RESEARCH BRIEF

EXAMINING THE INCREASE IN PEDESTRIAN FATALITIES IN THE UNITED STATES, 2009–2018

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Over the period from 2009 to 2018, pedestrian fatalities in the United States increased 53%, from 4,109 to 6,283, after decreasing for three decades (National Center for Statistics and Analysis, 2019; Schneider, 2020; Webb, 2019). The proportion of all traffic fatalities that were pedestrians increased from 12% to 17% over the same time period (Webb, 2019). Between 2010 and 2017, the U.S. experienced the largest percentage increase in pedestrian fatalities among 30 countries in the Organization for Economic Co-operation & Development, 24 of which saw decreases in pedestrian fatalities (International Transport Forum, 2019).

Although major risk factors for pedestrian crashes, injuries, and deaths are well documented (e.g., high speeds, large vehicles, poor lighting) and some studies have examined long-term trends in pedestrian fatalities, not much is known about the factors underlying the large increase in pedestrian fatalities in recent years. The main objective of this research was to examine more closely the increase in pedestrian fatalities from 2009 to 2018 through analysis of changes in the presence of certain pedestrian, driver, vehicle, and environmental factors. The outcomes of this analysis are also described in the context of other recent and topical studies.

METHODS

Data on all motor vehicle crashes that occurred in the United States in the years 2009 to 2018 and that resulted in the death of a pedestrian were examined in an attempt to determine whether there were identifiable pedestrian, driver, vehicle, or environmental characteristics that accounted for substantial proportions of the overall increase in pedestrian fatalities over this 10-year period.

Data

The data source was the National Highway Traffic Safety Administration's (NHTSA) Fatality Analysis Reporting System (FARS) database, which includes data on all motor vehicle crashes in the U.S. that occur on public roadways and result in a death within 30 days. All crashes that resulted in the death of a pedestrian in years 2009 to 2018 were examined.

Analysis

Pedestrian, driver, vehicle, and environmental factors present in crashes fatal to pedestrians were tabulated by year. In analyses of the characteristics of the drivers and vehicles that struck pedestrians, a small number of crashes involved more than one vehicle. In these crashes, only the vehicle that the police investigating the crash judged to have caused the most significant injury to the pedestrian was included.

In cases where some characteristics of the pedestrian, driver, striking vehicle, or crash were unknown (e.g., if a driver left the scene, the driver's age, sex, vehicle type, etc. are often unknown), "unknown" was treated as a substantive category. Exceptions were the driver's and pedestrian's blood alcohol concentration (BAC), for which NHTSA's multiply-imputed BAC values were used (Rubin et al., 1998).

For each variable, the change in the annual number of pedestrian fatalities within each category (e.g., year-to-year change in the number of victims who were men) and the percentage of the overall change in the number of pedestrian fatalities accounted for by that category (e.g., change in number of fatalities of male pedestrians divided by change in total number of pedestrian fatalities) were computed.

RESULTS

Characteristics of Fatally-Injured Pedestrians

The total number of pedestrians who died in crashes with motor vehicles increased by 53% from 4,109 in 2009 to 6,283 in 2018. Strikingly, the number of child and teen-aged pedestrian fatalities actually decreased over the study period — the only age group in which the annual number of fatalities decreased. The number of fatalities of pedestrians aged 60 to 69 more than doubled (Table 1).

Pedestrian fatalities increased by a slightly greater percentage among males than among females; the increase in fatalities among males accounted for 71% of the total increase in pedestrian fatalities over the study period (Table 1).

The increase in fatalities among non-Hispanic black pedestrians was greater than that among other races on a percentage basis; however, the increase in fatalities among non-Hispanic white pedestrians accounted for a greater share of the total increase in pedestrian fatalities than did any other group (Table 1). Notably, however, the number of pedestrians whose race was unknown decreased for most of the study period, before increasing markedly in 2018. (This is likely because the 2018 data used in the current study are not yet considered final; data on race in FARS is usually more complete in final versions of data sets than in earlier versions.) Excluding persons of unknown race and only examining data through 2017, pedestrian fatalities increased by 60% among non-Hispanic whites, 77% among blacks, and 86% among Hispanics. The increases in fatalities among non-Hispanic white, black, and Hispanic pedestrians accounted for 48%, 22%, and 23% of the total increase in pedestrian fatalities from 2009 through 2017, respectively.

Fatalities of pedestrians with no detectable alcohol in their blood increased by 58% over the study period and accounted for two-thirds of the overall increase in pedestrian fatalities (Table 1). Fatalities of pedestrians with positive blood alcohol concentration (BAC) below .08 g/dL increased by 63% but accounted for only 5% of the overall increase in pedestrian fatalities. Fatalities of pedestrians with BACs of .08 or higher increased by 43% and accounted for 28% of the overall increase in pedestrian fatalities.

Driver/Vehicle Factors

The number of pedestrians fatally struck by drivers aged 60–69 and 70–79 increased by the largest amounts on a percentage basis, however, the number fatally struck by drivers aged 20–29 and 30–39 increased by the largest absolute numbers (Table 2).

The number of pedestrians killed in crashes with drivers who were legally intoxicated (BAC ≥ .08 g/dL) increased by a larger amount than did the number killed in crashes with drivers with zero or lower BAC on a percentage basis. However, the majority of drivers who fatally struck pedestrians had no detectable alcohol (BAC=0 g/dL), and these drivers accounted for 79% of the total increase in pedestrian fatalities over the study period (Table 2)

The number of sport utility vehicles (SUVs) that fatally struck pedestrians increased by 79% over the course of the study period, more than any other type of vehicle; however, the number of pedestrians fatally struck by cars increased by the largest absolute number (Table 2; Figure 1). Interestingly, the representation of vehicles <5 years old and 10+ years old in crashes fatal to pedestrians both increased substantially over the study period, whereas the number of vehicles 5–9 years old that fatally struck pedestrians decreased slightly. The involvement of vehicles 15+ years old in crashes fatal to pedestrians nearly tripled, accounting for 41% of the total increase in pedestrian fatalities over the study period (Table 2).

Environmental/Roadway Factors

The number of pedestrians killed on weekdays increased by a larger amount than did the number killed on weekends (Table 3). Crashes that occurred during the late night and early morning hours on weekdays increased by the largest amount on a percentage basis; however, crashes that occurred in the evening and early nighttime hours (4-10:59pm) accounted for more than half of the total increase in pedestrian fatalities over the study period.

A large majority of pedestrian fatalities occurred in darkness throughout the study period; these increased by the largest amount on a percentage basis and accounted for 87% of the overall increase in pedestrian fatalities (Table 3). While pedestrian fatalities during daylight also increased during the study period, they only accounted for a small proportion of the overall increase in total pedestrian fatalities.

The number of pedestrians killed in crashes in rural areas was nearly constant each year over the study period; the overall increase in pedestrian fatalities over the study period occurred almost entirely in urban areas (Table 3). The number of pedestrians killed on principal arterials and minor arterials increased by 70% and 76% over the study period, respectively. After increasing through 2013, the number of pedestrians killed on local roads and streets decreased through the end of the study period—there were fewer pedestrians killed on local roads or streets in 2018 than in 2009. The increase in pedestrian fatalities on urban non-freeway arterials accounted for 70% of the overall increase in pedestrian fatalities over the study period (Figure 2). The number of pedestrians fatally injured on roads with speed limits of 25 mph or slower increased by 64% over the study period, however, 68% of the overall increase in pedestrian fatalities occurred on roads with speed limits of 40 mph or faster, likely reflecting the increasing numbers of fatalities on arterials.

The number of pedestrians killed at non-intersection locations without crosswalks increased by 70% over the study period and accounted for a large majority of the overall increase in pedestrian fatalities (Table 3). In contrast, the number of pedestrians killed at intersections or marked crosswalks at non-intersection locations remained virtually unchanged. The number of pedestrians fatally struck at non-intersection locations on urban non-freeway arterials more than doubled over the study period, which alone accounted for 56% of the entire increase in pedestrian fatalities (Figure 3). The number of pedestrians fatally struck while walking along the roadway more than doubled from 2010 to 2018 (data not available for 2009); a far larger number of pedestrians were struck and killed while crossing the road, accounting for 51% of the overall increase in pedestrian fatalities (Table 3). Of those killed at non-intersection locations on all roadways, 57% were crossing the road; 65% of fatalities at non-intersection locations on urban arterials were crossing.

DISCUSSION

This research sought to elucidate factors associated with the large increase in pedestrian fatalities that occurred in the United States from 2009 through 2018. A few major findings emerged. Virtually the entire increase in pedestrian fatalities occurred in urban areas: the number of pedestrians killed in urban areas increased by more than 2,000 over the study period, while the number in rural areas increased by one. Well over two-thirds of the overall increase in pedestrian fatalities occurred on urban non-freeway arterials. The number of pedestrian fatalities at non-intersection locations on the roadway increased by more than 1,800 while the number killed at intersections increased by 29. The number of pedestrians killed in darkness increased by 1,900 while the number killed in daylight increased by fewer than 200. Deaths of adult pedestrians accounted for the entirety of the increase; the number of child and teen-aged pedestrian fatalities decreased. Although alcohol is a major factor in pedestrian fatalities generally, neither intoxication on the part of pedestrians nor drivers appear to have played a large role in the increasing trend. Although the proportion of pedestrians fatally struck by SUVs increased over the study period, the increase in the absolute number of pedestrians fatally struck by cars was larger.

Relation to Other Research

The findings of the current study regarding roadway and environmental factors confirm and extend the results of previous studies. An analysis of longer-term pedestrian fatality trends from 1977 to 2016 demonstrated an increase, dating back to 1977, in the percentage of pedestrian fatalities that occurred on roadways with characteristics typical of non-freeway arterials, as well as an increase, dating back to 1987, in the percentage that occurred in darkness (Schneider, 2020). Hu & Cicchino (2018) examined the increase in pedestrian fatalities from 2009 to 2016, since which time pedestrian fatalities have continued to increase. Hu & Cicchino noted that fatalities had increased more in urban areas than in rural areas, more on arterials than on other types of roads, more at non-intersection locations than at intersections, and more in darkness than in daylight, factors that increased in prominence in the two additional years examined in the current study. For example, virtually all of the increase in the number of pedestrian fatalities since 2016 has occurred in darkness and 90% of it occurred at non-intersection locations on urban arterials.

With respect to characteristics of fatally-injured pedestrians, it is interesting and important to note that the entirety of the increase in fatalities over the study period occurred among adults ages 20 and older. The greatest within-group increases were among those ages 60–69 and 30–39, though smaller increases were observed for all other age groups except children and teens as well. Hu & Cicchino (2018) analyzed changes in per capita death rates among pedestrians from 2009 to 2016 and also found the greatest increase among those ages 60–69, followed closely by those ages 30–59 and 20–29. The current study demonstrated a slightly greater percentage increase in pedestrian fatalities among males than females (54% vs. 48%) but a much greater contribution to the overall increase among males than females (71% vs. 28%), reflecting the fact that men substantially outnumber women among fatally injured pedestrians. Similarly, Hu and Cicchino (2018) found higher per capita death rates among males compared to females, with a slightly greater percentage increase among males than females (40% vs. 33%). With respect to alcohol use among pedestrians, similar to Hu & Cicchino, the current study found that the largest within-group increase was among those with non-zero BACs below .08 g/dL. However, importantly, the increased number of pedestrians who had not been drinking (BAC=0 g/dL) accounted for fully two-thirds of the overall increase in pedestrian fatalities over the study period. Similarly, with respect to drivers who struck pedestrians who died, the within-group percentage increase was largest for drivers with BACs that exceeded the legal limit for intoxication, however, pedestrians struck by drivers with BACs of 0 g/dL accounted for nearly 80% of the overall increase in pedestrian fatalities.

Distraction, and smartphone use in particular, on the part of both pedestrians and drivers, is often proffered as an explanation for the increase in pedestrian fatalities, though there is a lack of agreement due to data limitations and the possible contributions of other factors (Baker, 2019; Bogel-Burroughs, 2019). Ralph & Girardeau (2020) noted that, while there is mixed evidence on the impacts of distracted walking, distracted driving is common and very risky. Attention to distracted pedestrians, they asserted, detracts from more impactful factors with more effective countermeasures. Although nominally available in FARS, neither driver nor pedestrian distraction was examined in the current research brief because it is difficult to ascertain in a post-crash investigation, and it is generally regarded that it is underreported and unreliable in crash data (National Academies of Sciences, Engineering, and Medicine, 2005).

Increases in driving and pedestrian exposure have also been implicated in the increase in pedestrian fatalities (Baker, 2019; Bliss, 2019; National Academies of Sciences, Engineering, and Medicine, 2020). Although the current study did not directly examine driving exposure nor pedestrian exposure, existing data would suggest that increases in exposure — at least in aggregate — are unlikely to have been large enough to explain the 53% increase in pedestrian fatalities. Annual vehicle miles traveled in the U.S. increased by approximately 10% between 2009 and 2018 (Federal Highway Administration, 2019). While lack of consistent metrics of pedestrian exposure make it difficult to determine whether or precisely how much pedestrian exposure has changed (National Transportation Safety Board, 2018; United States Government Accountability Office, 2020), various sources suggest that pedestrian exposure changed little over the study period. For example, analysis of data from surveys conducted by the Bureau of Labor Statistics indicates that the total number of annual walking trips by all U.S. residents increased by about 2% from 2009 through 2017 (U.S. Bureau of Labor Statistics, 2018), whereas in contrast, data from surveys conducted by the Federal Highway Administration suggests that the total number of walking trips decreased by about 5% over the same period (McGuckin & Fucci, 2018). Thus, while increases in pedestrian exposure to vehicles due to increases in driving, walking, or both may have played a role in the increasing trend in pedestrian fatalities since 2009, it is clear that neither a 10% increase in vehicle miles traveled nor an even smaller increase in the amount of walking could provide a complete explanation for a 53% increase in pedestrian fatalities.

The current study and previous research demonstrate that certain vehicle characteristics, and shifts in them, have contributed to pedestrian fatalities. Schneider (2020) observed an increasing trend in the percentage of vehicles involved in pedestrian fatalities that were pickup trucks, vans, or SUVs dating as far back as 1982 to 1986. Pedestrians stuck by these vehicles, collectively known as light trucks, are more likely to be fatally injured than those struck by cars (Paulozzi, 2005), and their height may limit their drivers' visibility of pedestrians (Bogel-Burroughs, 2019). As of 2018, 60 percent of new vehicles sold were pickups or SUVs, and some automakers have or plan to discontinue selling the majority of their passenger car models in the U.S. (Lawrence et al., 2018). Importantly, however, while the number of pedestrians fatally struck by SUVs increased the most over the study period on a percentage basis, the increase in the absolute number of cars that fatally struck pedestrians was considerably larger. Collectively, these findings suggest that while SUVs' increasing share of the vehicle fleet has likely contributed to the increasing trend in pedestrian fatalities, this clearly is not the sole factor and is unlikely the main factor driving the trend in pedestrian fatalities.

Countermeasures to Reduce Pedestrian Fatalities

There are a variety of countermeasures to reduce pedestrian fatalities. The findings of the current study can help to prioritize them. For example, the current study finds that a large majority of the increase in pedestrian fatalities over the past 10 years occurred on non-freeway arterials, at non-intersection locations, and in darkness. Thus, while crash patterns in a particular state, county, or city may indicate different problems locally, a search for countermeasures might reasonably start with these factors in mind.

In the event that a pedestrian is struck by a vehicle, the pedestrian's risk of being severely injured or killed increases as impact speed increases, with risk of death rising particularly rapidly in response to even a 1-mph increase in speed within the range of roughly 32 to 48 mph (Tefft, 2013). A study of data from 1977 to 2016 similarly found that there has been a long-term increase in pedestrian fatalities on roads with speed limits above 35 mph (Schneider, 2020), and the current study finds that over two-thirds of the increase in pedestrian fatalities in years 2009 to 2018 occurred on roads with speed limits of 40 mph or higher. Observational research has demonstrated strong associations of higher speed limits with increased vehicle speeds, likelihood of vehicles exceeding the speed limit, and traffic fatalities (Friedman et al., 2009; McCartt & Hu, 2017). Higher speed limits on freeways are associated with increased travel speeds and crash frequency on adjacent arterial roads (Alhomaidat et al., 2019, 2020), particularly important in the present context as 72% of the increase in pedestrian fatalities over the study period occurred on arterials. Thus, it is clear that there is a need to reduce vehicle speeds in environments where pedestrian activity is anticipated, and to separate pedestrians from vehicles in environments in which high vehicle speeds are intended. Hu & Cicchino (2018) note several countermeasures that can improve pedestrian safety on urban arterials, including road diets, median crossing islands, pedestrian hybrid beacons, and automated speed enforcement. Measures to reduce motor vehicle speeds, including reduced speed limits and changing the physical characteristics of roads in ways that reduce their design speed (Sanders et al., 2020), can reduce both the incidence and severity of pedestrian crashes. Lower speed limits at night as well as targeted enforcement at night can reduce pedestrian fatalities in darkness (Schneider, 2020).

While speeds are clearly a factor, more research is needed to understand the factors contributing to the major increase in pedestrian fatalities specifically on urban arterials, and specifically at non-intersection locations on urban arterials, so that appropriate countermeasures can be targeted to them. It is presently unknown whether this increase is attributable to increased exposure, increased danger, or both. While pedestrian exposure appears to have increased only slightly if at all in aggregate, it is possible that changes in population, land use, or transportation modes may have led to changes in the locations of pedestrian exposure. In addition, approximately two-thirds of pedestrians killed at non-intersection locations on urban arterials were crossing the road. Research should examine whether these are predominantly attributable to pedestrian behavior (e.g., crossing midblock when there is a marked crosswalk a few feet away) or to inadequate pedestrian facilities (e.g., where the nearest safe location to cross is a substantial distance away).

Additionally, changes to vehicle design could have important implications for pedestrian safety. For example, Hu & Cicchino found increasing vehicle horsepower associated with increased rates of pedestrian fatalities (2018), and vehicle horsepower has been increasing for several decades (McCartt & Hu, 2017), a trend that may have harmful implications for pedestrians. The National Transportation Safety Board has recommended that NHTSA revise its Federal Motor Vehicle Safety Standard 108 to incorporate a more advanced vehicle headlight system evaluation and allow more advanced vehicle lighting systems (National Transportation Safety Board, n.d.). Other vehicle improvements include hood and bumper designs that mitigate pedestrian injury (National Transportation Safety Board, 2018). While emerging pedestrian detection technologies integrated with automatic emergency braking systems have the potential to reduce the number of pedestrian-involved crashes and thus hopefully also fatalities (United States Government Accountability Office, 2020), closed-course evaluations have yielded wide variation in performance across vehicle makes and models (AAA, 2019; Insurance Institute for Highway Safety, 2019) and real-world effectiveness of the technology is not well understood (Baker, 2019). Moreover, results of the current study indicate that a large majority of pedestrian fatalities occur under conditions beyond the capabilities of current generation systems (i.e., at relatively high speeds and in darkness) (c.f., AAA, 2019; Wakeman et al., 2019). The Government Accountability Office has recommended that pedestrian safety tests be considered in the New Car Assessment Program (United States Government Accountability Office, 2020). It is important to note, however, that it will likely take many years for changes in vehicle design and technology to have substantial effects on pedestrian safety, as nearly half of the vehicles that fatally struck pedestrians in 2018 were 10 or more years old.

Conclusion

Pedestrian fatalities in the U.S. increased by more than 50% from 2009 to 2018, accounting for an increasing proportion of all traffic fatalities. Consistent with previous studies, results indicate that the number of pedestrians fatally struck by SUVs increased more rapidly than the number fatally struck by cars. However, it is also noted that far more pedestrians are killed by cars, and that the number of pedestrians killed by cars also increased substantially over the previous decade. Also consistent with previous studies, results indicate that the largest increases in pedestrian fatalities in recent years occurred in urban areas, on arterials, at non-intersection locations, and in darkness, which collectively accounted for nearly the entire increase in pedestrian fatalities. Moreover, over half of the entire increase in pedestrian fatalities occurred specifically at non-intersection locations on urban non-freeway arterials, the majority of which involved pedestrians crossing at these locations. More research is needed to understand the factors associated with the apparent increase in the number of pedestrians killed while crossing urban arterials at non-intersection locations without crosswalks, and to identify appropriate countermeasures to reduce the incidence of crashes and deaths in this prominent scenario.

Table 1. Characteristics of Fatally Injured Pedestrians, United States, 2009-2018.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Change Within Group		Group Change as % of Total Change
											N	%	
Total	4,109	4,302	4,457	4,818	4,779	4,910	5,494	6,080	6,075	6,283	+2,174	+53%	100%
Pedestrian Age (years)													
<20	460	507	467	497	449	434	465	520	459	408	−52	−11%	−2%
20-29	609	679	699	766	732	748	836	904	870	913	+304	+50%	14%
30-39	524	552	565	609	616	660	743	854	871	986	+462	+88%	21%
40-49	757	688	700	731	778	694	815	838	898	908	+151	+20%	7%
50-59	727	776	849	916	917	944	1,125	1,229	1,208	1,161	+434	+60%	20%
60-69	436	455	520	571	590	653	747	844	879	943	+507	+116%	23%
70-79	310	334	377	392	373	426	412	505	485	529	+219	+71%	10%
80+	268	294	260	315	293	303	306	317	336	361	+93	+35%	4%
Unknown	18	17	20	21	31	48	45	69	69	74	+56	+311%	3%
Pedestrian Sex													
Male	2,827	2,961	3,102	3,337	3,277	3,426	3,831	4,245	4,234	4,363	+1,536	+54%	71%
Female	1,282	1,339	1,354	1,478	1,496	1,477	1,654	1,810	1,812	1,899	+617	+48%	28%
Unknown	0	2	1	3	6	7	9	25	29	21	+21		1%
Pedestrian Race & Ethnicity													
White Non-Hispanic	1,937	2,072	2,156	2,413	2,351	2,425	2,731	3,043	3,091	2,853	+916	+47%	42%
Black Non-Hispanic	681	671	672	774	802	842	1,055	1,159	1,203	1,157	+476	+70%	22%
Hispanic (any race)	624	696	703	753	828	881	1,007	1,075	1,163	924	+300	+48%	14%
2+ Races or Other	240	241	286	298	343	379	379	421	413	322	+82	+34%	4%
Unknown	627	622	640	580	455	383	322	382	205	1,027	+400	+64%	18%
Pedestrian Blood Alcohol Concentration (g/dL)													
0.00	2,523	2,682	2,698	2,950	2,978	3,091	3,468	3,799	3,900	3,974	+1,451	+58%	67%
0.01-0.07	175	194	200	225	194	200	237	284	271	289	+113	+65%	5%
0.08+	1,411	1,426	1,559	1,643	1,607	1,620	1,789	1,997	1,905	2,021	+610	+43%	28%

Table 2. Characteristics of Vehicles & Drivers that Fatally Struck Pedestrians, United States, 2009–2018.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Change Within Group		Group Change as % of Total Change
											N	%	
Total	4,109	4,302	4,457	4,818	4,779	4,910	5,494	6,080	6,075	6,283	+2,174	+53%	100%
Driver Age (years)													
<20	266	270	259	286	249	251	291	324	308	286	+20	+8%	1%
20-29	918	950	1,004	1,095	1,057	1,073	1,256	1,313	1,382	1,365	+447	+49%	21%
30-39	681	715	757	765	770	841	911	1,026	993	1,121	+440	+65%	20%
40-49	684	672	726	725	757	725	780	841	839	865	+181	+26%	8%
50-59	549	602	589	698	712	763	780	849	859	889	+340	+62%	16%
60-69	327	383	399	434	436	439	491	596	571	575	+248	+76%	11%
70-79	155	169	159	207	184	188	227	247	272	275	+120	+77%	6%
80+	73	67	76	102	69	97	88	100	98	104	+31	+42%	1%
Unknown	456	474	488	506	545	533	670	784	753	803	+347	+76%	16%
Driver Sex													
Male	2,601	2,718	2,827	3,053	3,040	3,128	3,475	3,818	3,743	3,841	+1,240	+48%	57%
Female	1,071	1,134	1,159	1,276	1,210	1,273	1,368	1,510	1,598	1,657	+586	+55%	27%
Unknown	437	450	471	489	529	509	651	752	734	785	+348	+80%	16%
Driver Blood Alcohol Concentration (g/dL)													
0.00	3,335	3,510	3,715	3,995	3,870	4,024	4,526	4,831	4,911	5,048	+1,713	+51%	79%
0.01-0.07	191	154	138	147	178	192	223	283	176	227	+36	+19%	2%
0.08+	514	590	551	622	673	652	691	907	919	929	+415	+81%	19%
Unknown	70	47	54	54	58	42	54	60	70	80	+10	+14%	0%
Vehicle Type													
Car	1,693	1,757	1,859	2,090	1,962	2,055	2,383	2,573	2,557	2,651	+958	+57%	44%
SUV	683	740	752	815	811	850	955	1,149	1,223	1,222	+539	+79%	25%
Pickup	756	760	762	819	857	876	928	1,017	1,027	1,020	+264	+35%	12%
Van	309	323	306	315	292	332	315	360	290	303	−6	−2%	0%
Large Truck or Bus	292	317	370	360	381	360	379	380	398	450	+158	+54%	7%
Other	34	35	40	45	52	61	58	80	62	82	+48	+141%	2%
Unknown	342	370	368	374	424	376	476	521	518	555	+213	+62%	10%
Vehicle Age (years)													
<5	1,062	931	937	941	983	1,025	1,262	1,420	1,466	1,564	+502	+47%	23%
5-9	1,288	1,290	1,376	1,484	1,350	1,267	1,220	1,213	1,160	1,191	−97	−8%	−4%
10-14	889	1,103	1,103	1,188	1,162	1,303	1,336	1,528	1,555	1,458	+569	+64%	26%
15+	471	568	613	770	806	856	1,100	1,272	1,260	1,368	+897	+190%	41%
Unknown	399	410	428	435	478	459	576	647	634	702	+303	+76%	14%

Table 3. Characteristics of Crashes in Which Pedestrians were Killed, United States, 2009–2018.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Change Within Group		Group Change as % of Total Change
											N	%	
Total	4,109	4,302	4,457	4,818	4,779	4,910	5,494	6,080	6,075	6,283	+2,174	+53%	100%
Time of Day x Day of Week													
5-9:59am M-F	452	530	523	556	529	570	608	716	723	729	+277	+61%	13%
10am-3:59pm M-F	385	408	392	429	437	444	512	471	482	483	+98	+25%	5%
4-10:59pm M-Th	1,113	1,117	1,239	1,295	1,301	1,301	1,544	1,676	1,692	1,769	+656	+59%	30%
11pm-4:59am M-F[a]	440	490	527	524	552	568	637	752	771	830	+390	+89%	18%
11pm-4:59am Sa-Su[a]	513	551	549	620	577	575	616	725	684	679	+166	+32%	8%
5-9:59am Sa-Su	106	135	137	156	126	163	151	198	164	183	+77	+73%	4%
10am-3:59pm Sa-Su	119	129	107	132	125	128	120	143	141	156	+37	+31%	2%
4-10:59pm F-Su	954	921	960	1,087	1,104	1,140	1,272	1,374	1,392	1,416	+462	+48%	21%
Unknown	27	21	23	19	28	21	34	25	26	38	+11	+41%	1%
Month													
Jan-Mar	1,013	1,003	1,014	1,219	1,181	1,135	1,310	1,422	1,512	1,560	+547	+54%	25%
Apr-Jun	873	903	891	965	979	1,014	1,099	1,273	1,231	1,299	+426	+49%	20%
Jul-Sep	1,002	1,018	1,053	1,138	1,110	1,187	1,275	1,416	1,496	1,505	+503	+50%	23%
Oct-Dec	1,221	1,378	1,499	1,496	1,509	1,574	1,810	1,969	1,836	1,919	+698	+57%	32%
Lighting Conditions													
Daylight	1,079	1,092	1,068	1,168	1,166	1,191	1,245	1,311	1,297	1,256	+177	+16%	8%
Dark-Lighted	1,525	1,564	1,651	1,767	1,729	1,758	2,061	2,396	2,393	2,469	+944	+62%	43%
Dark-Unlighted	1,275	1,403	1,512	1,655	1,644	1,715	1,899	2,091	2,055	2,182	+907	+71%	42%
Dark-Unknown	46	63	41	30	32	37	80	56	74	95	+49	+107%	2%
Dawn/Dusk	162	161	162	177	181	185	188	205	235	228	+66	+41%	3%
Unknown	22	19	23	21	27	24	21	21	21	53	+31	+141%	1%
Land Use													
Rural	1,146	1,146	1,171	1,267	1,270	1,092	1,214	1,256	1,154	1,147	+1	+0%	0%
Urban	2,947	3,129	3,269	3,541	3,502	3,806	4,238	4,783	4,889	4,975	+2,028	+69%	93%
Unknown	16	27	17	10	7	12	42	41	32	161	+145	+906%	7%

[a] 11 PM previous day through 4:59 AM on day shown

Table 3. Characteristics of Crashes in Which Pedestrians were Killed, United States, 2009–2018. *(cont.)*

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Change Within Group		Group Change as % of Total Change
											N	%	
Roadway Functional Class													
Freeway/Interstate	614	681	684	671	704	705	845	934	877	978	+364	+59%	17%
Principal arterial	1,422	1,465	1,470	1,593	1,598	1,715	2,011	2,313	2,329	2,416	+994	+70%	46%
Minor arterial	747	743	879	993	882	1,023	1,110	1,343	1,347	1,317	+570	+76%	26%
Collector	454	446	471	489	440	422	533	694	673	653	+199	+44%	9%
Local road or street	846	933	917	1,047	1,139	988	938	745	809	751	-95	-11%	-4%
Unknown	26	34	36	25	16	57	57	51	40	168	+142	+546%	7%
Speed Limit (mph)													
≤ 25	402	429	424	443	461	536	589	622	641	660	+258	+64%	12%
30-35	1,094	1,111	1,144	1,328	1,262	1,244	1,381	1,545	1,536	1,452	+358	+33%	16%
40-45	1,137	1,196	1,275	1,391	1,350	1,407	1,605	1,842	1,879	1,848	+711	+63%	33%
50+	1,252	1,323	1,378	1,431	1,434	1,470	1,642	1,850	1,787	2,004	+752	+60%	35%
Unknown	224	243	236	225	272	253	277	221	232	319	+95	+42%	4%
Pedestrian Location[b]													
Intersection	1,029	907	908	995	1,012	969	1,028	1,120	1,158	1,058	+29	+3%	1%
Non-Intersection	2,654	2,938	3,091	3,312	3,217	3,377	3,827	4,256	4,304	4,500	+1,846	+70%	85%
Not on Road	387	385	402	460	467	437	517	592	510	574	+187	+48%	9%
Unknown	39	72	56	51	83	127	122	112	103	151	+112	+287%	5%
Pedestrian Action[c]													
Crossing	—	2,438	2,450	2,729	2,575	2,742	3,094	3,394	3,482	3,458	+1,020	+42%	51%
Walking along roadway	—	373	435	501	522	599	687	735	695	781	+408	+109%	21%
Disabled vehicle related	—	203	304	261	265	265	283	317	330	365	+162	+80%	8%
Other/Unknown	—	1,288	1,268	1,327	1,417	1,304	1,430	1,634	1,568	1,679	+391	+30%	20%

[b] Marked crosswalks not located at intersections are counted in category intersection.
[c] Not recorded prior to 2010. Changes shown for 2010-2018.

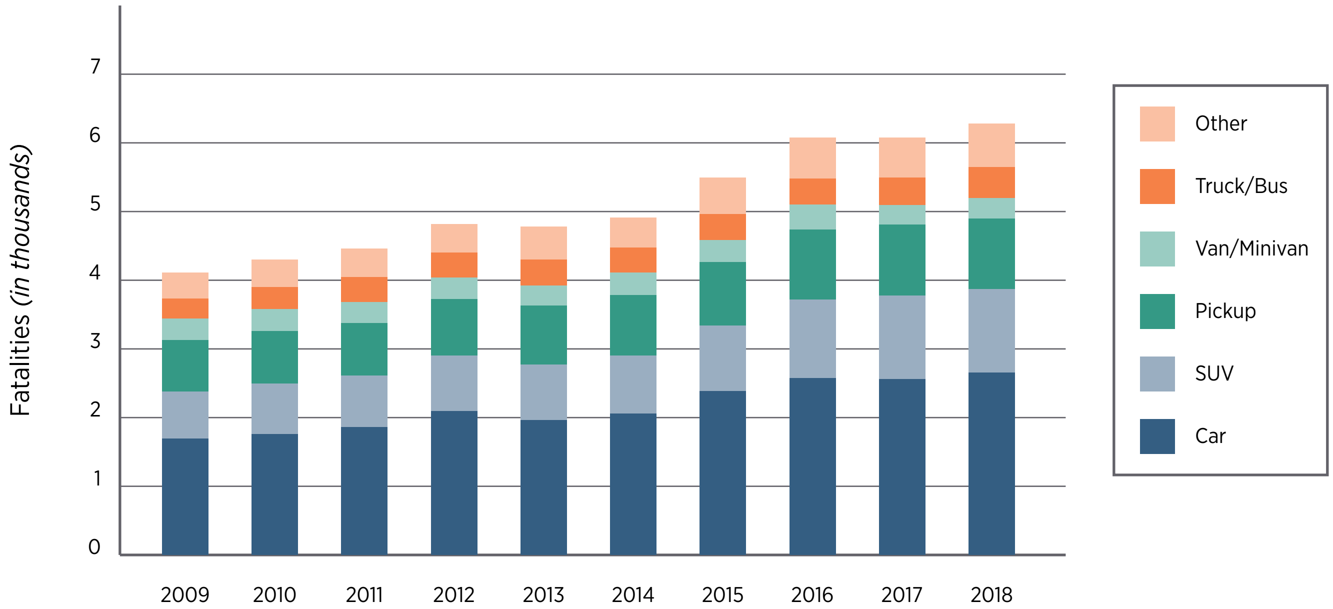

Figure 1. Types of Vehicles that Fatally Struck Pedestrians, United States, 2009–2018.

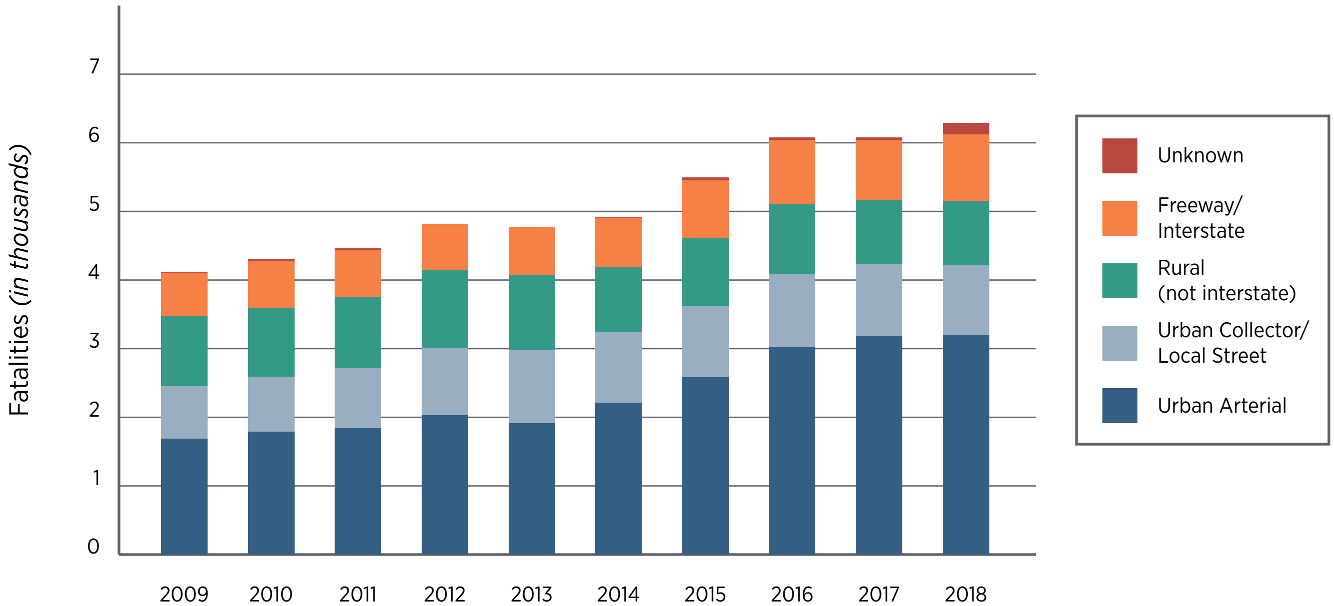

Figure 2. Functional Classification of Roadways on which Pedestrians were Killed, United States, 2009-2018.

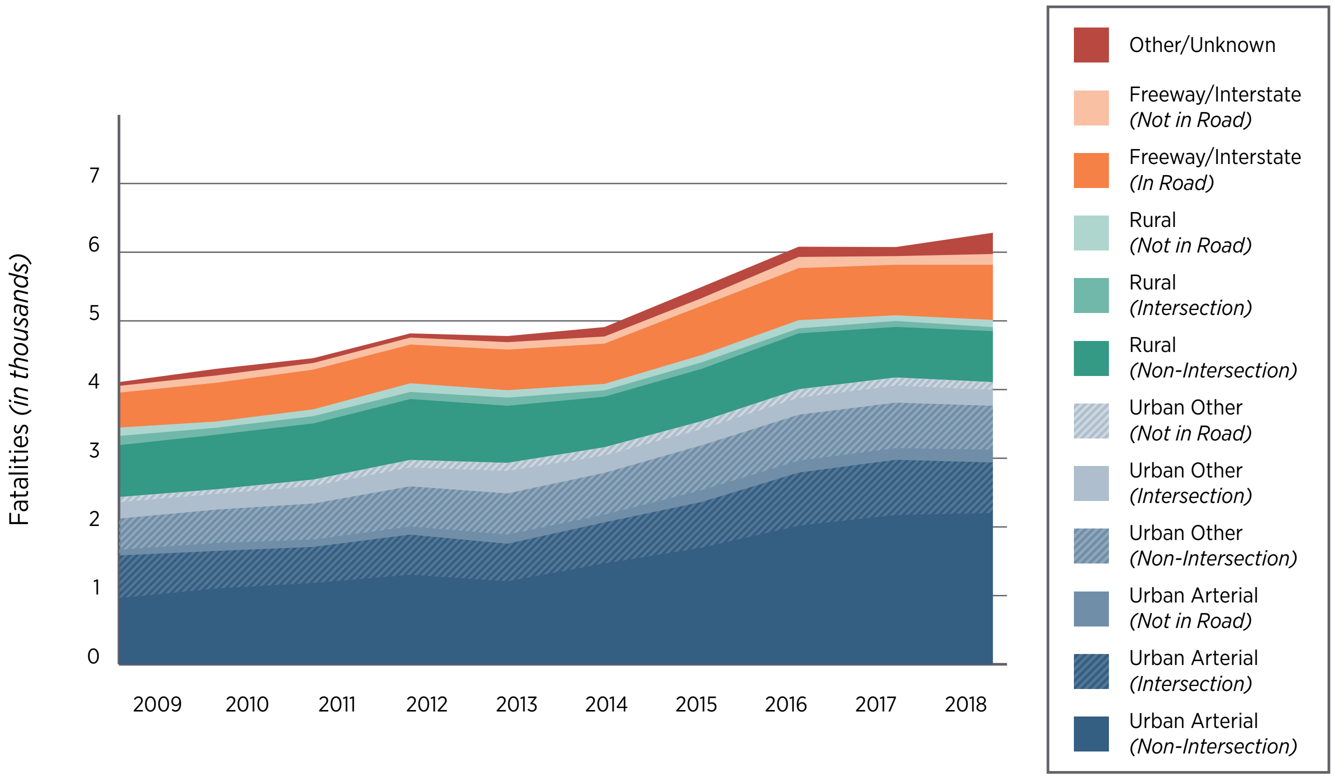

Figure 3. Pedestrian Pre-Crash Location on Roadway and Roadway Function Class, Fatally Injured Pedestrians, United States, 2009-2018.

Other=collectors & local streets. Rural=all rural roads except Interstate highways.
Crosswalks at non-intersection locations are grouped with intersections.

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About the AAA Foundation for Traffic Safety

The AAA Foundation for Traffic Safety is a 501(c)(3) nonprofit, publicly supported charitable research and education organization. It was founded in 1947 by the American Automobile Association to conduct research to address growing highway safety issues. The organization's mission is to identify traffic safety problems, foster research that seeks solutions and disseminate information and educational materials. AAA Foundation funding comes from voluntary, tax-deductible contributions from motor clubs associated with the American Automobile Association and the Canadian Automobile Association, individual AAA club members, insurance companies and other individuals or groups.

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