

Spotlight on
Highway Safety



Pedestrian Traffic Fatalities by State

2021 PRELIMINARY DATA (January - December)



Pedestrian Traffic Fatalities by State

2021 PRELIMINARY DATA

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EXECUTIVE SUMMARY

This report includes state-provided fatality projections for all of 2021, an in-depth analysis of recently released 2020 data from the National Highway Traffic Safety Administration's (NHTSA) Fatality Analysis Reporting System (FARS) and an overview of proven strategies states and communities are – or should consider – employing to reduce pedestrian crashes and injuries.

First, it uses the latest available state-reported data to project the number of pedestrian deaths in each state and nationwide for all 12 months of 2021. GHSA projects a total of 7,485 pedestrians were killed in traffic crashes, an increase of 11.5%. This would be the largest number of pedestrian fatalities in four decades.

The report also analyzes the 2020 FARS data to identify the leading crash factors that contributed to pedestrian deaths during that year (the most recent year national data are available). In 2020, the number of U.S. pedestrian deaths was 6,607 compared with 6,272 in 2019. This report provides a closer look at these numbers, examining not only state-level data, but also national trends regarding speeding and alcohol involvement in these fatal crashes, as well as the environment in which they occurred. It also explores the types of vehicles involved and how America's largest cities have fared in recent years.

This is the latest in a series of GHSA reports analyzing pedestrian fatality data. As in previous reports, the most recent data has been adjusted slightly to account for historical underreporting.

The report also considers the application of the Safe System approach to preventing traffic-related serious injuries and fatalities, which is at the core of the recently released U.S. Department of Transportation (U.S. DOT) National Roadway Safety Strategy (NRSS). The NRSS calls for the use of all roadway safety interventions – infrastructure, human behavior, responsible oversight of the vehicle and transportation industry, and emergency response – to achieve a zero fatalities goal.¹ This report highlights countermeasures that can help prevent pedestrian-involved crashes and includes examples of state and community initiatives.

¹ U.S. Department of Transportation. (2022, January). National Roadway Safety Strategy. <https://www.transportation.gov/NRSS>

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INTRODUCTION

During the past decade, U.S. pedestrian fatalities increased from 4,302 in 2010 to an estimated 6,607 in 2020 (Table 1 and Figure 1), representing approximately 17% of all traffic deaths.

Between 2019 and 2020, pedestrian deaths increased 5%, while other traffic fatalities increased 8%. This reverses the trend since 2010 in which pedestrian fatalities made up an increasing proportion of traffic fatalities each year.

Table 1 Pedestrian Fatalities and Percent of Total Traffic Fatalities, 2010-2020

Year	Pedestrian Fatalities	All Other Traffic Fatalities Combined	Total Traffic Fatalities	Pedestrian Deaths as a Percentage of Total Traffic Fatalities
2010	4,302	28,697	32,999	13.0%
2011	4,457	28,022	32,479	13.7%
2012	4,818	28,964	33,782	14.3%
2013	4,779	28,114	32,893	14.5%
2014	4,910	27,834	32,744	15.0%
2015	5,494	29,990	35,484	15.5%
2016	6,080	31,726	37,806	16.1%
2017	6,075	31,398	37,473	16.2%
2018	6,374	30,461	36,835	17.3%
2019	6,272	30,083	36,355	17.3%
2020	6,607 ²	32,566	39,173	16.9%
% Change from 2010 to 2020	+ 54%	+ 13%	+ 19%	

Sources: FARS

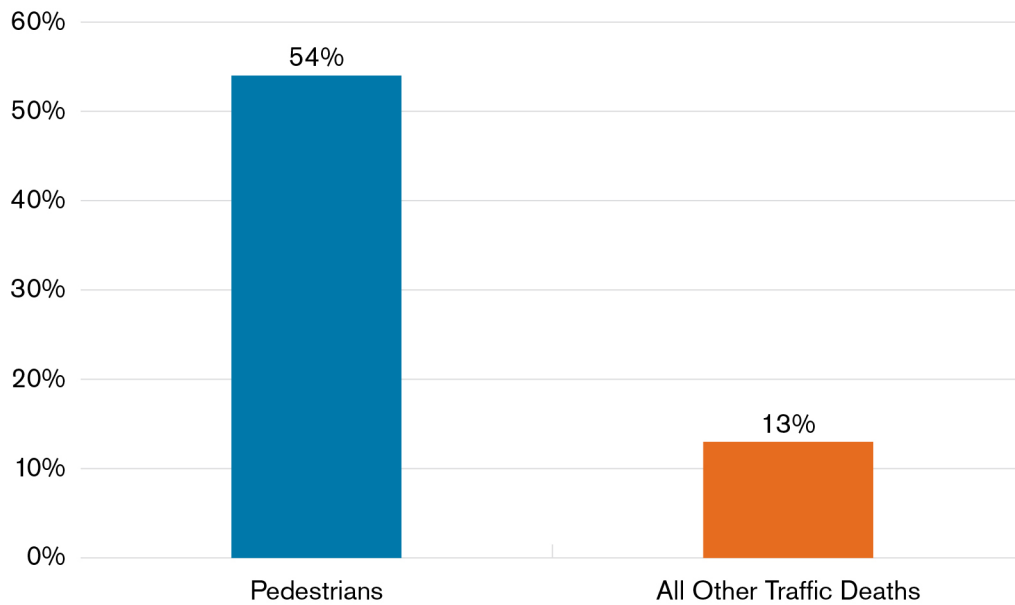
² Adjusted *for this table only*. Unadjusted = 6,516. In 2019, the preliminary count of pedestrian fatalities was 6,205; the final count was 6,272. This suggests an undercount factor of approximately 1.011. The undercount factor used in the previous report, based on earlier historical data, was 1.017. An average of the historical factor and the most recent year's factor yields an adjustment factor of 1.014. For all other traffic fatalities, the 2019 preliminary count was 29,891, while the final 2019 count was 30,083. This suggests an undercount factor of 1.006. The undercount factor used in the previous report was 1.009, so the average other vehicle fatalities adjustment factor is 1.008. This approach weights more recent data more heavily, while smoothing out year-to-year fluctuations by incorporating historical data.

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In 2020, the proportion of pedestrian fatalities decreased slightly, from 17.3% to 16.9%. Despite this year-to-year proportional drop, between 2010 and 2020, pedestrian deaths increased an astonishing 54%, while all other fatalities increased just 13%.

Figure 1 Percent Increase in Number of Traffic Deaths, 2010 to 2020



Source: FARS

The safety of people on foot should be of concern to all roadway users because everyone is a pedestrian. Simply put, we all walk or roll. Examining the latest data helps traffic safety professionals understand what may be driving this decade-long increase in pedestrian deaths and, more importantly, how to reverse it.

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PART 1: PRELIMINARY 2021 STATE DATA

In April 2022, GHSA surveyed the State Highway Safety Offices (SHSOs) for their preliminary full-year pedestrian fatality counts for 2021. All 50 states and the District of Columbia (D.C.) provided data. The preliminary state data were adjusted using an adjustment factor of 1.036, based on historic differences between preliminary counts of pedestrian fatalities reported by SHSOs and final data provided by SHSOs, approximately one year later.

Because of differences between SHSO-reported data and FARS data, this report does not make direct comparisons between the two sources. The numbers reported by SHSOs are generally higher than those reported by FARS (about 2% higher nationwide). This occurs because some SHSOs:

- Include deaths that occur more than 30 days after the crash. FARS counts only traffic fatalities that occur within 30 days of the crash.
- Classify people on e-scooters, skateboards and other personal conveyances as pedestrians. FARS classifies these fatalities separately from pedestrians.
- Include pedestrian deaths that did not involve a motor vehicle, such as a pedestrian struck by a bicycle. FARS only includes fatal crashes that involve a motor vehicle.
- Include deaths that occur on non-public roads such as parking lots. FARS only includes fatal crashes that occur on public roadways.

Based on SHSO data, GHSA projects 7,485 pedestrians were killed in 2021, compared to 6,711 in 2020 (Table 2). This is a projected increase of 11.5%, representing 774 additional lives lost, and **would be the largest number in 40 years.** (Because 2020 was an unusual year for travel patterns due to the pandemic, data from 2019 is included for historical comparison.) The data presented in this section builds on [GHSA's prior analysis of state data for the first six months of 2021](#).

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Table 2

Pedestrian Fatalities by State, Jan-June 2019-2021

Sources: State Highway Safety Offices and GHSA data analysis

State	2019 Final	2020 Final	2021 Preliminary (adjusted)	Change from 2019 to 2021		Change from 2020 to 2021	
				#	%	#	%
Alabama	114	101	126	12	10.5	25	24.8
Alaska	6	13	14	8	133.3	1	7.7
Arizona	220	235	235	15	6.8	0	0.0
Arkansas	61	80	106	45	73.8	26	32.5
California	1020	1026	958	-62	-6.1	-68	-6.6
Colorado	76	87	89	13	17.1	2	2.3
Connecticut	53	61	52	-1	-1.9	-9	-14.8
Delaware	32	25	29	-3	-9.4	4	16.0
District of Columbia	9	10	17	8	88.9	7	70.0
Florida	745	716	899	154	20.7	183	25.6
Georgia	239	281	348	109	45.6	67	23.8
Hawaii	37	21	23	-14	-37.8	2	9.5
Idaho	14	14	18	4	28.6	4	28.6
Illinois	171	175	228	57	33.3	53	30.3
Indiana	75	123	136	61	81.3	13	10.6
Iowa	22	30	32	10	45.5	2	6.7
Kansas	18	46	45	27	150.0	-1	-2.2
Kentucky	77	96	79	2	2.6	-17	-17.7
Louisiana	122	149	175	53	43.4	26	17.5
Maine	17	9	20	3	17.6	11	122.2
Maryland	125	131	126	1	0.8	-5	-3.8
Massachusetts	76	55	71	-5	-6.6	16	29.1
Michigan	149	175	188	39	26.2	13	7.4
Minnesota	50	45	57	7	14.0	12	26.7
Mississippi	67	104	95	28	41.8	-9	-8.7
Missouri	111	128	121	10	9.0	-7	-5.5
Montana	17	17	17	0	0.0	0	0.0
Nebraska	20	19	15	-5	-25.0	-4	-21.1
Nevada	69	82	88	19	27.5	6	7.3
New Hampshire	10	15	12	2	20.0	-3	-20.0
New Jersey	175	179	220	45	25.7	41	22.9
New Mexico	83	81	101	18	21.7	20	24.7
New York	286	241	296	10	3.5	55	22.8
North Carolina	236	228	255	19	8.1	27	11.8
North Dakota	5	8	10	5	100.0	2	25.0
Ohio	128	151	176	48	37.5	25	16.6
Oklahoma	88	86	102	14	15.9	16	18.6
Oregon	85	76	95	10	11.8	19	25.0
Pennsylvania	154	146	186	32	20.8	40	24.4
Rhode Island	8	17	11	3	37.5	-6	-35.3
South Carolina	164	187	192	28	17.1	5	2.7
South Dakota	8	14	14	6	75.0	0	0.0
Tennessee	148	172	181	33	22.3	9	5.2
Texas	661	714	825	164	24.8	111	15.6
Utah	38	36	42	4	10.5	6	16.7
Vermont	3	6	8	5	166.7	2	33.3
Virginia	124	114	125	1	0.8	11	9.7
Washington	101	111	125	24	23.8	14	12.6
West Virginia	32	18	36	4	12.5	18	100.0
Wisconsin	53	50	54	1	1.9	4	8.0
Wyoming	10	7	12	2	20.0	5	71.4
TOTAL	6,412	6,711	7,485	1,073	16.7	774	11.5

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In 2021, pedestrian fatalities are projected to have increased in 37 states and the District of Columbia (D.C.), remain unchanged in three states, and decreased in only 10 states. This is consistent with the [six-month analysis](#) GHSA released in April, which reported increases in 39 states and D.C. and decreases in 11 states.

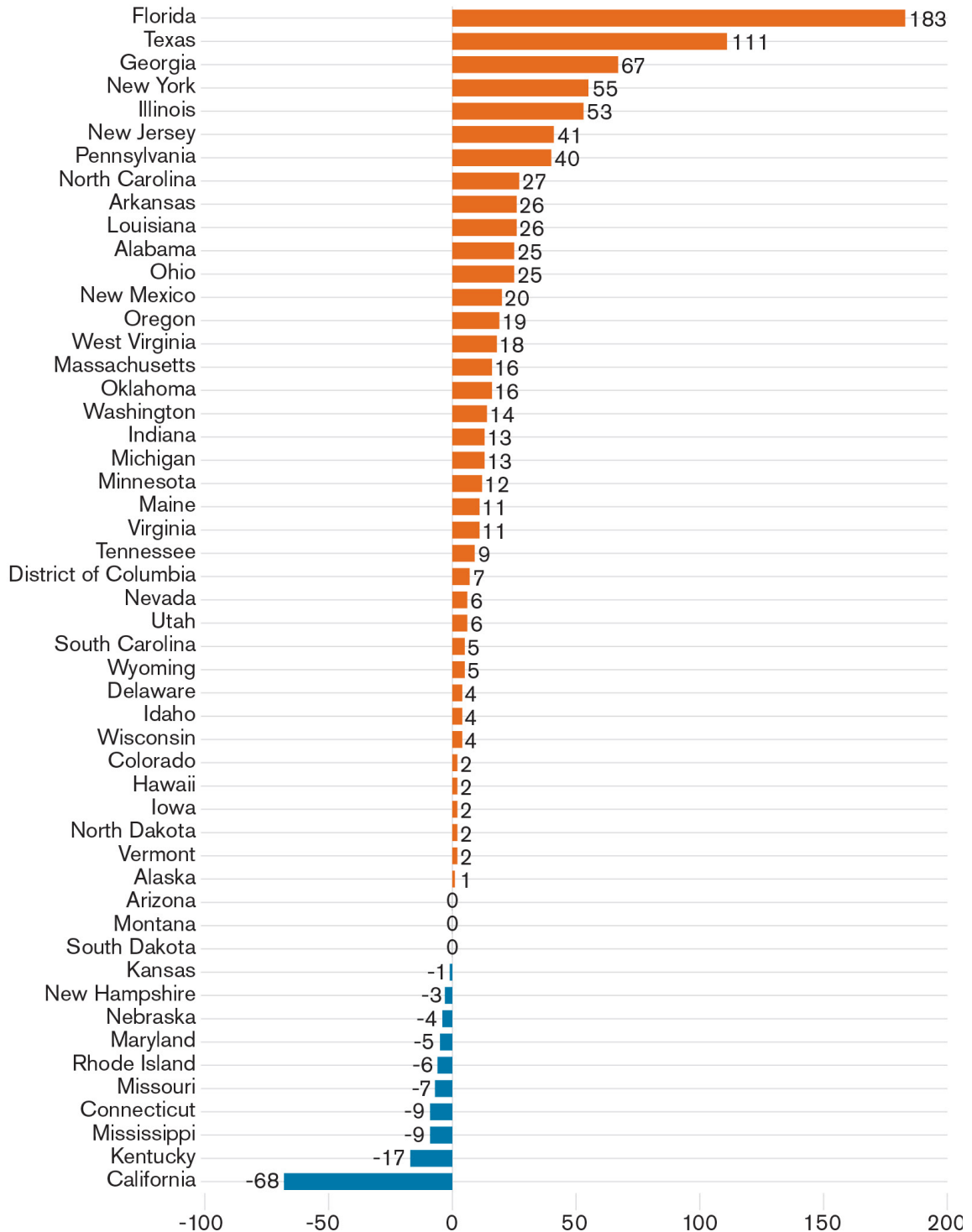
Figures 2 and 3 provide a more visual representation of the year-to-year difference in both the raw number of fatalities and the percentage changes. Sadly, two states – Florida and Texas – each had more than 100 additional pedestrian deaths in 2021. In addition, seven states experienced an increase of more than 30% in the number of people on foot struck and killed in motor vehicle crashes.

Note that states with smaller populations will have a large swing in percentages with just a slight change in fatalities, while in more populous states a large change in raw numbers can result in a smaller percentage shift. For example, six fewer deaths in Rhode Island equated to a 35.3% drop compared to the previous year. On the other hand, in Texas 111 more pedestrians were killed, which represented a 15.6% year-over-year increase.

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Figure 2 Difference in Pedestrian Fatalities, 2020-2021

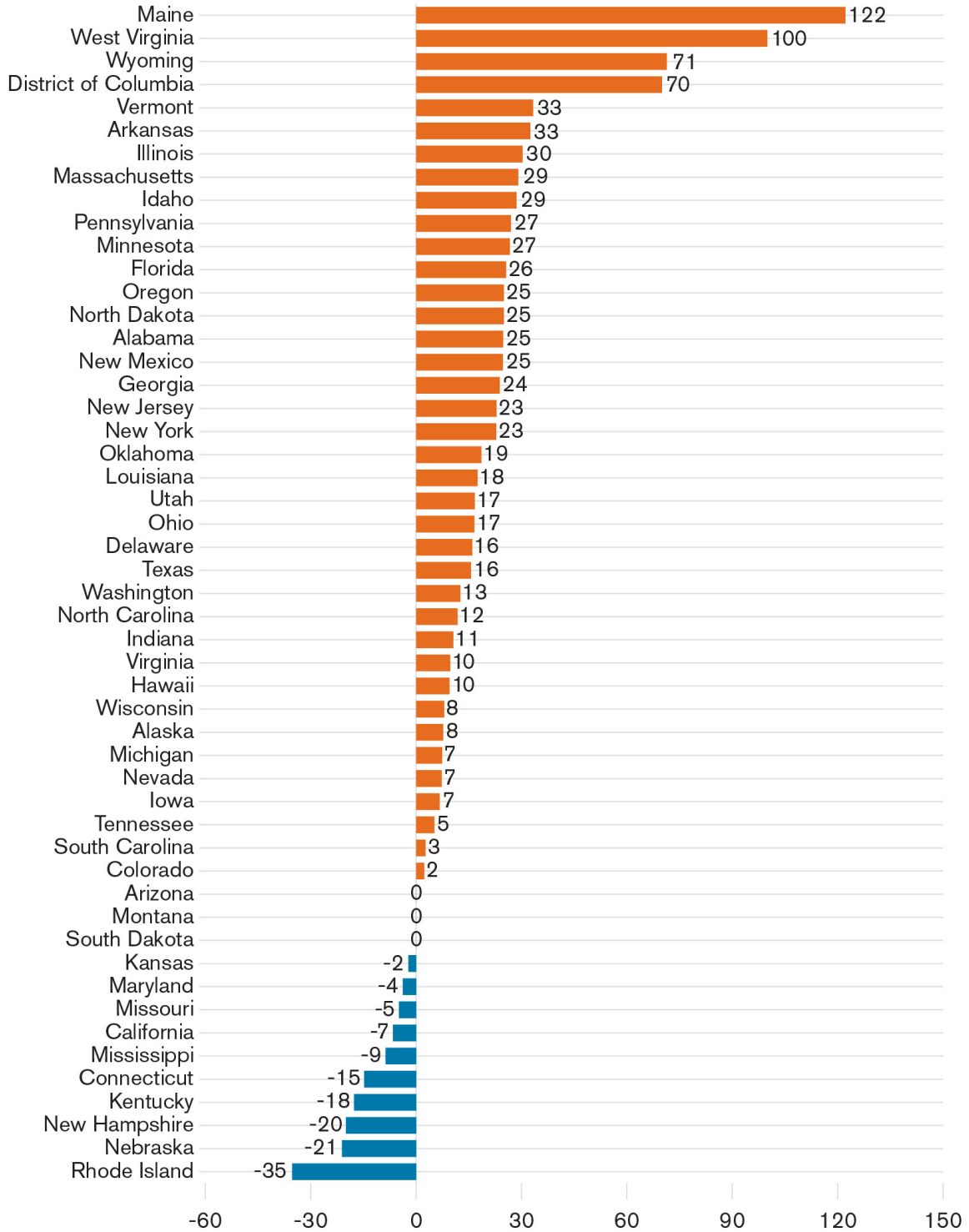


Source: State Highway Safety Offices and GHSA data analysis

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Figure 3 Percentage Difference in Pedestrian Fatalities, 2020-2021



Source: State Highway Safety Offices and GHSA data analysis

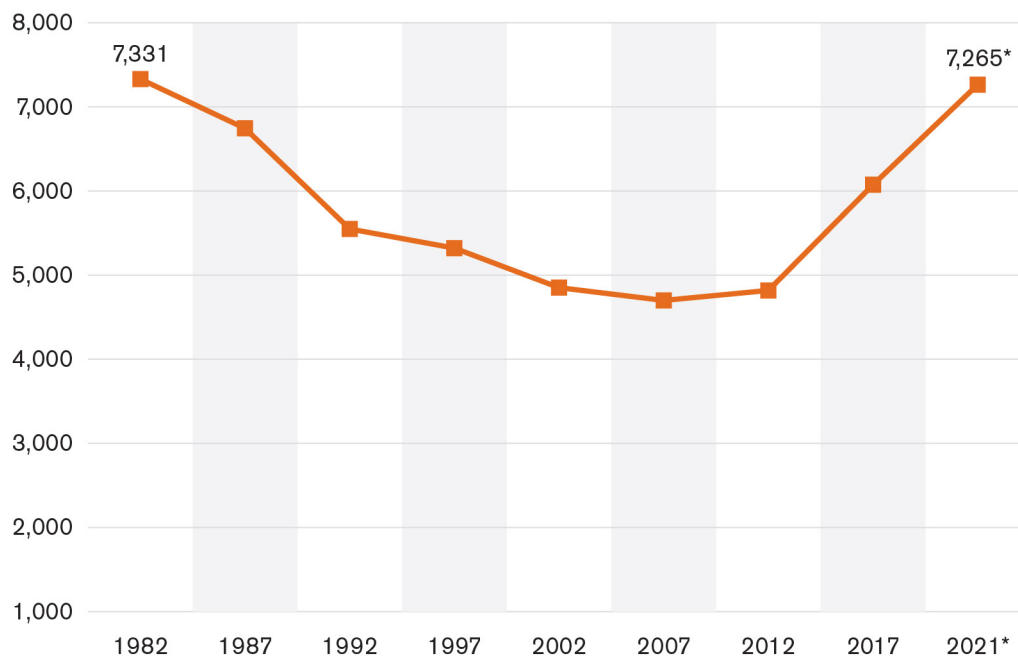
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As noted, direct comparisons between SHSO data and FARS data are not made due to differences in these two sources. However, if the projected 11.5% increase in the number of SHSO-reported pedestrian fatalities is applied to 2020 FARS (Release 1) data, the number of pedestrian fatalities in FARS for 2021 is projected to be 7,265: $6,516 \times 1.115 = 7,265$

If this projection proves accurate, **pedestrian fatalities for 2021 could be the largest number reported in FARS in 40 years.** This is shown in Figure 4.

Figure 4 Number of Annual U.S. Pedestrian Fatalities, 1982-2021



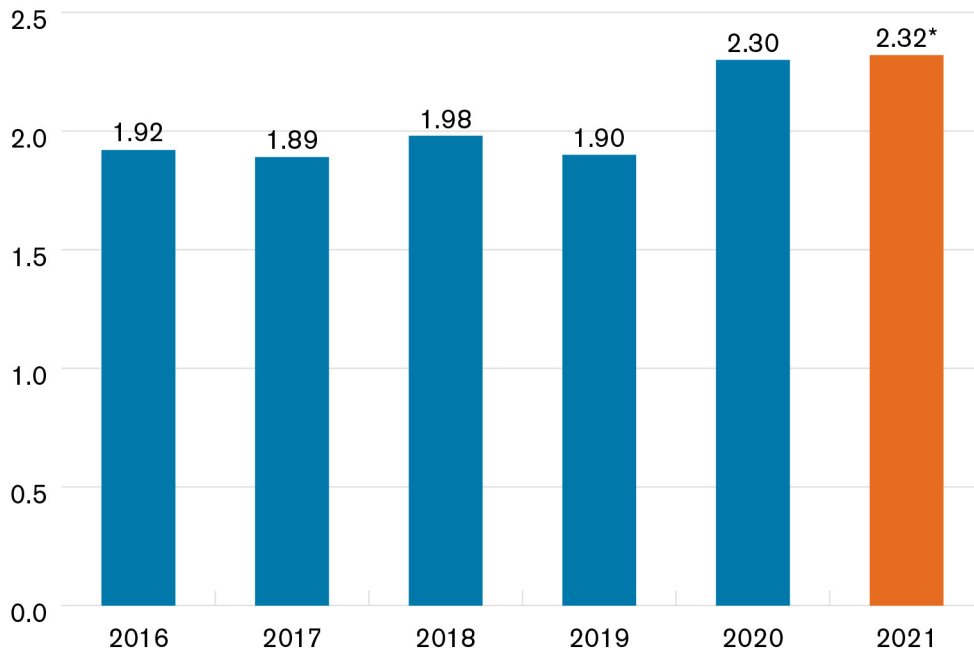
*Projected
Sources: FARS and GHSA analysis of SHSO data

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The Federal Highway Administration (FHWA) estimates there were a total of 3.2 trillion vehicle miles travelled (VMT) in 2021, an increase of 11.2% over 2020, which saw historically low VMT due to the pandemic. Factoring in the 7,485 predicted pedestrian fatalities for 2021 results in a projected pedestrian fatality rate of 2.32 per one billion VMT, representing a slight 1% increase over the 2.30 rate in 2020. In other words, more drivers were on the road last year, more pedestrians were killed, and the pedestrian fatality rate remained at a historically high level, as shown in Figure 5.

Figure 5 U.S. Pedestrian Fatality Rate per One Billion VMT



*Projected
Sources: FARS and GHSA analysis of SHSO data

Table 3 presents the rate of pedestrian fatalities per 100,000 residents. The overall rate increased from 2.02 in 2020 to 2.26 in 2021. Rates increased in 38 states and D.C. Twenty-one states and D.C. had annual fatality rates above 2.0 (up from 19 in 2020). For 2021, New Mexico is projected to have the highest rate at 4.77, while Nebraska had the lowest at 0.76.

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Table 3

Pedestrian Fatality Rate by State Per 100,000 Population, 2020-2021

Sources: State Highway Safety Offices and U.S. Census Bureau

State	2020	2021
Alabama	2.01	2.50
Alaska	1.77	1.91
Arizona	3.27	3.23
Arkansas	2.66	3.50
California	2.60	2.44
Colorado	1.50	1.53
Connecticut	1.69	1.44
Delaware	2.52	2.89
District of Columbia	1.45	2.54
Florida	3.32	4.13
Georgia	2.62	3.22
Hawaii	1.45	1.60
Idaho	0.76	0.95
Illinois	1.37	1.80
Indiana	1.81	2.00
Iowa	0.94	1.00
Kansas	1.57	1.53
Kentucky	2.13	1.75
Louisiana	3.20	3.78
Maine	0.66	1.46
Maryland	2.12	2.04
Massachusetts	0.78	1.02
Michigan	1.74	1.87
Minnesota	0.79	1.00
Mississippi	3.52	3.22
Missouri	2.08	1.96
Montana	1.57	1.54
Nebraska	0.97	0.76
Nevada	2.63	2.80
New Hampshire	1.09	0.86
New Jersey	1.93	2.37
New Mexico	3.83	4.77
New York	1.20	1.49
North Carolina	2.18	2.42
North Dakota	1.03	1.29
Ohio	1.28	1.49
Oklahoma	2.17	2.56
Oregon	1.79	2.24
Pennsylvania	1.12	1.45
Rhode Island	1.55	1.00
South Carolina	3.64	3.70
South Dakota	1.58	1.56
Tennessee	2.49	2.59
Texas	2.44	2.79
Utah	1.10	1.26
Vermont	0.93	1.24
Virginia	1.32	1.45
Washington	1.44	1.62
West Virginia	1.01	2.02
Wisconsin	0.85	0.92
Wyoming	1.21	2.07
National Rate	2.02	2.26

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PART 2: 2020 NATIONAL DATA

In addition to analyzing the preliminary state pedestrian fatality data for all of 2021, which provides raw numbers only, GHSA also examined the most recently available national pedestrian fatality data for 2020 using FARS. The FARS data include specific crash factors, which allow for a more in-depth analysis. This report presents at speeding, alcohol involvement, environmental factors, striking vehicle type and data for the 10 most populous U.S. cities.

Speeding

In 2020, the percentage of pedestrian fatalities with speeding cited as a factor increased approximately 20%, from 7.2% to 8.6%. This supports existing research that speeding and other risky driving behaviors increased during the pandemic.^{3 4} Speed has a significant impact on pedestrian safety. In fact, the average risk of death for pedestrians increases exponentially the faster a vehicle is traveling, from just 10% at 23 mph to 90% at 58 mph.⁵ The driver of a faster moving vehicle has less time to react to a pedestrian in the roadway, and the pedestrian has less time react to the vehicle. Table 4 presents speeding-related pedestrian fatality data from 2016 through 2020.

Table 4 Pedestrian Fatalities in Which Speeding Was Indicated as a Factor, by Year

Year	Speeding Indicated	Total	% with Speeding Indicated
2016	442	6,080	7.27
2017	413	6,075	6.80
2018	412	6,374	6.46
2019	451	6,272	7.19
2020	562	6,516	8.62

Source: FARS

Pedestrian fatalities with speeding as a factor were examined by the type of roadway where the crashes occurred. Compared with 2019, the proportion of pedestrian fatalities that were speeding related increased sharply on both interstates and local roads:

- In 2019, 7% of pedestrian fatalities on interstates listed speeding as a factor. In 2020, this percentage increased to 10.1%.
- In 2019, 6.8% of pedestrian fatalities on local roads listed speeding as a contributing factor. In 2020, this percentage jumped to 11.6%.

Because interstates restrict pedestrian access, these deaths likely involved individuals who got out of a disabled vehicle, workers in construction zones or first responders.

3 AAA Foundation for Traffic Safety. (2021). AAA Traffic Safety Culture Index. <https://newsroom.aaa.com/wp-content/uploads/2021/10/2020-TSCI-Full-Report-October-2021-FINAL.pdf>

4 Wagner, E., Atkins, R., Berning, A., Robbins, A., Watson, C., & Anderle, J. (2020, October). Examination of the traffic safety environment during the second quarter of 2020 [DOT HS 813 011]. <https://rosap.nhtl.bts.gov/view/dot/50940>

5 Tefft, B.C. (2011). Impact speed and a pedestrian's risk of severe injury or death [Technical Report]. AAA Foundation for Traffic Safety. <https://aaaafoundation.org/impact-speed-pedestrians-risk-severe-injury-death/>

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Table 5 breaks down 2020 pedestrian fatalities by roadway type and illustrates in what percent of these fatalities speeding was a factor.

Table 5 2020 Speeding-Related Pedestrian Fatalities by Roadway Type

Type of Roadway	Speeding Indicated?		Total	% with Speeding Indicated
	Yes	No		
Interstate, principal arterial	83	741	824	10.07
Freeway and expressway, principal arterial	19	258	277	6.86
Principal arterial, other	172	2,339	2,511	6.85
Minor arterial	141	1,284	1,425	9.89
Collector	65	594	659	9.86
Local	76	582	658	11.55
Unknown	6	156	162	3.70
Total	562	5,954	6,516	8.62

Source: FARS

Researchers also examined pedestrian fatalities by age group, exploring what proportion were speeding-related (Figure 6). The data revealed a concerning trend. For most age groups the percentage of pedestrian crashes with speeding as a factor crept up slightly between 2018 and 2020. However, there was a sharp increase in speeding as a factor in fatalities for pedestrians younger than 15.

Since 2018, the percentage of pedestrian fatalities among children younger than age 15 in which speeding was listed as a contributing factor more than doubled, from 5.8% to 11.9%. Most fatalities in this age group occurred on weekdays (64% over the period 2018-2020) and during daylight hours (53%), suggesting that many of these children may have been traveling to or from school or after-school activities. Were more drivers speeding through and near school zones?

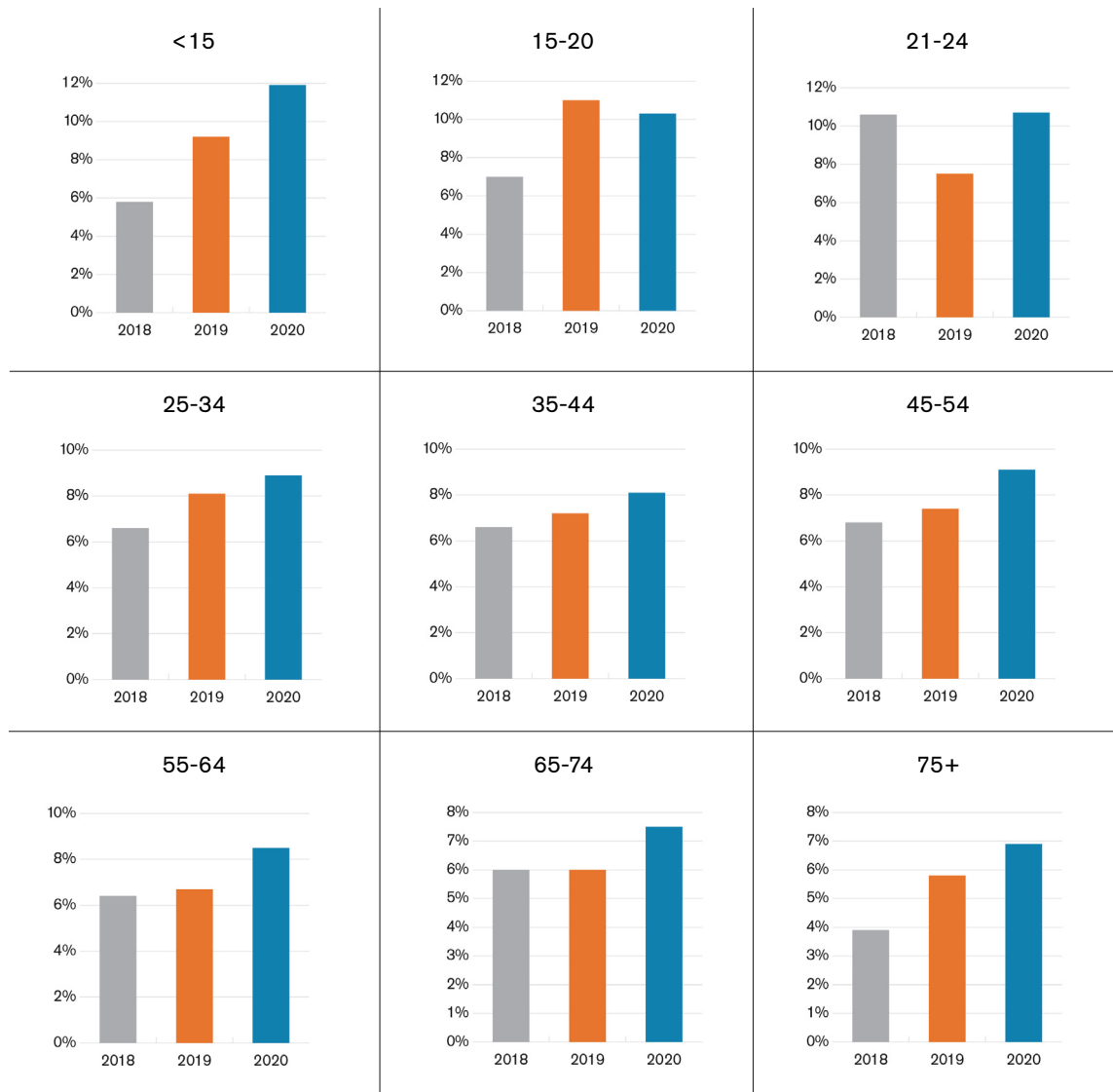
Of course, many areas of the country were in lockdown during much of 2020, and school children were learning remotely. In fact, the U.S. Census Bureau reports 93% of households participated in some form of distance learning during COVID-19.⁶ This raises another question: Were more children going outside during the day and not in a controlled environment, such as around their home, at a playground or near a school? Note that the proportion of pedestrian fatalities that involve children has remained steady. The notable trend is a jump in child fatalities that involved speeding.

⁶ <https://www.census.gov/library/stories/2020/08/schooling-during-the-covid-19-pandemic.html>

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Figure 6 Speeding Involved Pedestrian Fatalities by Age Group, 2018-2020



Source: FARS

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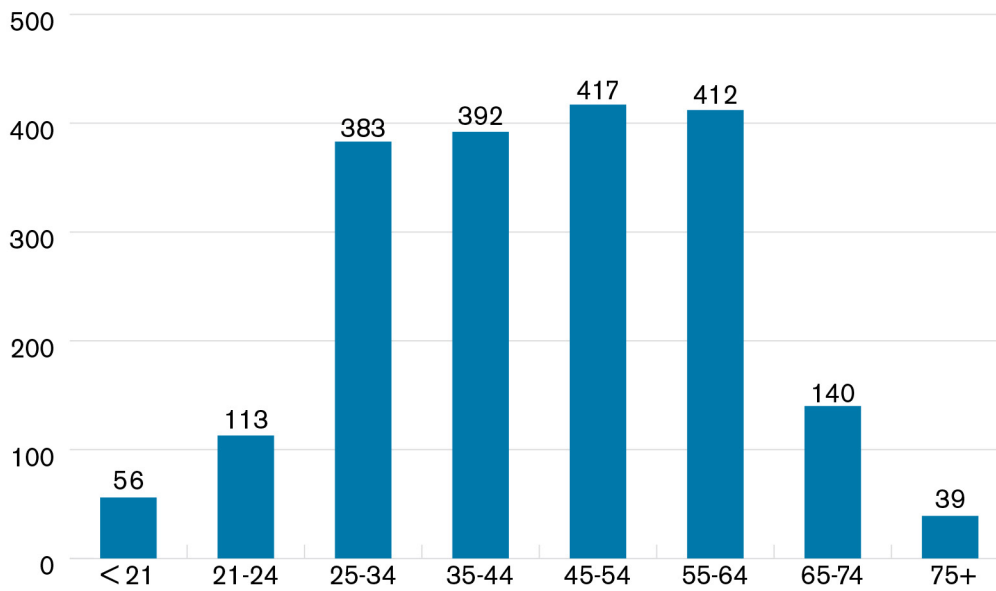
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Alcohol Impairment

It is well established that alcohol consumption can lead to impairment for both drivers and pedestrians. Drunk driving remains a pervasive highway safety threat to all road users, and any vehicle remains a far greater threat to a pedestrian than a pedestrian does to a vehicle. Nonetheless, data show that a considerable number of pedestrians killed in crashes had a blood alcohol concentration (BAC) of 0.08.

In 2020, 31.2% of pedestrians ages 16 or older killed in motor vehicle crashes had a BAC of 0.08 or greater. (The figure in 2019 was 31.7%.) Figure 7 breaks down all pedestrian fatalities involving a pedestrian with a BAC of 0.08 or greater by age group. This analysis is limited to pedestrians 16 years of age or older because higher BACs are rare among pedestrians younger than 16.

Figure 7 2020 Pedestrian Fatalities with Pedestrian BAC \geq 0.08, by Age Group



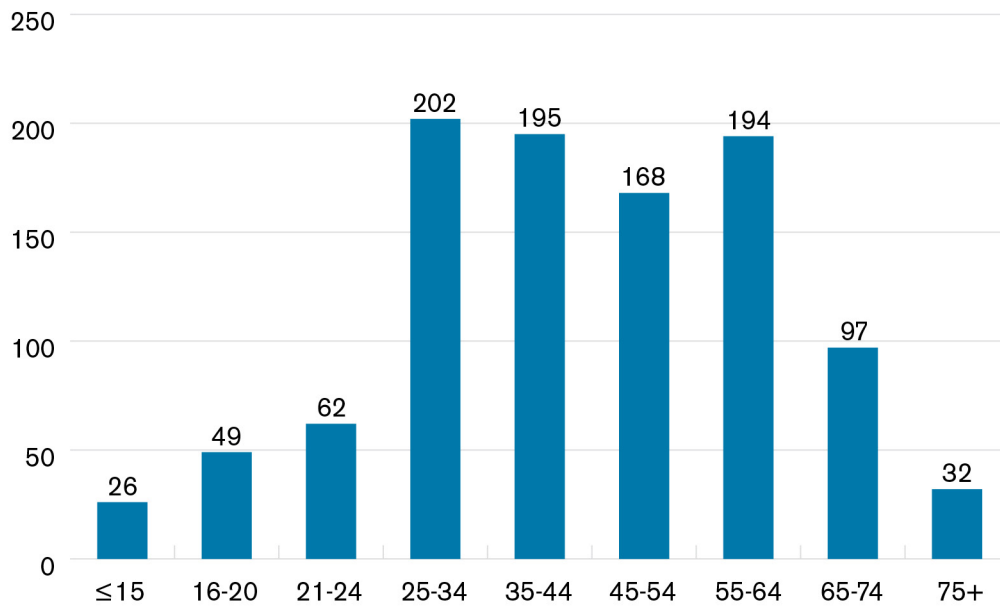
Source: FARS

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Looking at drivers, in 2020, 16.1% of pedestrian fatalities involved a driver with a BAC of 0.08 or higher. (This count includes fatalities for pedestrians younger than 16.) With the exception of 2019, when it was 13%, this figure has been consistently in the 16% to 17% range, so it is likely that 2019 was an unusually low year and the 2020 proportion is returning to the higher range. Figure 8 breaks down all impaired driver-involved pedestrian fatalities by the age of the impaired driver.

Figure 8 Pedestrian Fatalities with Driver BAC \geq 0.08, by Age Group



Source: FARS

The discussion of alcohol impairment among pedestrians is controversial. While alcohol impairment puts a pedestrian at greater risk while walking around vehicle traffic, clearly it is vehicles and their drivers that are the ones striking and killing pedestrians. However, given that these crashes are prevalent, more must be done to identify new countermeasures to effectively address this problem.

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Table 6

Pedestrian Fatality Rate by State Per 100,000 Population, 2018-2020

Source: FARS

Population

The pedestrian fatality rate is calculated by multiplying the number of fatalities by 100,000 and dividing that by the state population. The result is the number of pedestrian deaths per 100,000 people who reside in the state. In 2020, most states had small increases in their rates compared with 2019, but overall, the rates were stable. Table 6 lists the pedestrian fatality rate for all states and D.C. Key findings include:

- New Mexico had the highest rate at 3.8. However, New Mexico also had the highest rate in 2019 (4.0), so this represents a slight decrease for 2020.
- The rate for Mississippi increased dramatically from 2.2 in 2019 to 3.7 in 2020.
- The states with the lowest rates were Maine (0.7), Massachusetts and Idaho (0.8 each).
- Nineteen states had fatality rates greater than 2.0, which is equal to the number of states with fatality rates this high or higher in 2019.
- The total U.S. fatality rate in 2020 was 1.99, a slight increase from the 1.91 observed in 2019.

State	2018	2019	2020
Alabama	2.19	2.43	2.03
Alaska	1.90	0.82	1.77
Arizona	3.30	2.89	3.13
Arkansas	2.06	2.05	2.72
California	2.48	2.56	2.53
Colorado	1.56	1.27	1.52
Connecticut	1.65	1.51	1.58
Delaware	2.38	3.29	2.52
District of Columbia	1.57	1.28	1.45
Florida	3.32	3.32	3.27
Georgia	2.49	2.22	2.64
Hawaii	2.96	2.54	1.45
Idaho	0.97	0.67	0.76
Illinois	1.30	1.37	1.39
Indiana	1.70	1.08	1.39
Iowa	0.70	0.67	0.85
Kansas	0.96	0.55	1.60
Kentucky	1.64	1.63	2.04
Louisiana	3.52	2.54	3.14
Maine	0.45	1.19	0.66
Maryland	2.17	2.05	2.14
Massachusetts	1.12	1.12	0.75
Michigan	1.42	1.41	1.72
Minnesota	0.75	0.83	0.81
Mississippi	2.99	2.18	3.62
Missouri	1.55	1.78	2.11
Montana	1.41	1.50	1.57
Nebraska	1.25	1.03	0.92
Nevada	2.61	2.01	2.57
New Hampshire	0.66	0.74	1.16
New Jersey	1.95	1.96	1.89
New Mexico	3.97	3.96	3.78
New York	1.37	1.41	1.16
North Carolina	2.16	2.11	2.21
North Dakota	0.79	0.66	1.03
Ohio	1.09	1.06	1.37
Oklahoma	1.52	2.15	2.17
Oregon	1.84	1.94	1.70
Pennsylvania	1.54	1.15	1.12
Rhode Island	0.66	0.76	1.55
South Carolina	3.25	3.17	3.70
South Dakota	1.14	0.79	1.58
Tennessee	2.01	2.17	2.51
Texas	2.15	2.24	2.39
Utah	1.14	1.19	1.01
Vermont	0.96	0.48	1.25
Virginia	1.39	1.44	1.31
Washington	1.32	1.34	1.27
West Virginia	1.22	1.73	1.01
Wisconsin	0.96	1.01	0.87
Wyoming	1.04	1.90	1.04
National Rate	1.95	1.91	1.99

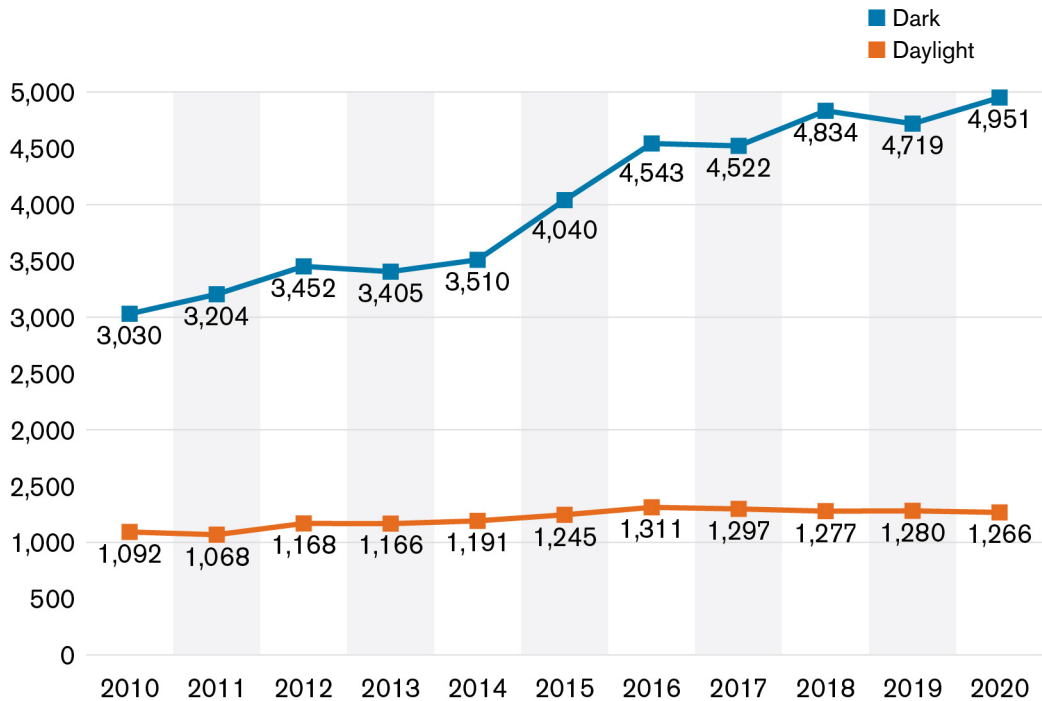
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Light Condition

Most pedestrian fatalities continue to occur at night, although nighttime fatalities have accounted for an even larger share of the total during the past few years. In 2020, 76.6% of crashes with known lighting conditions occurred after dark, compared to 19.6% during daylight hours and 3.8% during dawn or dusk. Figure 9 illustrates the wide disparity between deaths during daylight hours and at night. (Dawn or dusk are excluded considering the small share of fatalities they represent.)

Figure 9 Number of Pedestrian Fatalities by Light Condition, 2010-2020



Source: FARS

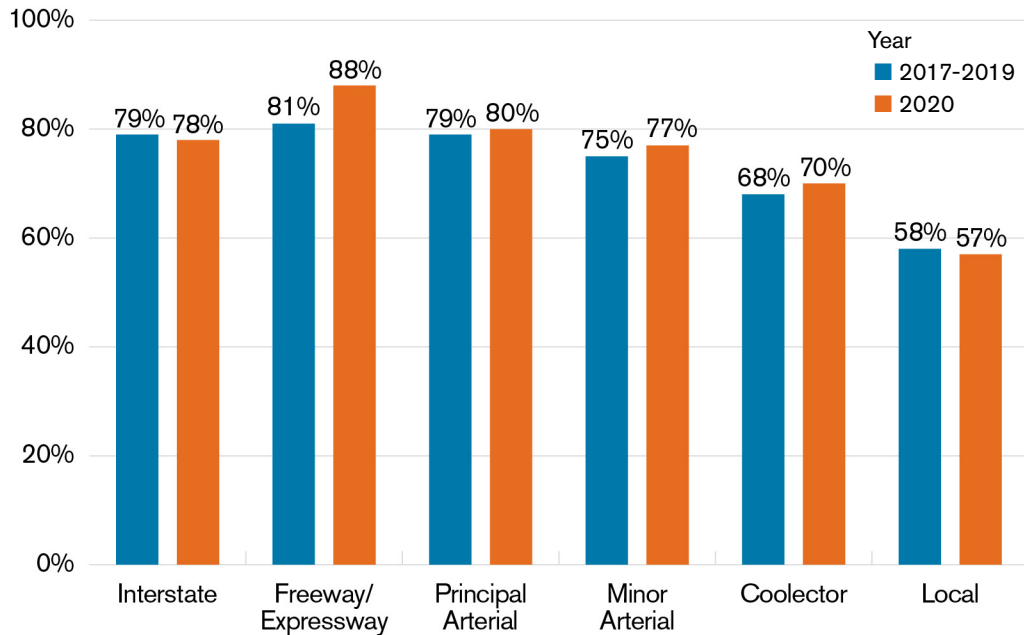
Diving even deeper into the data, in 2020 more than half (51.2%) of fatalities between sunset and sunrise occurred where artificial lighting conditions existed. In 2019, this figure was 52.5%. However, this data does not account for the quality of the artificial lighting conditions, and good lighting is a proven countermeasure for increasing pedestrian visibility and helping to prevent crashes at night.

Examining the data by roadway function class illustrates that freeways and expressways are particularly dangerous after sunset, with 88% of all pedestrian fatalities on these roads happening at night. Consistent with prior years, pedestrian fatalities on local roads were less likely to occur in the dark. Even so, more than half of these fatal crashes took place at night. Figure 10 compares 2020 data against the prior three-year average.

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Figure 10 Percent of Pedestrian Fatalities by Roadway Function Class that Occurred in the Dark, 2017-2019 average vs. 2020



Source: FARS

Roadway Factors

Looking at where pedestrian crashes occur can offer insights for future preventative countermeasures. This report examines whether sidewalks were present, whether crashes occurred at intersections and the type of roadway on which the crash took place. These factors reflect values available in FARS data from police crash reports. The presence of a sidewalk helps to protect pedestrians; however, broader infrastructure design considerations, discussed later in this report, can provide even more protection for people on foot.

In 2020, a larger percent of pedestrian fatalities happened where no sidewalk was noted on the crash report form (67% compared with an average of 62% during the four prior years), as shown in Table 7. One explanation for this may be that some people shifted essential trips from transit to walking during the height of the pandemic.⁷ ⁸ These pedestrians may have been using routes without sidewalks – or other infrastructure designed to separate pedestrians and vehicles – more frequently.

7 Habib, M.A., & Anik, M.A.H. (2021). Impacts of COVID-19 on transport modes and mobility behavior: Analysis of public discourse in Twitter. *Journal of the Transportation Research Board*. <https://journals.sagepub.com/doi/full/10.1177/03611981211029926>

8 Hunter, R.F., Garcia, L., de Sa, T.H. et al. (2021). Effect of COVID-19 response policies on walking behavior in US cities. *Nat Commun* 12, 3652 (2021). <https://doi.org/10.1038/s41467-021-23937-9>

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Table 7 Pedestrian Fatalities by Presence of a Sidewalk, 2016-2020

Year	Sidewalk Present?			Total	% None Noted
	None Noted	Yes	Unknown		
2016	3,851	2,115	114	6,080	63.3
2017	3,598	2,341	136	6,075	59.2
2018	3,973	2,306	95	6,374	62.3
2019	3,976	2,247	49	6,272	63.4
2020	4,374	2,088	54	6,516	67.1

Source: FARS

The bulk of pedestrian fatalities (75.8%) in 2020 took place in non-intersection locations. This is consistent with the proportion in 2019 (73.1%) and prior years. It reinforces the fact that crossing the street at an intersection is the safest option.

The last roadway factor analyzed is the functional classifications of the roads on which fatal pedestrian crashes took place. In 2020, 60.4% of pedestrian fatalities happened on non-freeway arterials, 22.7% on local/collector roads or roads of unknown functional class, and 16.9% on interstates and freeways.

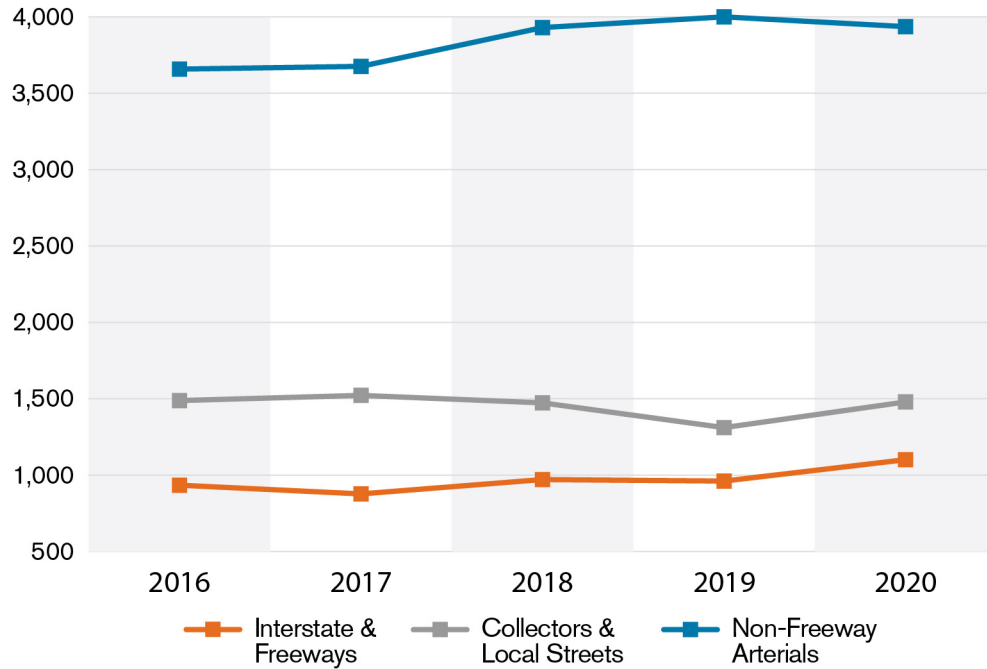
Approximately 17% of pedestrian deaths took place on interstates and freeways, where pedestrians are not typically present, and where motor vehicles are traveling at speeds that would greatly reduce the odds of surviving of a crash. These pedestrians are more likely to typically be stranded motorists who exit their vehicle, construction workers, first responders or tow truck drivers. The sheer number of deaths on these roads (more than 1,000 in 2020 alone) indicates a need for stronger Move Over laws, requiring drivers to slow down and change lanes in the presence of a stopped vehicle, as well as more consistent enforcement of, and public education about, existing laws.

The roadway functional classification proportions are comparable to the past five years, as shown in Figure 11, and suggest that non-freeway arterials are the most dangerous roads for pedestrians. Arterials tend to carry a large volume of local traffic at relatively high speeds, so it is not surprising that pedestrians tend to be at high risk on or near these roadways.

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Figure 11 Pedestrian Fatalities by Roadway Functional Class, 2016-2020



Source: FARS

Vehicle Type

The type of vehicle that strikes a pedestrian is significant. As Table 8 shows, in 2020 a passenger car was the striking vehicle in approximately 40% of pedestrian fatalities, while SUVs were involved in about 20%.

Table 8 2020 Pedestrian Fatalities by Striking Vehicle Type, All Crashes

Vehicle Type	Count	Percent
Passenger Cars	2,556	39.23
SUVs	1,322	20.29
Pickups	1,017	15.61
Other/Unknown	874	13.41
Large Trucks	468	7.18
Vans	237	3.64
Buses	42	0.64

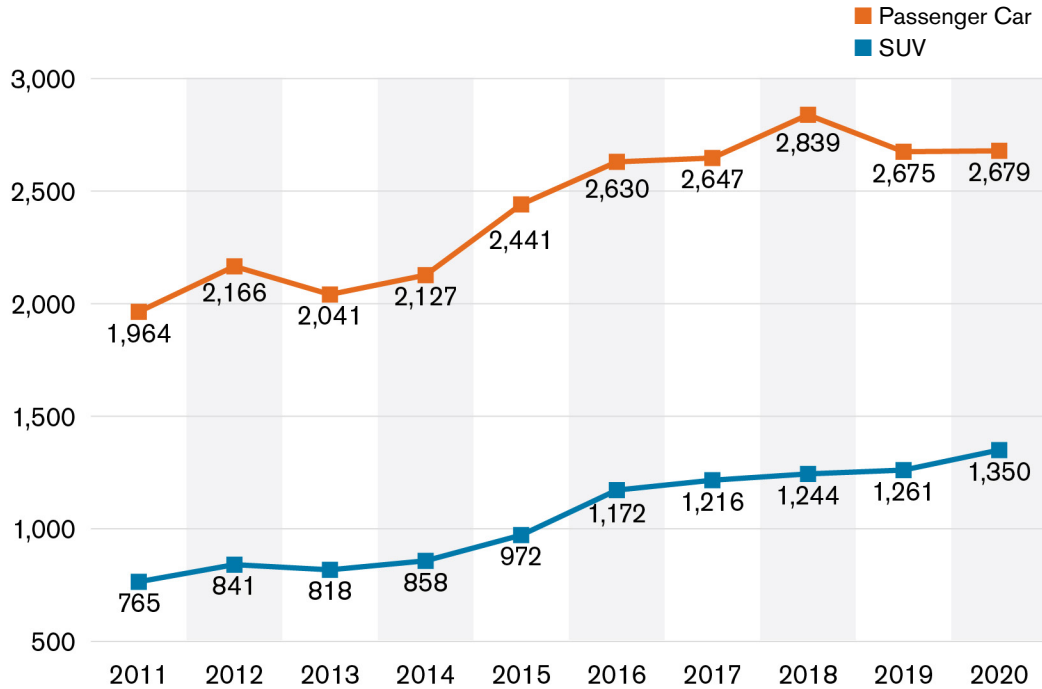
Source: FARS

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Figure 12 shows the growth in the number of pedestrians killed by SUVs versus passenger cars over the past decade. Deaths caused by SUVs grew 76%, while deaths caused by passenger cars grew 36% during the same time period.

Figure 12 Number of Pedestrians Killed in Crashes Where the Striking Vehicle was a Passenger Car or SUV, 2011-2020



Source: FARS

As illustrated in Figure 13, in 2020, new vehicle sales and leases decreased dramatically, likely due to pandemic-related conditions. According to the Bureau of Transportation Statistics, there were only 3.4 million new sales/leases for passenger cars, and 11.1 million new sales/leases for light trucks in 2020.⁹ While passenger vehicle sales have been dipping for years, this is the first decline in light trucks in more than a decade. Note that light trucks include vans, minivans and SUVs.

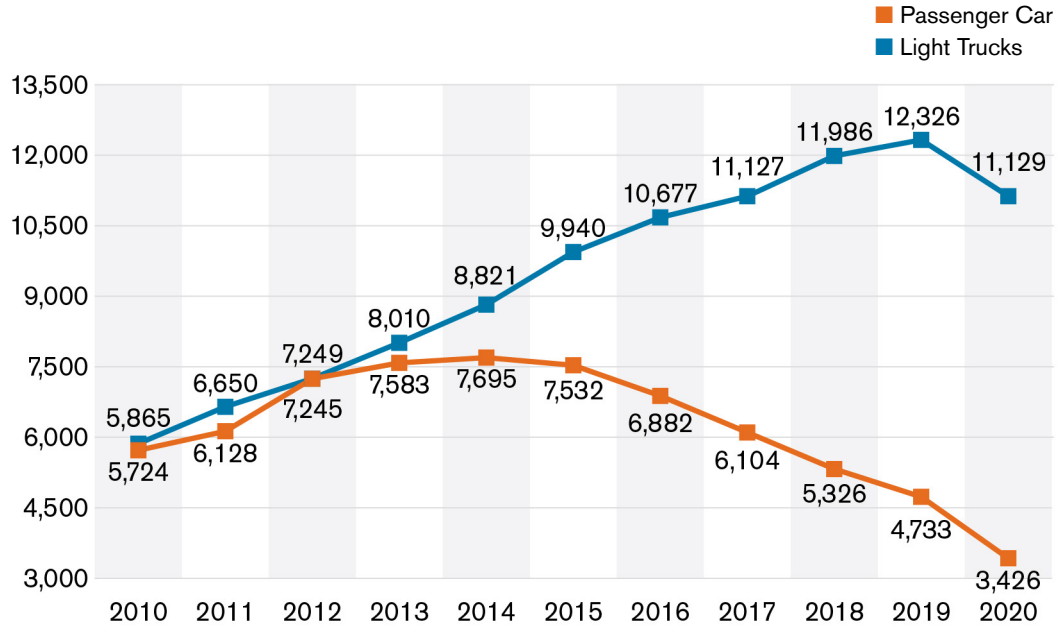
All newer vehicles generally have better crash avoidance technology than older models, and some new vehicles have pedestrian detection as a standard feature. In most cases, new vehicles tend to be safer than older vehicles. The decline of new vehicle sales in 2020 slowed the integration of safer vehicles on the road. As a result, pedestrians – and all road users – were less protected than they could have been had a greater proportion of vehicles been new.

⁹ <https://www.bts.gov/content/new-and-used-passenger-car-sales-and-leases-thousands-vehicles>

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Figure 13 Light Truck and Passenger Car Sales & Leases (in Thousands), 2010-2020



Source: Source: Bureau of Transportation Statistics

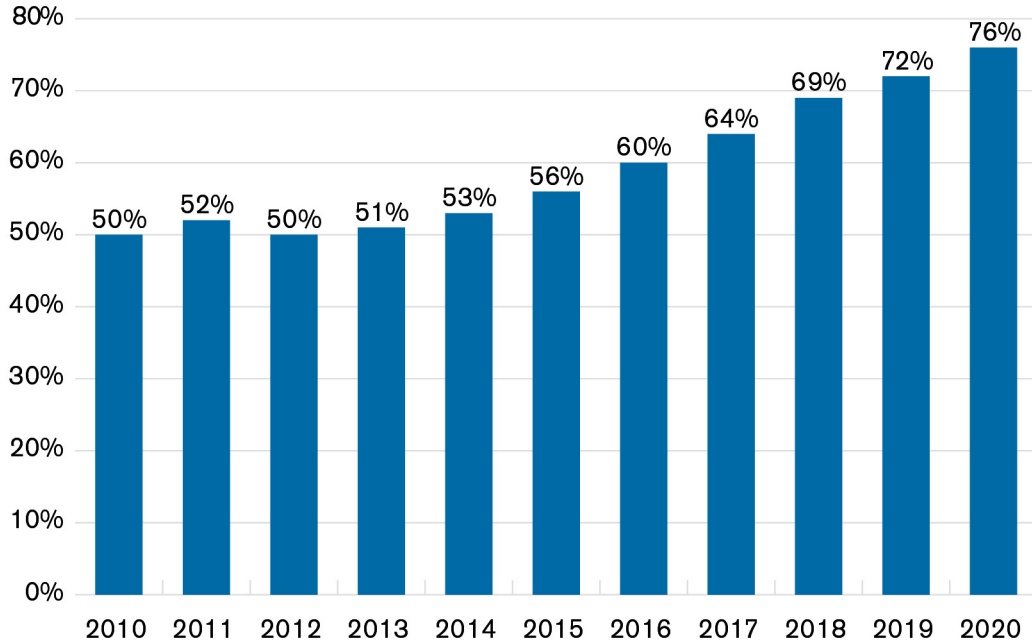
Despite the drop in light truck sales in 2020, the percentage of new vehicle sales/leases that are classified as light trucks (including SUVs or minivans) continues to rise (Figure 14). Larger vehicles are inherently more dangerous to pedestrians. Because of their greater body weight and larger profile, light trucks can cause greater harm to a pedestrian than smaller, lighter cars. In addition, new research suggests light trucks may present a visibility hazard for drivers that includes limiting their ability to see pedestrians.¹⁰

¹⁰ Wen, H., & Cicchino, J. (March 2022). The association between pedestrian crash types and passenger vehicle types. Insurance Institute for Highway Safety. <https://www.iihs.org/topics/bibliography/ref/2249>

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Figure 14 Light Trucks as a Percent of Total Light Vehicle Sales, 2010-2020



Source: FARS

Race and Ethnicity

Complete race and ethnicity data for pedestrian fatalities are not yet available from FARS due to delays in processing death certificates. However, a preliminary NHTSA report indicated that all traffic related deaths of non-Hispanic Black people are projected to have increased 23% in 2020.¹¹

GHSA's March 2021 report, [Pedestrian Traffic Fatalities by State](#), revealed some alarming long-term trends. Data examined for the five-year period 2015-2019 found that Black, Indigenous and People of Color (BIPOC) were over-represented in pedestrian crashes considering their share of the population. Considering the ethnic categories in FARS, non-Hispanic Black people represented 12% of the population during this time period but accounted for 21% of pedestrian fatalities. Hispanics made up 19% of the population but were 21% of pedestrian deaths. And most astonishingly, American Indians represented 0.7% of the population but accounted for 2.4% of deaths – more than triple what would be expected if pedestrian deaths were distributed equally among race and ethnicity categories.

On the other hand, non-Hispanic whites and Asians were under-represented in pedestrian fatalities: 62% of the population versus 52% of deaths for whites, and 5.7% of the population but only 3% of deaths for Asian/Unknown.

¹¹ National Highway Traffic Safety Administration. (2021). Early estimates of motor vehicle traffic fatalities and fatality rate by sub-categories in 2020 [DOT HS 813 018]. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813118>

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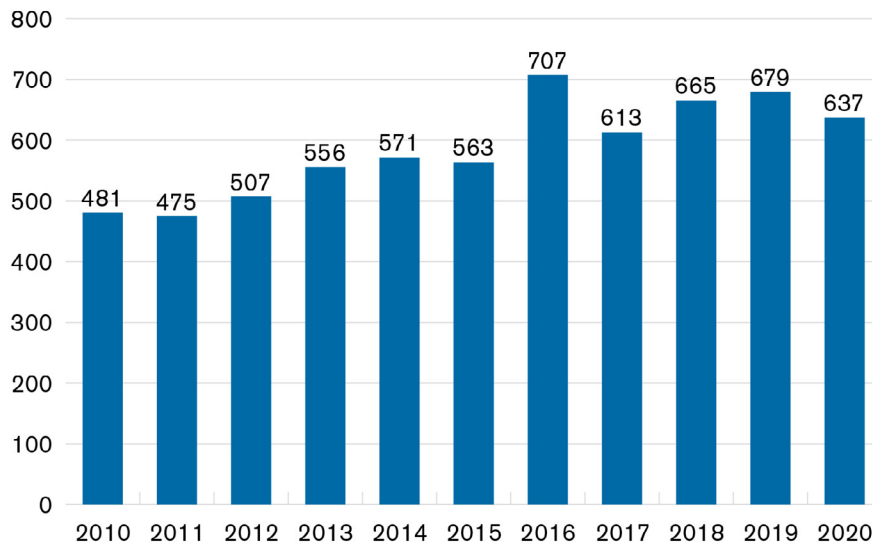
Considering that BIPOC make up 60% of transit riders,¹² and that transit ridership fell dramatically during the pandemic,^{13 14} it is likely that BIPOC's over-representation in pedestrian deaths continued into 2020 and potentially increased.

A Closer Look at Cities

Because so many pedestrian fatalities occur in urban areas, it is important to look closely at the data from the 10 most populous U.S. cities: Chicago, Dallas, Houston, Los Angeles, New York, Philadelphia, Phoenix, San Antonio, San Diego and San Jose.

Cities are defined as actual cities versus larger Metropolitan Statistical Areas (MSA) within which cities are located. In 2020, there were a total of 637 pedestrian fatalities in these cities, an 8% decrease from the previous count of 689 in 2019. Over the past decade, with few exceptions, the total number of pedestrian fatalities in these cities had been increasing. Figure 15 provides this data.

Figure 15 Pedestrian Deaths in the 10 Largest U.S. Cities, 2010-2020



Source: FARS

It is possible that the COVID-19 lockdowns in these cities contributed to the 2020 decline. New York City is a good example. There were only two pedestrian fatalities in New York City in March 2020, compared to an average of 10 in March during the prior three years. Incredibly, no pedestrian fatalities were reported in New York City in April 2020, while there was an average of six in April during the prior three years.

12 Clark, H. (2017). Who rides public transportation. American Public Transportation Association. <https://www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-Who-Rides-Public-Transportation-2017.pdf>

13 Habib, M.A., & Anik, M.A.H. (2021). Impacts of COVID-19 on transport modes and mobility behavior: Analysis of public discourse in Twitter. Journal of the Transportation Research Board. <https://journals.sagepub.com/doi/full/10.1177/03611981211029926>

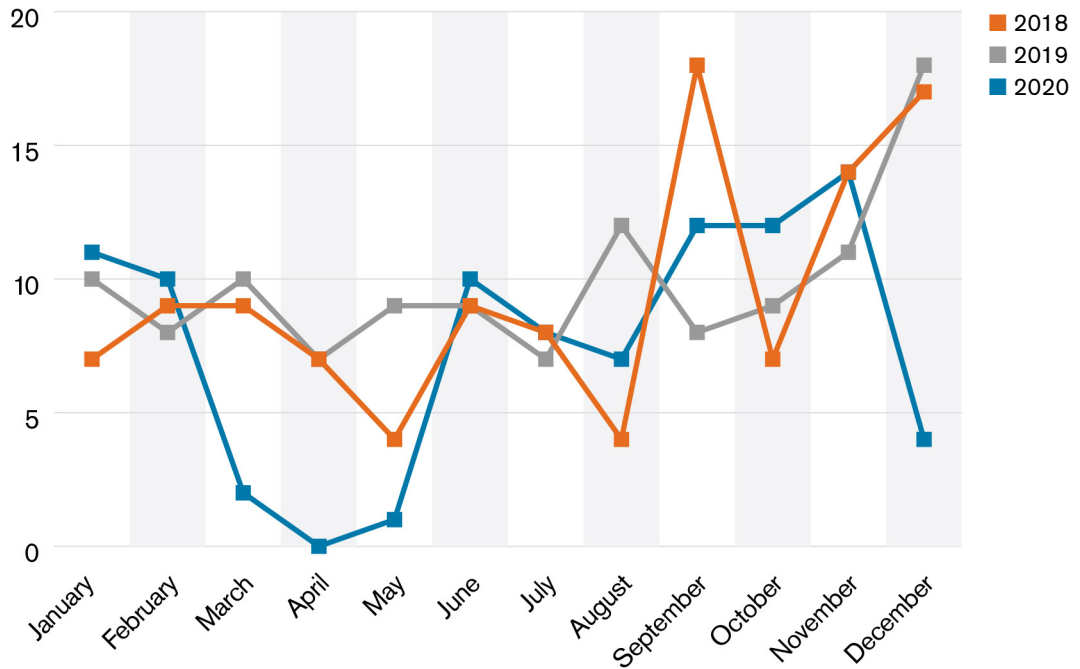
14 Hunter, R.F., Garcia, L., de Sa, T.H., et al. (2021). Effect of COVID-19 response policies on walking behavior in US cities. Nat Commun 12, 3652 (2021). <https://doi.org/10.1038/s41467-021-23937-9>

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Figure 16 shows clear dips in New York City's pedestrian fatality counts in March, April, May and December of 2020 (with 2018 and 2019 also shown for comparison), which roughly correspond to Covid-19 surges in New York City.

Figure 16 Pedestrian Fatalities in New York City by Month, 2018-2020



Source: FARS

Figure 17 provides the data for all 10 cities. Most showed decreasing pedestrian fatality numbers in 2020 as compared to 2019. Some interesting findings include the following:

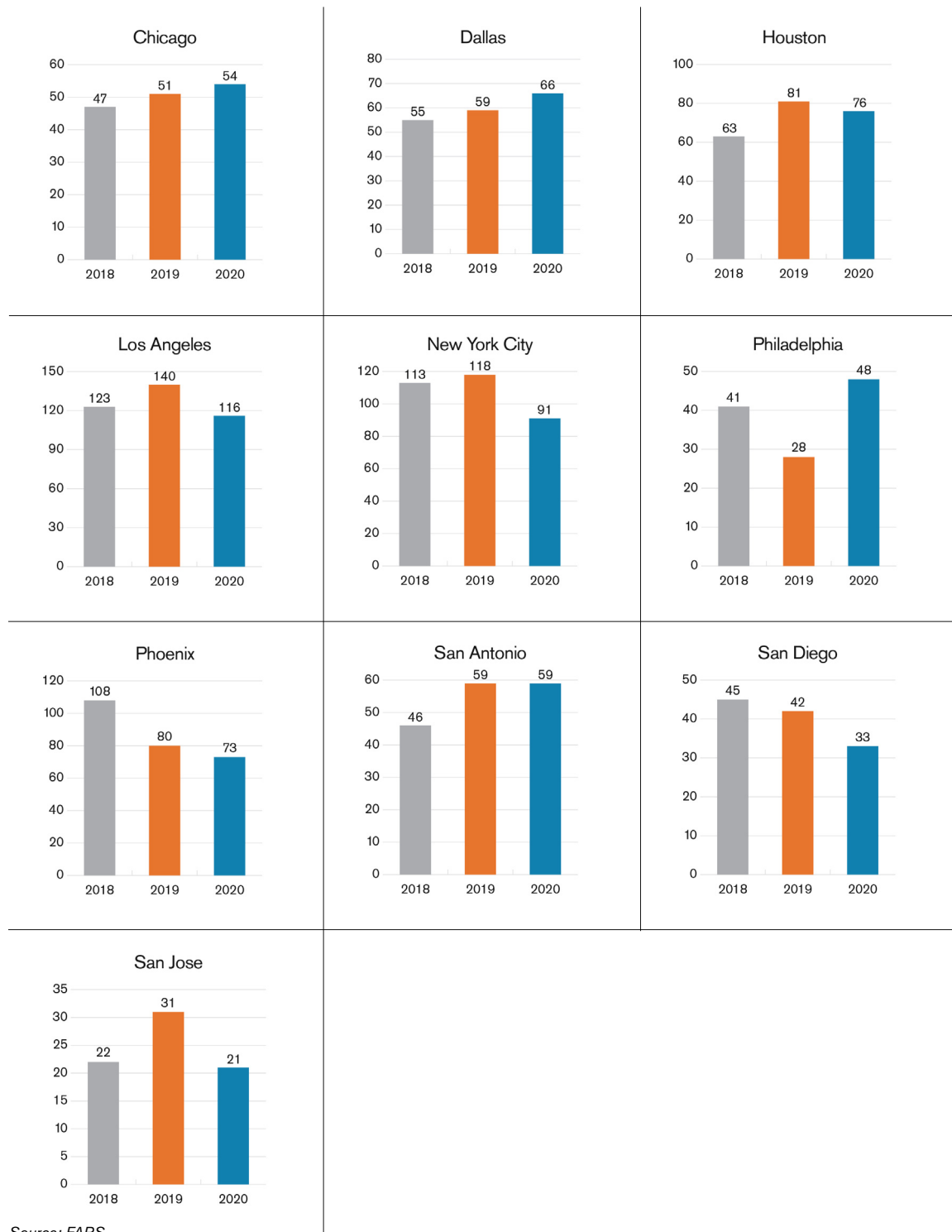
- In Chicago and Dallas, pedestrian fatalities have trended upward since 2018.
- In San Antonio, the upward trend between 2018 and 2019 stabilized in 2020 (no change).
- In Houston, Los Angeles, New York City and San Jose, pedestrian fatalities increased in 2019 and then decreased in 2020.
- In Philadelphia, pedestrian fatalities decreased in 2019 but increased in 2020.
- In Phoenix and San Diego, pedestrian fatalities have steadily declined since 2018.

It is important to note that many of the cities with longer and more cautious public health restrictions, such as those in California and New York City, saw a relatively large drop in pedestrian fatalities for 2020 as compared to 2019.

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Figure 17 Pedestrian Deaths in the 10 Largest U.S. Cities, 2018-2020



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PART 3: HOW TO REDUCE PEDESTRIAN FATALITIES AND INJURIES

While the drop in fatalities in major cities in New York and California in 2020 is welcome news, **it should not take a pandemic lockdown to reduce pedestrian fatalities.**

Engineers, law enforcement officials, public health professionals, SHSO leaders, safety advocates and others in the U.S. have been grappling with how to keep pedestrians safe ever since Henry Bliss was struck and killed by a taxi in New York City in 1899.¹⁵

There are two basic lines of defense against pedestrian and motor vehicle conflicts. The first (and most effective) is preventing the crash from happening in the first place, ideally through separation of transportation pathways. The second is mitigating the physical effects of any crash through a variety of tactics, including reduced vehicle speeds where pedestrians are present.

Traditionally, the safety community has embraced a four E's approach to traffic safety. The original three were engineering, enforcement and education, with emergency medical response sometimes included. More recently, equity has been added to ensure transportation safety for all people regardless of age, race, gender, ability, income, background and other personal characteristics.

Following the lead of some European countries, the U.S. has embraced a Safe System approach to traffic safety, which seeks to create a transportation system that accommodates human mistakes and keeps crash impacts on the body at survivable levels. The 2022 U.S. DOT [National Roadway Safety Strategy](#) endorses the Safe System approach. This is a shift from the four E's and requires robust collaboration among all parties, keeping in mind that activities from all the E's continue to play an important role in building a Safe System. Research shows tremendous promise from Safe System efforts in other countries.¹⁶

The Safe System approach emphasizes equity across all disciplines. For example, roadway safety features should be added to all socioeconomic communities equitably, and roads should be built and designed with the safety of all users in mind. Laws should be enforced equitably. Educational materials should be developed with community input and delivered within a culturally appropriate context. And both rural and urban areas should have access to prompt and state-of-the-art emergency medical services.

The Safe System approach encompasses five elements, which will advance pedestrian safety: safer people, safer roads, safer vehicles, safer speeds and post-crash care. Each of these objectives is examined on the following pages.

15 Eschner, K. (2017, September 13). Henry Bliss, America's first pedestrian fatality, was hit by an electric taxi. <https://www.smithsonianmag.com/smart-news/henry-bliss-americas-first-pedestrian-fatality-was-hit-electric-taxi-180964852/>

16 Signor, K., Kumfer, W., LaJeunesse, S., & Carter, D. (2018). Safe systems synthesis: An international scan for domestic application. University of North Carolina Highway Safety Research Center. https://www.roadsafety.unc.edu/wp-content/uploads/2018/08/SafeSystemsSynthesis-FinalReport_3.pdf

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Safer People

This is the Safe System component most familiar to GHSA and SHSOs. SHSOs leverage federal highway safety grants (under U.S.C. Title 23 Sections 402 and 405) – and sometimes state and private sector funding – to implement programs focused on safe users and the choices that all road users make every day. These programs tend to be education, community outreach and law enforcement initiatives that can complement engineering and other safety efforts.

SHSOs and their partners should carefully consider the precise role of proactive traffic enforcement in pedestrian safety and focus efforts on vehicles and drivers who clearly pose a greater safety threat to all road users. FHWA recommends in its [Pedestrian Safety Guide and Countermeasure Selection System](#) that **enforcement operations should focus on drivers rather than pedestrians**. GHSA's August 2021 report, [Equity in Highway Safety Enforcement and Engagement Programs](#), recommends that traffic enforcement efforts should be directed to the most dangerous and unlawful violations.

In December 2021, GHSA released [Putting the Pieces Together: Addressing the Role of Behavioral Safety in the Safe System Approach](#), a report that explains the role of behavioral safety and road user responsibility within the Safe System framework. This report includes a helpful matrix that illustrates how SHSO programs – including education and enforcement – support all elements of a Safe System.

Unless and until pedestrians and motor vehicles are fully separated, the choices that road users make will inherently affect pedestrian safety. Education and enforcement are proven to be effective in influencing road user choices and improving safety, particularly in reducing alcohol-impaired driving and lowering vehicle speeds, both of which improve safety for people on foot.

Increasingly, SHSOs have been concentrating some of their education and enforcement efforts on programs specifically designed to enhance safety for pedestrians. These are just a few examples.

- The **California Office of Traffic Safety** has embraced the Safe System approach. It funds a variety of pedestrian education programs, such as more than 30 “community streets” mini-grants in 19 Southern California communities most impacted by traffic injuries and fatalities. Managed by the Southern California Council of Governments, these projects feature community-driven education campaigns, open street events to encourage active transportation, walk audits of neighborhoods to identify areas where pedestrian safety could be improved, as well as a “kit of parts” that showcases temporary infrastructure demonstrations, such as pedestrian refuge islands, curb extensions, separated bike lanes and high-visibility crosswalks. In addition, the University of California, Berkeley Safe Transportation Research and Education Center’s Community Pedestrian and Bicycle Safety Training program developed a pilot, *Comunidades Activas y Seguras* (Safe and Active Communities), to improve walking safety in Spanish-speaking communities. It includes Spanish podcasts and other Spanish-first engagement and educational outreach.
- **Michigan Office of Highway Safety Planning** has awarded grant funds to the League of Michigan Bicyclists (LMB) for the development and implementation of training courses on pedestrian and bicyclist laws with additional best practice safety content for Michigan residents. The SHSO also develops, updates, publishes and distributes free publications on pedestrian and bicyclist safety, including a *Walk Safe* brochure (available in three languages), *Bicyclist Safety* brochure (available in three languages) and *Michigan Pedestrian Laws: Guide for Law Enforcement Officers*.
- The **New York Governor’s Traffic Safety Commission** funded the Ramapo Police Department (RPD) to conduct a pedestrian safety education and enforcement program in response to numerous

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crashes involving pedestrians, many of which resulted in serious injuries. In 2021, special details were conducted with a plain clothes police officer attempting to safely cross a roadway using a designated crosswalk. Motorists who did not yield to the pedestrian as required by law were stopped by a marked police vehicle. During the mobilization period, the RPD issued 262 warning cards to drivers and pedestrians who failed to comply with New York's pedestrian safety laws, and 33 summonses to drivers who failed to yield to pedestrians in the crosswalk.

- The **New Jersey Division of Highway Traffic Safety** supports the statewide "Street Smart" pedestrian safety campaign managed by the North Jersey Transportation Planning Authority and implemented by the state's Transportation Management Associations (TMA) and other partners. This program brings together government, business and education leaders; law enforcement officials; advocates; and representatives from local civic and service organizations to conduct grassroots public outreach and community engagement coupled with enforcement, including the innovative "Cops in the Crosswalk" decoy program to educate motorists. Police officers also distribute coupons to pedestrians demonstrating safe crossing behaviors. In 2019, one TMA piloted the use of pop-up infrastructure placing temporary delineators around a crosswalk at a problematic intersection. The delineators helped increase drivers stopping for pedestrians by 5%. Other program evaluation has shown improvements in motorists stopping for pedestrians in crosswalks and greater awareness of the state's pedestrian safety law due to campaign messaging.
- The **Oregon Transportation Safety Office** funds statewide partners to administer the Oregon Friendly Driver program, which educates drivers on best practices to share the road safely with pedestrians and bicyclists. This program offers free one-hour classes to educate drivers on how to operate safely on roadways where people are walking or biking. The class is geared toward people who drive for work and marketed to businesses.

Some states are strengthening their pedestrian safety laws or increasing penalties associated with violating these laws.

- For example, **Connecticut** has expanded the circumstances under which drivers must yield the right-of-way to pedestrians at marked and unmarked crosswalks not controlled by a traffic signal or police officer. The new law requires drivers to yield if a pedestrian indicates intent to cross the road by extending their arm or by moving any body part or any extension of a body part, including a wheelchair, cane, walking stick, crutch, bicycle, electric bicycle, stroller, carriage, cart or leashed dog into the crosswalk's entrance.
- **Florida** has increased the penalties associated with failure to stop for a school bus, setting the minimum civil penalty at \$200 and calling for a minimum six-month license suspension for a subsequent offense within five years. The penalties for passing a school bus on the side where children enter and exit also increased proportionally.
- **Maryland** passed a vulnerable road user law with stronger penalties for a motorist that injures or kills a pedestrian or another vulnerable road user. The law includes a mandatory court appearance by any driver who causes a crash involving a vulnerable road user who is killed or seriously injured.
- **North Carolina** enacted legislation prohibiting truck modifications such as the "Carolina Squat" (a suspension lift is installed on the vehicle so that the front end is lifted, while the rear is lowered making the vehicle look like it is doing a squat) that make it more difficult for the driver to see pedestrians. Under the new law, the height of the front fender cannot be four or more inches higher than the height of the rear fender. A similar prohibition is pending in the South Carolina legislature.

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Given the uptick in pedestrians killed on interstates, Move Over laws are another tool that may improve safety for first responders or other individuals forced to exit their vehicles on high-speed roadways. All states have Move Over laws, which typically require drivers to move away from any emergency vehicle by one lane or, if that is not possible, to slow down to a safe speed. SHSOs fund education and outreach efforts to raise awareness about these laws.

SHSOs have access to several federal grants to improve pedestrian safety, though federal regulation limits how SHSOs can allocate these grant funds. The State and Community Highway Safety Grant Program under 23 U.S.C. Section 402, also known as Section 402, provides funding for all states and territories for a wide range of highway safety purposes, including pedestrian safety, though this competes with all other safety needs.

The National Priority Safety Program under 23 U.S.C. Section 405, also known as Section 405, provides for 5% of all Section 405 funds to be annually distributed to qualifying states specifically for programs to improve non-motorized safety (Section 405 (h)). A state is eligible if its annual combined pedestrian and bicyclist fatalities exceed 15% of total annual crash fatalities using the most recently available final FARS data. For Federal Fiscal Year (FFY) 2022, 26 states, D.C. and Puerto Rico qualified for this funding. Since this grant was created by the FAST Act in 2015, states have encountered significant roadblocks as the law strictly connects the use of these funds to training, education and/or awareness programs addressing state bicycle and pedestrian safety laws.

However, not every state has such laws in place. Working with safety partners, GHSA successfully encouraged Congress to amend this program to better meet highway safety needs in the recently enacted Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law). Beginning in FFY 2024, the program will be re-designated as Section 405 (g) and expanded so that states will be able to use these grant funds for a wider range of nonmotorized safety purposes, including public education and awareness about speed, safety equipment and safety infrastructure, police training and enforcement, research and data analysis.

GHSA encourages SHSOs to overcome funding limitations by getting creative and partnering with state Departments of Transportation to educate road users about the impact of engineering changes to enhance pedestrian safety. For example, an SHSO could use its communication channels to explain how infrastructure countermeasures such as roundabouts, leading pedestrian intervals, refuge islands and enhanced lighting help keep people on foot safer.

Safer Roads

Traffic engineering considerations, such as roadway design, crosswalk characteristics and the presence of street lighting or sidewalks are paramount to improve pedestrian safety. Promising roadway and crosswalk treatments that have been associated with improved pedestrian safety include, but are not limited to, the following:

- **Raised pedestrian crossings** – ramped speed tables that span the entire width of the roadway – can reduce pedestrian crashes by 45%.¹⁷

¹⁷ Federal Highway Administration. (2013). "Raised pedestrian crossings" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=7

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- **Pedestrian refuge islands**, which are located in the median of a two-way street and provide a safe break point for pedestrians, have been found to reduce pedestrian crashes by 56%.¹⁸
- **Street lighting** can help motor vehicle drivers see pedestrians sooner, thus providing critical additional time to avoid crashes. Overhead lighting, outside of intersections, is estimated to reduce all types of crashes by 23%. At intersections, the benefit is even greater – a 27% reduction in crashes.¹⁹
- **Sidewalks** significantly improve pedestrian safety, as most fatal pedestrian crashes occur in locations without sidewalks. A recent study conducted in Central Florida found the likelihood of a pedestrian crash per mile along roadways with no sidewalk is three times greater than when a sidewalk is present.²⁰

FHWA explores these and other proven strategies to improve pedestrian safety in its [Pedestrian Safety Guide and Countermeasure Selection System](#). **Transportation planners would be wise to consult this useful tool and put pedestrian safety ahead of vehicle throughput when designing new or modifying existing roadways.**

Another road design concept growing in popularity is **asphalt art**: painted crosswalks, intersection murals and other artistic treatments of the roadway surface. While some anecdotal evidence suggests asphalt art can improve safety by getting drivers to slow down, until recently there has not been any research on their efficacy at improving safety. However, a new study reports significant safety gains, including a 50% decrease in the rate of crashes involving pedestrians or other vulnerable road users after asphalt art is installed.²¹ Clearly, this approach warrants additional study as a protective pedestrian countermeasure.

Safer Vehicles

The third Safe System objective – safer vehicles – provides another layer of safety for road users. Motorists are currently more likely to benefit from vehicle safety technology, which is mostly focused on protecting vehicle occupants rather than pedestrians. While drivers and passengers are much more likely to survive a crash in a car or truck today than they were decades ago, pedestrians remain as susceptible as ever to injury or death when struck by a motor vehicle.

However, some vehicle safety features can help pedestrians as well. Many newer vehicles have **automatic emergency braking systems** (AEB) that can detect and brake for pedestrians if the driver fails to do so. A recent study found that AEB with pedestrian detection was associated with a 25-27% reduction in pedestrian crash risk and a 29-30% drop in pedestrian injury crash risk. Unfortunately, the system was not found to be effective in dark conditions without street lighting, at higher speeds or while the vehicle was turning. The challenge in dark conditions lends further evidence for the need for good street lighting as discussed earlier.²²

18 Federal Highway Administration. (2008, September). Desktop reference for crash reduction factors, Table 11 [FHWA-SA-08-011].

19 Harkey, D.L., R. Srinivasan, J. Baek, F. Council, K. Eccles, N. Laffer, F. Gross, B. Persaud, C. Lyon, E. Hauer, & J. Bonneson. (2008). NCHRP Report 617: Accident modification factors for traffic engineering and ITS. Transportation Research Board. (2008). <https://www.hsisinfo.org/detail.cfm?id=296&msckid=e7f2deabd13d11ec98b9f689c6c127f9>

20 Abou-Senna, H., Radwan, E., & Mohamed, A. (2022). Investigating the correlation between sidewalks and pedestrian safety, Accident Analysis & Prevention, Vol.166. <https://doi.org/10.1016/j.aap.2021.106548>

21 Bloomberg Philanthropies. (2022, April). Asphalt art safety study historical crash analysis and observational behavior assessment at asphalt art sites. <https://assets.bbhub.io/dotorg/sites/43/2022/04/Asphalt-Art-Safety-Study.pdf>

22 Cicchino, J. (2022, February). Effects of automatic emergency braking systems on pedestrian crash risk, Insurance Institute for Highway Safety. <https://www.iihs.org/topics/bibliography/ref/2243>

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Some vehicle manufacturers are testing **energy absorbing components** such as compliant bumpers, dynamically raised hoods and windshield airbags to reduce the severity of pedestrian injuries in the event of a collision.²³ While these treatments are largely experimental at present, it is worth watching to see if any new features emerge on future vehicles.

Larger vehicles such as SUVs, vans and trucks can cause more harm in a pedestrian crash given their higher weight and profile, but research suggests their design may pose a greater risk to pedestrians as well. Specifically, the pillars that support the roof of these vehicles on either side of the windshield could limit a driver's ability to see a pedestrian before a crash occurs. At intersections, SUVs involved in a fatal pedestrian collision were twice as likely to be involved in a left turn crash versus no turn. For vans, this was three times as likely and for pickups, four times. Right turn fatal crashes also disproportionately involved SUVs, vans or pickups.²⁴

The IIJA included new provisions to improve automotive safety for pedestrians. The law directs NHTSA to issue final rules to make AEB standard equipment. NHTSA must issue a notice for review and comment as well as a report on potential updates to hood and bumper standards to better protect non-motorized road users within two years. On March 3, NHTSA initiated an IIJA-mandated process to update its New Car Assessment Program (NCAP, also known for its 5-Star Safety Ratings) to incorporate pedestrian AEB among other new vehicle technologies.²⁵

Safer Speeds

Lower vehicle speeds yield fewer crashes and, when crashes do occur, tend to result in fewer and less acute injuries. Slowing motor vehicle traffic in areas frequented by pedestrians is a key step in preventing or mitigating the severity of crashes. There are numerous road design features and policies that can help curb vehicle speeds.

Installation of **roundabouts**, circular-shaped intersections where drivers move counterclockwise around a center point, is among the most effective measures to control speed. On average, roundabouts reduce crashes resulting in injury or loss of life by 78-82%.²⁶ In addition to lowering vehicle speeds, roundabouts have fewer conflict points between pedestrians and drivers. Pennsylvania has garnered tremendous safety gains following the installation of roundabouts. An analysis of crash reports three years before and after the installation of roundabouts at 26 previously stop- or signal-controlled intersections found that the total number of crashes was reduced by 22%. Even more importantly, fatalities were reduced by 100% and suspected serious injuries dropped 81%.²⁷

An FHWA desktop reference summarizes studies about the effectiveness of a number of other traffic calming measures such as lane narrowing, speed humps and curb extensions, among others.²⁸

23 Crandall, J. R., Bhalla, K. S., & Madeley, N. J. (2002). Designing road vehicles for pedestrian protection. *BMJ (Clinical research ed.)*, 324(7346), 1145–1148. <https://doi.org/10.1136/bmj.324.7346.1145>

24 Wen, H., & Cicchino, J. (March 2022). The association between pedestrian crash types and passenger vehicle types. Insurance Institute for Highway Safety. <https://www.iihs.org/topics/bibliography/ref/2249>

25 National Highway Traffic Safety Administration. (March 2022). NHTSA proposes significant updates to five-star safety rating program. <https://www.nhtsa.gov/press-releases/five-star-safety-ratings-program-updates-proposed>

26 American Association of State Highway and Transportation Officials. (2002). Highway safety manual.

27 <https://www.penndot.pa.gov/ProjectAndPrograms/RoadDesignEnvironment/RoadDesign/Pages/Roundabouts.aspx>

28 Federal Highway Administration. (2014). A desktop reference of potential effectiveness in reducing speed. U.S. Department of Transportation. https://safety.fhwa.dot.gov/speedmgt/ref_mats/eng_count/2014/reducing_speed.cfm

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In addition to the built environment, **speed limit laws** can positively impact vehicle speeds. For example, lowering the speed limit in Boston from 30 mph to 25 mph significantly reduced mean speeds as well as the odds of vehicles exceeding 25 mph, 30 mph and 35 mph.²⁹ Some states are changing their approach to speed limits. California recently passed a law that allows cities and the state DOT to lower speed limits in increments of five miles per hour by considering and factoring in the safety of pedestrians when conducting speed surveys. Research has shown that five mph lower posted speed limits equate to 56-88% fewer serious pedestrian injuries and 80-96% fewer pedestrian fatalities.³⁰

Automated traffic enforcement (particularly speed enforcement), while controversial, has irrefutably led to reductions in motorist speeds and crashes. A literature review of studies evaluating speed cameras concluded that all studies measuring speed or speeding saw reductions when the cameras were present.³¹

The IJJA allows for the use of federal funds for speed cameras in school and work zones. In New York City, speed cameras in school zones have significantly improved safety, with speeding violations down an average of 72% during hours of operation and injuries down 14%. In addition, the city has instituted a Dangerous Vehicle Abatement Program, requiring owners of vehicles with 15 or more speed camera violations within a 12-month period to take a safe vehicle operations course.³²

The use of speed cameras in work zones can help protect road workers as well. Maryland's SafeZones automated speed enforcement program in work zones has shown a nearly 90% reduction in the number of vehicles traveling at 12 mph or more above the posted limit.³³ Pennsylvania's Automated Work Zone Speed Enforcement (AWZSE) pilot program is also showing strong results, with 25% fewer fatal crashes in work zones than pre-AWZSE levels.³⁴

Another tool to manage vehicle speeds is **digital alerting**. This technology enables authorized users such as police, fire and other first responders, tow truck operators and DOT workers to notify drivers through vehicle dash boards and navigation apps of a disabled vehicle, roadway incident or work zone ahead. The technology prompts them to slow down, move over and/or take other actions that reduce the potential for a crash. The Pennsylvania Turnpike Commission's use of digital alerting resulted in crashes involving roadside assistance vehicles falling from 30 in 2018 to zero in 2020.³⁵

Simply put, whether by modifying the built environment, reducing or enforcing existing speed limits, or leveraging technology, getting drivers to slow down will save pedestrians' lives.

29 Wen, H., & Cicchino, J. (2020, March). Lowering the speed limit from 30 to 25 mph in Boston: Effects on vehicle speeds, Insurance Institute for Highway Safety. <https://www.ihs.org/topics/bibliography/ref/2168>

30 Hussain Q. et al. (2019, August). The relationship between impact speed and the probability of pedestrian fatality during a vehicle-pedestrian crash: A systematic review and meta-analysis. *Accident Analysis & Prevention*, 129, 241-249.

31 Cecilia, W., Charlene, W., Joan, H. K., Le Brocque, R., & Bellamy, N. (2010, November 10). Speed cameras for the prevention of road traffic injuries and deaths. <https://doi.org/10.1002/14651858.CD004607.pub4>

32 Wiley-Schwartz, K. (2022, April). Changing the culture of speed. Automated enforcement, DVAP and communications [PowerPoint presentation]. New York City Department of Transportation.

33 <https://www.safezones.maryland.gov/images/Maryland%20SafeZones%20Fact%20Sheet%202021%20Summer.pdf>

34 <https://workzonecameras.penndot.gov/download/pennsylvanias-awzse-2022-annual-report/#>

35 HAAS Alert. (2021, February). Case study: Improving highway incident respondent safety via digital alerting. <https://landing.haasalert.com/hubfs/HAAS%20Alert%20Case%20Study%20-%20PA%20Turnpike.pdf>

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Post-Crash Care

The final objective of a Safe System is post-crash care. When a pedestrian is injured by a motor vehicle, the more quickly emergency medical services are deployed, the greater the chance of survival. NHTSA estimates that [76,000 pedestrians were injured nationwide in 2019](#) (the latest year for which statistics were available). In 2020, NHTSA released a multi-language public service announcement (PSA) specific to pedestrian post-crash care. The PSA urges bystanders to “Stop. Call. Stay.” at the scene of a pedestrian-vehicle crash until EMS arrives.

While SHSOs are not tasked with emergency medical response, they can fund traffic incident management training that can help better protect EMS workers and others at the roadside and help prevent secondary crashes, educate the public on their role when they come upon a crash scene and deliver educational messages and bystander training on how to provide post-crash care.

CONCLUSION

Whether looking at preliminary state data for 2021 or investigating the 2020 national FARS data, the trend is clear: more pedestrians are being killed on our nation’s roads. With 2021 on track to have the highest number of pedestrian deaths in 40 years, this is clearly a national crisis that must be addressed at the federal, state and local levels.

For 2021, GHSA projects 7,485 pedestrian fatalities, 11.5% more than in 2020. Thirty-seven states and D.C. are projected to have increases, while only 10 states had fewer pedestrian deaths than the prior year. The pedestrian fatality rate per VMT is projected to remain at an historically high level.

The 2020 national FARS data, which include data from police crash report forms, provide additional insight into the characteristics of the 6,516 pedestrian fatalities currently recorded in the system. A growing number of these pedestrian fatalities involve excessive speed. Meanwhile, alcohol impairment continues to be a factor for both fatally-injured pedestrians as well as the drivers involved in these crashes. Most pedestrian fatalities occur at night, a surprising number take place on interstates or other roads not designed for foot traffic, and SUVs or other larger vehicles are involved in an increasing proportion of pedestrian deaths.

Despite the grim news, the Safe System approach provides a clear path forward to help stem the tide of pedestrian deaths. This system takes a holistic approach to traffic safety, building layers of protection to not only prevent crashes but also anticipate human error and keep impact levels survivable if a crash does occur.

There are five elements of the Safe System approach – safer people, safer roads, safer vehicles, safer speeds, and post-crash care. The U.S. DOT’s NRSS endorses a Safe System approach, and GHSA commends the U.S. DOT for including speed management as a fundamental safety pillar in the NRSS. Reducing the epidemic of unsafe vehicle speeds on our roads will improve pedestrian safety tremendously.

Safer roads are paramount for building a transportation system that prioritizes the safety of all users over the rapid movement of vehicles. Safer vehicles can help prevent crashes and mitigate their impact on those involved. Better post-crash care will improve survival rates. But ultimately, safer people are at the core of any system, since no matter how safe the vehicles and roadways are, the decisions that drivers, bicyclists and pedestrians make every day influence the safety of everyone around them.