prime-age drivers was used as an implicit control for risk factors not related to age, such as different vehicle patterns of use. This ratio measures the relative crash risk of a certain vehicle category for young teens. A young teen operating a vehicle belonging to a vehicle category with a

higher ratio is more prone to collision losses than when operating a vehicle with a lower category ratio. This does assume that all other risk factors are the same. Figure 4 illustrates this ratio by vehicle category in descending order. Midsize sports cars have the highest ratio of 2.6, whereas large cargo/passenger vans have the lowest ratio of 0.95. Ten vehicle categories have a ratio above 2.0. Generally speaking, smaller vehicles tend to have higher ratios indicating they are more risky for young teens.

Figure 4: Collision claim frequency ratio of young teenage drivers to prime-age drivers by vehicle size and class, 2000-13 models

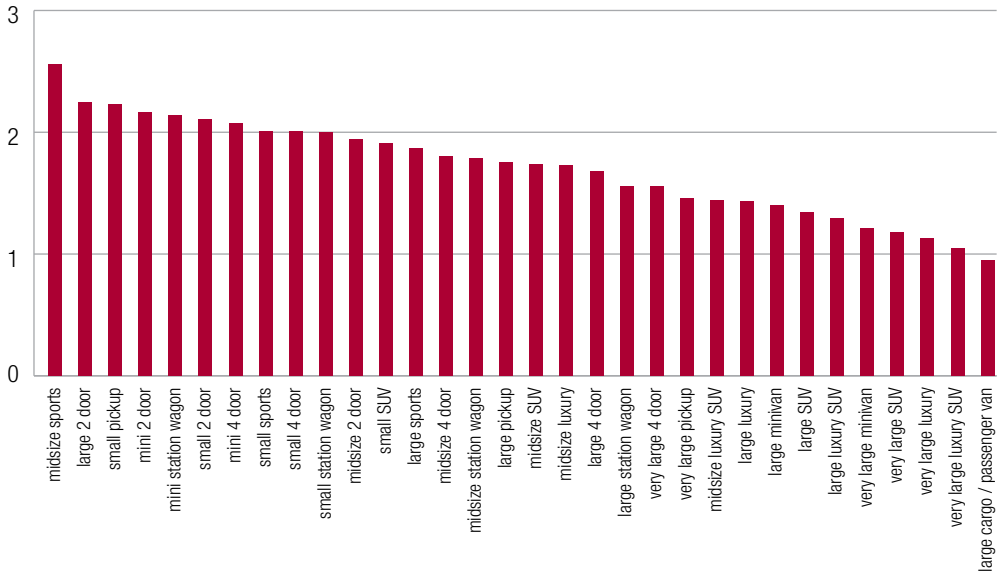


Figure 5 combines the collision claim frequency ratios from Figure 4 with the collision exposure distribution. Small two-door cars, which had the sixth highest claim frequency ratio (2.1) showed the largest exposure difference between the two age groups. Four percent of the young teen exposure is concentrated in the small two-door car category, compared with 2 percent for the older drivers (35-50 years old). Small four-door cars also show a large exposure discrepancy between the age groups. Thirteen percent of the young teen exposure is for small four-door cars compared with 8 percent for prime-age adults.

Figure 5: Collision claim frequency ratio and exposure distribution

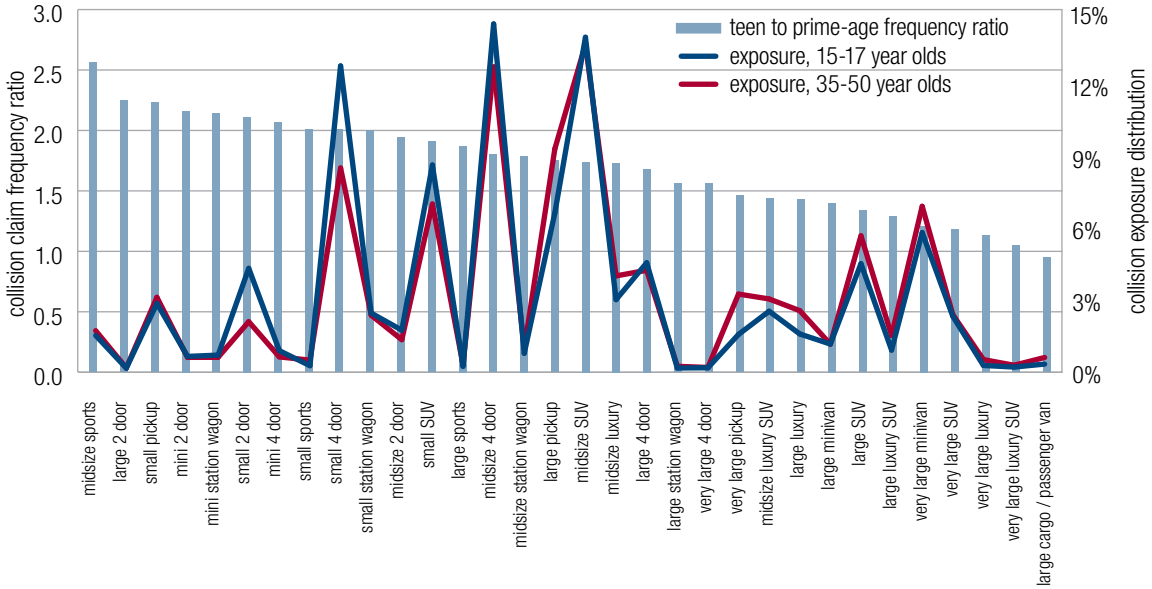


Table 2 contains the exposure, claims, claim frequencies per 100 insured vehicle years, claim frequency ratio of young teens over prime-age drivers, and rankings of the ratios by vehicle category. Vehicle categories are listed in order of claim frequency ratios, from highest to lowest. Vehicle categories with a collision exposure less than 1,000 years for both teens and prime age are not listed. Their corresponding claim frequency ratios are treated as missing.

Table 2: Collision claim frequency and rank by vehicle type and class, 2000-13 models

	Exposure		Claims		Claim frequency			Claim frequency rank		
Size and class	Young teenagers	Prime age	Young teenagers	Prime age	Young teenagers	Prime age	Ratio	Young teenagers	Prime age	Ratio
Midsize sports car	24,099	2,064,485	3,611	120,672	15.0	5.8	2.56	2	19	1
Large 2 door car	1,321	110,138	193	7,160	14.6	6.5	2.25	3	12	2
Small pickup	46,478	3,814,275	4,745	174,619	10.2	4.6	2.23	17	29	3
Mini 2 door	9,474	663,851	1,181	38,239	12.5	5.8	2.16	10	20	4
Mini station wagon	10,421	667,266	1,402	42,011	13.5	6.3	2.14	7	15	5
Small 2 door	70,946	2,536,637	10,947	185,614	15.4	7.3	2.11	1	3	6
Mini 4 door	13,493	687,845	1,967	48,376	14.6	7.0	2.07	4	6	7
Small sports car	3,011	517,763	349	29,820	11.6	5.8	2.01	13	21	8
Small 4 door car	212,180	10,602,592	29,848	741,492	14.1	7.0	2.01	5	7	9
Small station wagon	39,712	2,877,124	4,910	177,971	12.4	6.2	2.00	11	17	10
Midsize 2 door car	27,803	1,590,811	3,910	115,533	14.1	7.3	1.94	6	4	11
Small SUV	143,023	8,709,522	14,160	451,839	9.9	5.2	1.91	18	25	12
Large sports car	2,610	275,929	321	18,113	12.3	6.6	1.87	12	11	13
Midsize 4 door car	241,481	15,909,213	30,366	1,110,089	12.6	7.0	1.80	9	8	14
Midsize station wagon	11,662	1,114,609	1,128	60,244	9.7	5.4	1.79	19	23	15
Large pickup	109,586	11,611,886	8,998	545,849	8.2	4.7	1.75	24	27	16
Midsize SUV	232,187	17,081,737	21,206	896,965	9.1	5.3	1.74	21	24	17
Midsize luxury car	49,109	4,938,998	6,354	368,752	12.9	7.5	1.73	8	2	18
Large 4 door car	74,821	5,234,229	8,119	338,932	10.9	6.5	1.68	14	13	19
Large station wagon	1,413	194,038	151	13,270	10.7	6.8	1.56	15	9	20
Very large 4 door car	1,546	133,932	141	7,830	9.1	5.8	1.56	22	18	21
Very large pickup	24,824	3,984,497	1,471	161,769	5.9	4.1	1.46	30	31	22
Midsize luxury SUV	41,017	3,729,786	3,759	238,164	9.2	6.4	1.44	20	14	23
Large luxury car	25,156	3,115,619	2,610	225,599	10.4	7.2	1.43	16	5	24
Large minivan	18,117	1,361,382	1,152	61,751	6.4	4.5	1.40	29	30	25
Large SUV	74,195	7,044,486	5,081	359,650	6.8	5.1	1.34	28	26	26
Large luxury SUV	13,899	1,815,517	1,115	113,203	8.0	6.2	1.29	25	16	27
Very large minivan	95,893	8,592,433	6,633	491,577	6.9	5.7	1.21	27	22	28
Very large SUV	37,493	2,907,532	2,026	133,235	5.4	4.6	1.18	31	28	29
Very large luxury car	3,181	546,342	270	41,171	8.5	7.5	1.13	23	1	30
Very large luxury suv	2,055	249,447	147	16,986	7.2	6.8	1.05	26	10	31
Large cargo / passenger van	4,130	656,938	132	22,013	3.2	3.4	0.95	32	32	32

Note: Teen exposure has to be at least 1,000 years to be included in the ratio bar chart.

Discussion

Collision losses vary by vehicle type and size. This analysis shows that some of the differences are amplified for young teen drivers compared with prime-age drivers; how much higher depends on the type and size of the vehicle a teen operates. Mini and small vehicles tend to have higher collision losses when driven by young teens relative to prime age drivers. This pattern is consistent with the findings of the IIHS analysis, which shows that fatally injured young teen drivers are more likely than adults to have been killed in cars, and they die in small cars more than in any other type of vehicle. For mini, small, midsize and large passenger cars, the claim frequency ratio was larger for the two-door version compared with their four-door counterparts.

The results for pickup trucks were also not favorable to young teen drivers. While small pickup truck claim frequencies ranked 17th and 33rd for young teens and prime age drivers respectively, small pickups ended up with the third highest claim frequency ratio. This was one of the largest changes from the claim frequency rank to the ratio results. Large and very large pickups also moved up the rankings once the ratio was calculated.

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