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

TRAFFIC SAFETY FACTS
Research Note

NHTSA

DOT HS 812 686

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Passenger Vehicle Occupant Fatality Rates By Type and Size of Vehicle (Updated)[1]

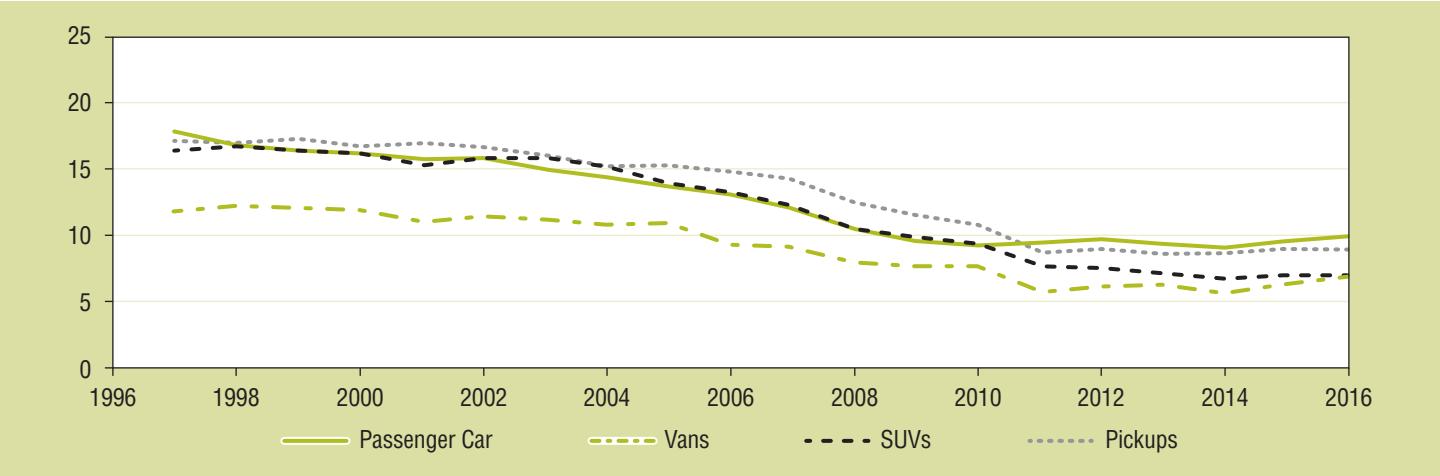
Summary

One of the National Highway Traffic Safety Administration's primary goals is to reduce the passenger vehicle occupant fatality rate. NHTSA has routinely published passenger vehicle occupant fatality rates for four passenger vehicle types—passenger cars, SUVs, pickup trucks, and vans (NHTSA, 2017). These categories of vehicles are broad and may mask differences in rates that might exist between vehicles of different sizes within a passenger vehicle type. This Research Note examines the occupant fatality rates by passenger vehicle type and size, and found that in all fatal crashes, the smaller the size, the higher the fatality rate within each of four passenger vehicle types. Overall, the smaller sized passenger cars and compact pickup trucks had higher occupant fatality rates, while the "large vans" category had the lowest occupant fatality rate.

Background

This Research Note examines the fatality rate to occupants of passenger vehicles involved in fatal motor vehicle traffic crashes by passenger vehicle type and size of the vehicle. Data from 1997 to 2016 has been presented to show trends in occupant fatality rates. The rates are presented per 100,000 registered vehicles. As shown in Figure 1, the occupant fatality rates in all fatal crashes for passenger cars, SUVs, and pickup trucks are similar, but higher than the rates for vans in early years. After 2010, the rate differences between four passenger vehicle types are clearly shown. In 2016, the highest occupant fatality rates per 100,000 registered vehicles are passenger cars (9.94) followed by pickup trucks (8.92), SUVs (6.99), and vans (6.92).

Figure 1
Occupant Fatality Rate Per 100,000 Registered Passenger Vehicles by Type of Vehicle, 1997–2016



Source: FARS 1997-2015 Final, 2016 ARF; Motor Vehicle Statistics from IHS Markit.

[1]This is an update of *Passenger Vehicle Occupant Fatality Rates by Type and Size of Vehicle,* NHTSA Research Note, Report No. DOT HS 809 979, January 2006. Washington, DC: National Highway Traffic Safety Administration.

These rates by the major vehicle classifications have been routinely published by NHTSA. In this study, we examine rates among passenger vehicle types by the size of the vehicle within each of these four categories. While only a rigorous statistical model can best determine the effect of vehicle type and size on the occurrence of fatalities and serious injuries, this note simply aims to provide occupant fatality rates by passenger vehicle type and size along purely descriptive lines.

Methodology

Passenger vehicle sizes can be defined by length, width, wheelbase, or the weight of the vehicle. Ideally, a classification based on a uniform criterion is desirable. A measure of classification has already been outlined by the American National Standards Institute (ANSI D-16, 6th ed., Section 2.2.11) that has also been adopted by the National Center for Statistics and Analysis (NCSA) Fatality Analysis Reporting System (FARS). In this study, the passenger vehicles are classified by size as shown in Table 1.

Table 1
Passenger Vehicle Classification Criteria

Vehicle Type	Size	Criteria
Passenger Cars	Subcompact	Wheelbase: Under 100 in.
	Compact	Wheelbase: 100-104 in.
	Midsize	Wheelbase 105-109 in.
	Full-size	Wheelbase > 109 inches
Vans	Minivans	Unibody Vans
	Large Vans†	Frame based Vans
SUVs	Midsize	Wheelbase > 88 inches Width: 66-75 inches
	Full-size	Wheelbase > 88 inches Width: 75+ inches
Pickup Trucks	Compact	Under 4,500 lbs.
	Standard	Over 4,500 lbs.

†Includes vans used to transport cargo as well as vans used to transport passengers, i.e., 12- to 15-passenger vans, conversion vans.

The registration data used in this report were extracted from Motor Vehicle Statistics from IHS Markit.

Results

This section presents the fatality rates by the size of the vehicle in each of four passenger vehicle types. For example, fatality rates for passenger cars have been provided for subcompact, compact, midsize, and full-size cars. The results show that the smaller the size, the higher the fatality rate in each of four passenger vehicle types. Overall, the smaller sized passenger cars and compact pickup trucks had higher total occupant fatality rates as compared to other vehicle types, while large vans had the lowest occupant fatality rate. The results are illustrated in Table 2.

Table 2
Total Occupant Fatality Rates per 100,000 Registered Vehicles by Vehicle Type and Size, 2016

Vehicle Type and Size	Rate
Compact Cars	12.91
Subcompact Cars	10.48
Midsize Cars	10.26
Full-size Cars	9.53
Compact Pickups	8.91
Standard Pickups	8.86
Minivans	7.28
Midsize SUVs	7.10
Full-size SUVs	6.78
Large Vans†	5.47

†Because the largest proportion included in this rate are cargo and other commercial vans, this or any other rate for large vans in the Research Note should not be used to make assessments of the fatality rate to the occupants of 15-passenger vans.

Figures 2 through 5 depict the occupant fatality rates for passenger vehicles by the type and size of the vehicles in all crashes. In recent years, the occupant fatality rates in all crashes showed an overall downward trend for all passenger vehicle types and sizes. In terms of relative differences between vehicle types, the smaller sized passenger cars and compact pickup trucks have the highest overall occupant fatality rates, while large vans and minivans have the lowest overall occupant fatality rates.

Figure 2
Occupant Fatality Rate Per 100,000 Registered Passenger Cars by Vehicle Size, 1997–2016

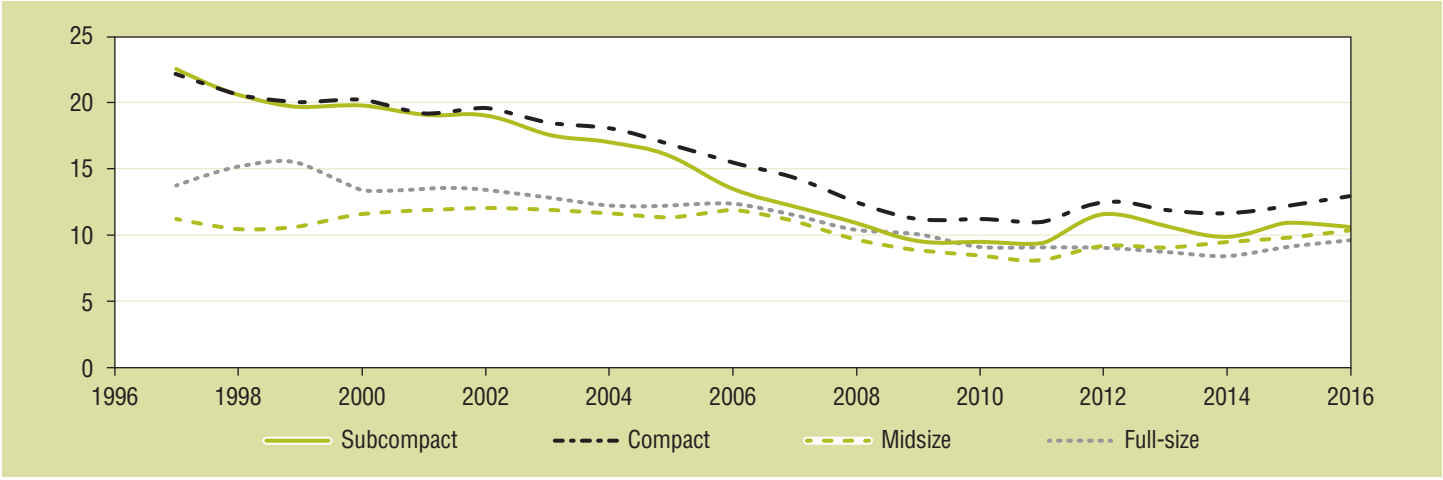


Figure 3
Occupant Fatality Rate Per 100,000 Registered Vans by Vehicle Size, 1997–2016

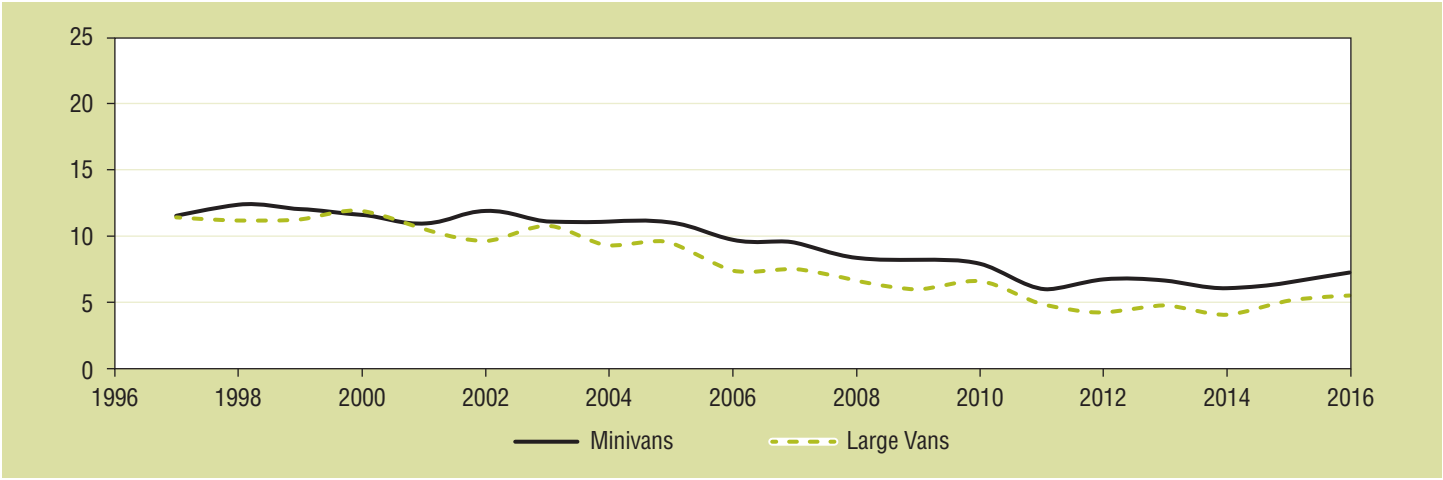


Figure 4
Occupant Fatality Rate Per 100,000 Registered SUVs by Vehicle Size, 1997–2016

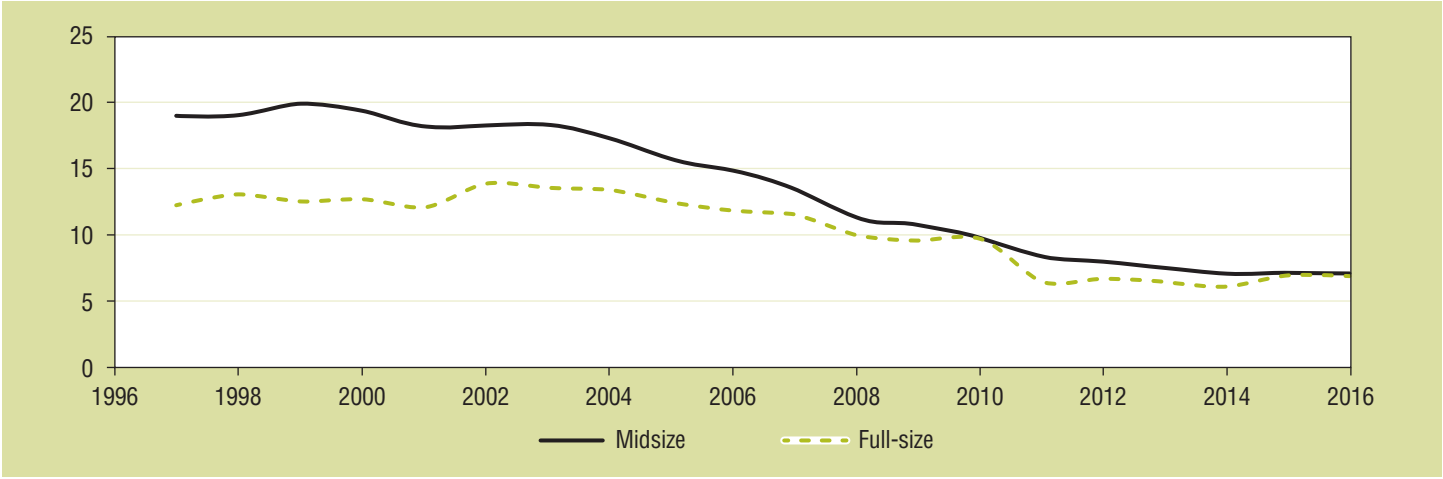
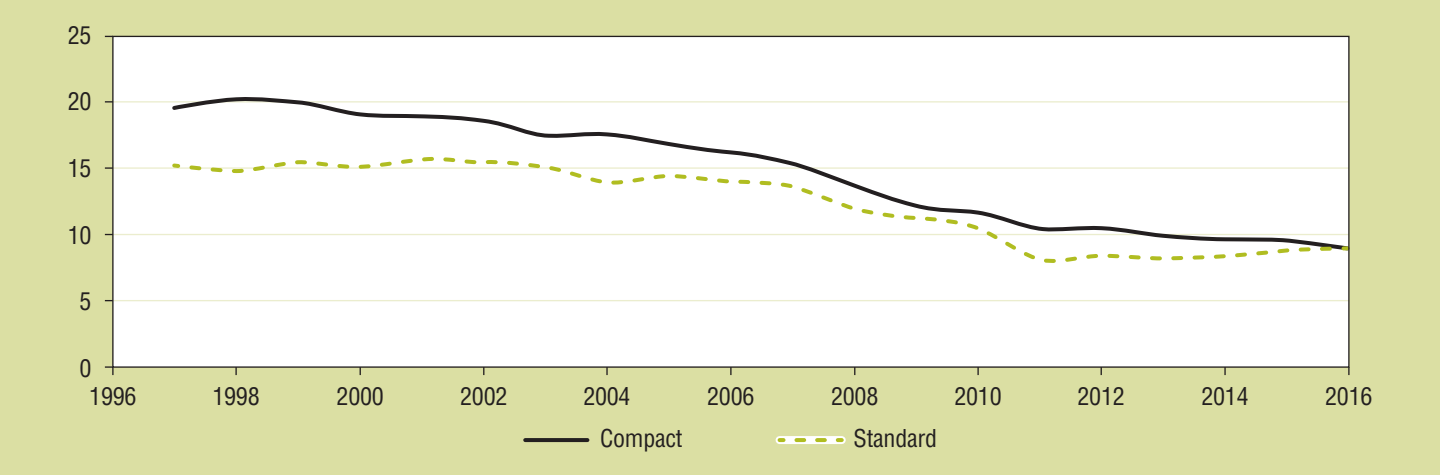


Figure 5
Occupant Fatality Rate Per 100,000 Registered Pickup Trucks by Vehicle Size, 1997–2016



Source: FARS 1997-2015 Final, 2016 ARF; Motor Vehicle Statistics from IHS Markit.

Table 3 shows the occupant fatality rate per 100,000 registered passenger vehicles from 1997 to 2016 by the type and the size of the passenger vehicle in all crashes.

Table 3
Occupant Fatality Rate per 100,000 Registered Vehicles by Vehicle Type and Size, 1997–2016

Year	Passenger Vehicles	Cars	Subcompact Cars	Compact Cars	Midsize Cars	Full-Size Cars	Vans	Mini Vans	Large Vans	SUVs	Midsize SUVs	Full-Size SUVs	Pickup Trucks	Compact Pickups	Standard Pickups
1997	16.90	17.81	22.59	22.11	11.20	13.66	11.84	11.55	11.38	16.38	19.08	12.27	17.16	19.48	15.13
1998	16.30	16.83	20.60	20.56	10.43	15.10	12.21	12.37	11.15	16.70	19.09	13.12	17.00	20.13	14.73
1999	16.06	16.42	19.67	20.04	10.65	15.37	12.04	12.06	11.28	16.41	20.00	12.55	17.31	19.95	15.40
2000	15.80	16.18	19.77	20.17	11.57	13.34	11.87	11.64	11.87	16.19	19.37	12.74	16.73	19.04	15.03
2001	15.43	15.75	19.07	19.23	11.81	13.42	11.05	10.98	10.49	15.34	18.24	12.11	16.97	18.85	15.60
2002	15.49	15.78	19.02	19.55	12.00	13.34	11.45	11.92	9.59	15.79	18.29	13.92	16.67	18.54	15.39
2003	14.89	14.98	17.60	18.49	11.91	12.78	11.17	11.12	10.77	15.81	18.37	13.62	16.05	17.43	15.07
2004	14.28	14.39	16.99	18.00	11.62	12.16	10.78	11.15	9.30	15.15	17.33	13.43	15.22	17.50	13.85
2005	13.71	13.68	15.92	16.85	11.31	12.14	10.86	11.08	9.49	13.92	15.75	12.48	15.28	16.77	14.35
2006	13.05	13.08	13.48	15.44	11.81	12.28	9.29	9.77	7.35	13.26	14.89	11.84	14.81	16.15	13.94
2007	12.18	12.05	12.09	14.32	11.02	11.42	9.09	9.53	7.50	12.25	13.49	11.57	14.22	15.32	13.58
2008	10.61	10.53	10.84	12.52	9.66	10.30	7.94	8.37	6.59	10.40	11.31	9.99	12.50	13.68	11.87
2009	9.80	9.57	9.47	11.24	8.81	9.97	7.66	8.22	5.94	9.92	10.75	9.56	11.52	12.14	11.18
2010	9.37	9.23	9.40	11.19	8.45	9.01	7.59	7.91	6.58	9.30	9.79	9.72	10.78	11.62	10.40
2011	8.68	9.46	9.37	10.99	8.05	8.98	5.76	6.00	4.82	7.74	8.37	6.40	8.73	10.45	8.03
2012	8.86	9.73	11.50	12.45	9.18	8.97	6.18	6.76	4.20	7.57	8.00	6.66	8.96	10.46	8.33
2013	8.51	9.34	10.62	11.89	9.00	8.67	6.23	6.67	4.72	7.16	7.52	6.39	8.58	9.86	8.09
2014	8.27	9.11	9.77	11.61	9.43	8.35	5.66	6.07	4.02	6.75	7.06	6.04	8.65	9.60	8.29
2015	8.69	9.58	10.85	12.21	9.77	9.04	6.34	6.50	5.07	7.06	7.16	6.91	8.96	9.54	8.72
2016	8.89	9.94	10.48	12.91	10.26	9.53	6.92	7.28	5.47	6.99	7.10	6.78	8.92	8.91	8.86

Source: FARS 1997–2015 final file, 2016 ARF; Motor Vehicle Statistics from IHS Markit.
Note: Totals for vehicle type include counts for vehicles whose size could not be determined using available information. Counts by vehicle size will not add up to vehicle type totals.

Conclusions

The occupant fatality rates show variation by the size of the vehicle in a passenger vehicle type. In 2016, compact cars had the highest occupant fatality rate of 12.91 fatalities per 100,000 registered vehicles, followed by subcompact cars at 10.48, midsize cars at 10.26, full-size cars at 9.53, and compact pickup trucks at 8.91. Large vans had the lowest occupant fatality rate at 5.47.

This Research Note simply provides a descriptive assessment of the occupant fatality rate by type and size of passenger vehicle in fatal crashes. The statistical modeling analysis that takes into consideration other vehicle, driver and environmental characteristics can be performed to more precisely assess the risk of occupant fatality. Also, the vehicle size played a large role in affecting the risk of fatality in multiple-vehicle crashes (vehicle incompatibility). Readers can refer to Kahane (2003, 2012) and Farmer (2011) for study details.

References

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This research note and other general information on highway traffic safety may be found at: https://crashstats.nhtsa.dot.gov/.