

Understanding the Increase in Fatal Hit-and-Run Crashes: Prevalences of Crashes, Injuries, and Deaths in the United States, 2017–2023

Previous research has shown that hit-and-run crashes are a major traffic safety problem, especially in crashes involving vulnerable road users. The objectives of the current study were to provide estimates of the numbers of hit-and-run crashes, injuries, and deaths in the United States in recent years, and to gain insight into the characteristics of fatal hit-and-run crashes as well as the drivers who flee from them. The current study analyzed data from a national database of all fatal crashes, as well as a representative sample of all police reported crashes regardless of severity. Results show that over 900,000 police-reported crashes (15% of all police-reported crashes) in 2023 involved a driver who left the scene. These crashes resulted in more than 240,000 injuries (10% of all crash injuries) and 2,872 deaths (7% of all crash deaths, the highest percentage ever recorded). Pedestrians and cyclists were found to be particularly vulnerable to injury and death in hit-and-run crashes: approximately one of every four pedestrian and cyclist injuries and deaths in 2023 occurred in a hit-and-run crash. Analysis of drivers who left the scenes of fatal crashes and were later apprehended showed that the vast majority were men, most were young adults, two in five lacked a valid license, and nearly three in five were not the owner of the vehicle that they were driving. This Research Brief further discusses potential countermeasures to reduce hit-and-run crashes and suggests potential future research.

METHODS

The primary objective of the current study was to estimate the number of hit-and-run crashes, injuries, and deaths in the United States from 2017 through 2023, updating previous research on the same topic by the AAA Foundation for Traffic Safety (AAAFTS) (Benson et al., 2018). The secondary objective was to understand contributing factors leading to fatal hit-and-run crashes and characteristics of drivers who flee such crashes to better understand this road safety issue.

Data from National Highway Traffic Safety Administration's (NHTSA) Crash Report Sampling System (CRSS) were used to quantify hit-and-run crashes and injuries. CRSS includes

data on a geographically stratified sample of all police-reported crashes in the United States regardless of severity. Statistics derived from CRSS were weighted to account for all police-reported crashes nationwide (National Center for Statistics and Analysis, 2025a). Data from NHTSA's Fatality Analysis Reporting System (FARS) were used to quantify hit-and-run fatalities. FARS contains information about all crashes that occur on public roadways in the U.S., involve a motor vehicle, and result in a death within 30 days of the crash (National Center for Statistics and Analysis, 2025b). Fatalities in CRSS were excluded to avoid double-counting. Both databases are available to the public in

the form of downloadable databases designed for statistical analysis. The data and additional information are available at cdan.dot.gov.

Data on all fatal hit-and-run crashes since 1975 (the first year of the FARS database) were used to examine long-term trends in hit-and-run fatalities. All other analyses were conducted using data from 2017 through 2023 to examine hit-and-run injuries and fatalities since AAAFTS's previous study (Benson et al., 2018).

To describe the surroundings of hit-and-run crashes more specifically than the binary urban/rural descriptor provided in the crash data, the locations of fatal crashes were joined with maps from the U.S. Census Bureau to identify the places in which they occurred and characterize the degree of urbanicity of those places. Principal cities were grouped according to their populations, locations inside Census-defined urban areas but outside of principal cities were classified

as suburban, and locations outside Census-defined urban areas were classified as rural.

Data on social vulnerability was derived from the U.S. Centers for Disease Control and Prevention's Social Vulnerability Index (SVI). The SVI utilizes U.S. Census Bureau data to quantify the vulnerability of the residents of places based on their demographic and socioeconomic characteristics (Kasha et al., 2025). In the current study, SVI was examined at the Zip Code Tabulation Area (hereafter "zip code") level. Zip codes were weighted by population and divided into quintiles of vulnerability.

Hit-and-run fatalities and injuries were quantified overall and by road user type. Fatalities were further examined in relation to environmental factors. The characteristics of hit-and-run drivers (i.e., the driver who left the scene), in cases where they were known, were also examined to provide insight into who leaves the scenes of fatal crashes.

RESULTS

Figure 1 shows the annual number of hit-and-run fatalities, as well as the percentage of total traffic fatalities that occurred in hit-and-run crashes, since NHTSA began compiling detailed data on traffic fatalities in 1975. After rising from 2.6% in 1976 to 4.2% in 1982, the annual percentage of fatalities that occurred in hit-and-run crashes remained in a narrow range between 3.4 and 4.4% until 2010. However, beginning in 2010, both the annual number and percentage of hit-and-run fatalities began increasing steadily, spiking in 2020 (the first year of the COVID-19 pandemic), and reaching a record high of 2,972 hit-and-run fatalities (7% of total traffic fatalities) in 2022.

Table 1 shows annual hit-and-run crashes, injuries, and fatalities since 2017. More than 900,000 police-reported crashes (15% of all crashes) involved a driver leaving the scene in 2023, a historic high. Approximately 10% of all traffic injuries

occurred in hit-and-run crashes each year over this period, representing approximately 240,000 to 300,000 injuries each year.

Hit-and-Run Injuries and Fatalities by Road User Type

Table 2 shows annual hit-and-run injuries and fatalities since 2017 by road user type. A large majority of people injured in hit-and-run crashes were vehicle occupants (1.63 million out of 1.86 million). However, the road users with the highest percentage of injuries occurring in hit-and-run crashes were pedestrians (approximately 24%). When hit-and-run fatalities were examined, a large majority of victims were pedestrians. Notably, the percentages of pedestrian fatalities and injuries that occurred in hit-and-run crashes were consistently similar, both rising from 20% in 2017 to 25% in 2023. A similar pattern was observed for pedalcyclists as well. Among vehicle

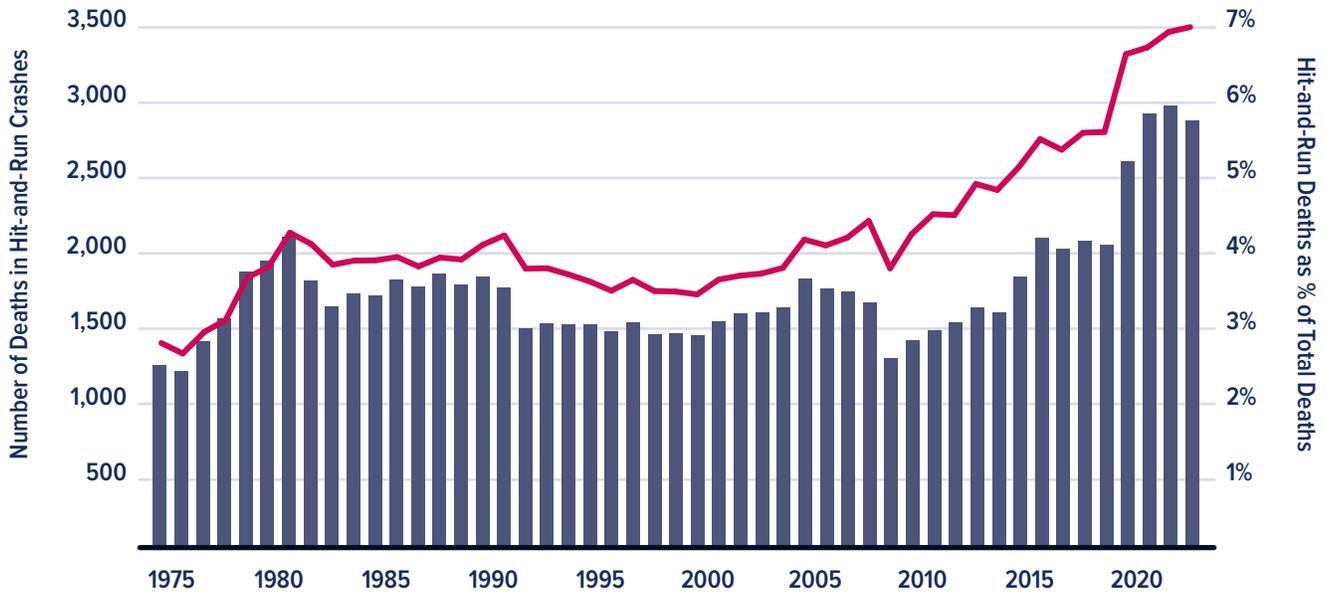


Figure 1. Annual Number of Deaths in Hit-and-Run Crashes (bars) and Hit-and-Run Deaths as a Percentage of Total Deaths (line), United States, 1975–2023

Table 1. Total Hit-and-Run Crashes, Injuries, and Fatalities, United States, 2017–2023

| Year | Hit-and-Run Crashes ^a | Percentage of All Crashes ^a | Hit-and-Run Injuries ^a | Percentage of All Injuries ^a | Hit-and-Run Fatalities ^b | Percentage of All Fatalities ^b |
|------|----------------------------------|--|-----------------------------------|---|-------------------------------------|---|
| 2017 | 785,012 | 12.2% | 250,999 | 9.1% | 2,010 | 5.4% |
| 2018 | 810,245 | 12.0% | 272,992 | 10.1% | 2,060 | 5.6% |
| 2019 | 817,690 | 12.1% | 299,141 | 10.9% | 2,037 | 5.6% |
| 2020 | 770,093 | 14.7% | 295,611 | 13.0% | 2,596 | 6.7% |
| 2021 | 899,997 | 14.7% | 251,885 | 10.1% | 2,917 | 6.7% |
| 2022 | 861,429 | 14.5% | 241,497 | 10.1% | 2,972 | 7.0% |
| 2023 | 919,292 | 15.0% | 242,886 | 9.9% | 2,872 | 7.0% |

Notes: ^aCRSS data. ^bFARS data.

Table 2. Hit-and-Run Injuries and Fatalities by Road User Type, United States, 2017–2023

| Year | Vehicle Occupants | Motorcyclists | Pedestrians | Pedalcyclists | Total* |
|-------------------|--------------------------|----------------------|------------------------|-----------------------|--------------------------|
| <i>Injuries</i> | | | | | |
| 2017 | 222,633 (8.8%) | 5,262 (6.0%) | 14,488 (20.4%) | 7,496 (15.1%) | 250,999 (9.1%) |
| 2018 | 242,380 (9.7%) | 5,209 (6.4%) | 16,325 (21.8%) | 7,725 (16.5%) | 272,992 (10.1%) |
| 2019 | 267,262 (10.6%) | 5,850 (7.2%) | 17,106 (22.5%) | 7,790 (15.8%) | 299,141 (10.9%) |
| 2020 | 266,308 (12.7%) | 6,053 (7.5%) | 14,307 (26.1%) | 7,148 (18.4%) | 295,611 (13.0%) |
| 2021 | 218,959 (9.6%) | 7,435 (8.7%) | 15,435 (25.5%) | 6,712 (16.0%) | 251,885 (10.1%) |
| 2022 | 207,905 (9.6%) | 5,659 (6.8%) | 16,756 (25.0%) | 8,448 (18.3%) | 241,497 (10.1%) |
| 2023 | 208,028 (9.4%) | 5,429 (6.6%) | 17,368 (25.4%) | 10,076 (20.2%) | 242,886 (9.9%) |
| Total | 1,633,474 (10.0%) | 40,897 (7.0%) | 111,783 (23.7%) | 55,395 (17.2%) | 1,855,011 (10.4%) |
| <i>Fatalities</i> | | | | | |
| 2017 | 413 (1.7%) | 164 (3.1%) | 1,226 (20.2%) | 168 (20.8%) | 2,010 (5.4%) |
| 2018 | 388 (1.6%) | 177 (3.5%) | 1,292 (20.3%) | 171 (19.6%) | 2,060 (5.6%) |
| 2019 | 373 (1.6%) | 157 (3.1%) | 1,310 (20.9%) | 141 (16.4%) | 2,037 (5.6%) |
| 2020 | 492 (2.0%) | 215 (3.8%) | 1,603 (24.4%) | 205 (21.6%) | 2,596 (6.7%) |
| 2021 | 537 (1.9%) | 252 (4.1%) | 1,831 (24.5%) | 225 (23.1%) | 2,917 (6.7%) |
| 2022 | 469 (1.8%) | 218 (3.5%) | 1,939 (25.5%) | 269 (24.1%) | 2,972 (7.0%) |
| 2023 | 481 (1.9%) | 234 (3.7%) | 1,818 (24.9%) | 274 (23.5%) | 2,872 (7.0%) |
| Total | 3,153 (1.8%) | 1,417 (3.6%) | 11,019 (23.1%) | 1,453 (21.5%) | 17,464 (6.3%) |

Percentages are hit-and-run injuries and fatalities as a percentage of all injuries and fatalities for each road user type.
 *Total includes 13,461 injuries and 422 fatalities of people of other/unknown road user type not shown in table.

occupants, a far smaller proportion of fatalities (1.8%) than injuries (10%) occurred in hit-and-run crashes, and occupants comprised a far smaller proportion of total victims killed (18%) than injured (88%). Appendix A shows total hit-and-run fatalities over the study period by state.

Environmental Factors

Table 3 depicts hit-and-run fatalities by time of day and lighting condition overall and for each road user type. For all road user types, hit-and-run fatalities were most likely to occur from 11 PM to 2:59 AM, followed by 7 PM to 10:59 PM

and 3 AM to 6:59 AM. Most known hit-and-run fatalities occurring from 7:00 PM to 7:00 AM mirror findings that the majority of hit-and-run fatalities were reported in dark lighting conditions. Similarly, these findings are consistent across all individual road user types. Among pedestrian fatalities, the hours from 7 PM to 10:59 PM accounted for the highest number of hit-and-run fatalities, and the percentage of all pedestrian fatalities that occurred in hit-and-run crashes was highest from 11 PM to 2:59 AM. Pedalcyclists saw the highest percentages of fatalities in hit-and-run crashes during these hours (43.6%) as well.

Table 3. Hit-and-Run Fatalities by Road User Type, Time of Day, and Lighting Condition, United States, 2017–2023

| Year | Vehicle Occupants | Motorcyclists | Pedestrians | Pedalcyclists | Total* |
|---------------------------|-------------------|---------------|---------------|---------------|----------------|
| <i>Time of Day</i> | | | | | |
| 11:00PM–2:59AM | 857 (3.0%) | 356 (7.3%) | 2,981 (33.9%) | 339 (43.6%) | 4,652 (10.5%) |
| 3:00AM–6:59AM | 498 (2.2%) | 156 (6.9%) | 1,873 (24.9%) | 195 (25.9%) | 2,770 (8.3%) |
| 7:00AM–10:59AM | 224 (0.9%) | 55 (1.8%) | 476 (14.9%) | 115 (13.0%) | 886 (2.8%) |
| 11:00AM–2:59PM | 348 (1.1%) | 113 (1.5%) | 336 (11.4%) | 82 (8.6%) | 901 (2.0%) |
| 3:00PM–6:59PM | 479 (1.3%) | 248 (2.2%) | 1,159 (15.4%) | 188 (12.7%) | 2,133 (3.6%) |
| 7:00PM–10:59PM | 736 (2.4%) | 481 (4.8%) | 4,030 (23.1%) | 515 (27.7%) | 5,917 (9.5%) |
| <i>Lighting Condition</i> | | | | | |
| Dark | 2,023 (2.6%) | 941 (6.3%) | 9,308 (25.7%) | 1,053 (31.6%) | 13,645 (10.1%) |
| Daylight | 1,019 (1.1%) | 409 (1.8%) | 1,200 (12.8%) | 322 (10.4%) | 3,032 (2.4%) |
| Dawn/Dusk | 104 (1.4%) | 63 (3.2%) | 363 (20.8%) | 56 (19.6%) | 598 (5.0%) |

Percentages are hit-and-run fatalities as a percentage of all fatalities for each road user type and time of day or lighting condition
 *Total excludes 205 fatalities of unknown time of day and 189 fatalities of unknown lighting conditions.

Table 4 shows fatalities that occurred in hit-and-run crashes overall and for road user type by urbanicity and SVI. Regarding urbanicity, the highest number of hit-and-run fatalities occurred in suburban areas for each road user type and in total, followed by cities with a population size of 500,000 or more people. Interestingly, although the number of hit-and-run fatalities in rural areas was greater than in cities ranging in size from 50,000 to 500,000 for all road user types and in total, a far smaller proportion of all fatalities occurred in hit-and-run crashes in rural areas than in cities of any size or in suburban areas. The proportion of all fatalities that occurred in hit-and-run crashes was highest in the largest cities, decreased with city size, was slightly higher in suburban areas than in the smallest cities, and was by far the lowest in rural areas. This was observed for total fatalities, occupant fatalities, and with only a few minor exceptions, for pedestrian, pedalcyclist, and motorcyclist fatalities as well.

Given the association of hit-and-run fatalities with urbanicity, additional analysis was carried out to examine hit-and-run fatalities in the 50 large urban areas (population of city and surrounding suburbs ≥ 500,000 people) that had the highest overall percentages of fatalities occurring in hit-and-run crashes, with results ranging from 9.6% to 18.5% for all road users. When broken down by road user type, the percentage of pedestrians killed in hit-and-run crashes ranged from 19.9% to 41.0% in these 50 large urban areas. The data for large urban areas are found in Appendix B.

Analysis of the SVI revealed a similar pattern as urbanicity. Both the number and percentage of hit-and-run fatalities increased as social vulnerability increased for all road user types and in total. Pedestrians and pedalcyclists had the highest percentages of fatalities for all five quintiles of vulnerability compared to vehicle occupants and motorcyclists. Similarly, the number of pedestrians killed in hit-and-run

Table 4. Number of Fatalities that Occurred in Hit-and-Run Crashes by Road User Type, Urbanicity, and Quintile of Social Vulnerability Index, United States, 2017–2023

| Year | Vehicle Occupants | Motorcyclists | Pedestrians | Pedalcyclists | Total |
|--|-------------------|---------------|---------------|---------------|---------------|
| <i>Urbanicity</i> | | | | | |
| City pop. >500,000 | 818 (6.2%) | 336 (8.0%) | 3,115 (32.6%) | 310 (30.0%) | 4,695 (16.4%) |
| City pop. 250,000–500,000 | 279 (5.1%) | 102 (5.4%) | 895 (28.4%) | 107 (23.7%) | 1,415 (12.7%) |
| City pop. 100,000–250,000 | 258 (3.3%) | 148 (5.6%) | 1,000 (24.2%) | 132 (24.4%) | 1,578 (10.3%) |
| City pop. 50,000–100,000 | 133 (2.7%) | 76 (4.1%) | 525 (20.0%) | 78 (19.8%) | 834 (8.3%) |
| City pop. <50,000 | 68 (1.5%) | 38 (2.7%) | 324 (16.8%) | 60 (18.2%) | 502 (5.9%) |
| Suburb | 822 (2.1%) | 442 (3.8%) | 3,566 (20.7%) | 524 (20.9%) | 5,467 (7.7%) |
| Rural | 763 (0.8%) | 274 (1.7%) | 1,526 (17.3%) | 235 (16.2%) | 2,881 (2.2%) |
| <i>Social Vulnerability Index (SVI)*</i> | | | | | |
| 20% most vulnerable | 1,325 (3.5%) | 572 (6.5%) | 5,235 (29.8%) | 640 (28.1%) | 7,943 (11.7%) |
| 2nd highest 20% | 686 (1.8%) | 317 (3.7%) | 2,407 (21.6%) | 337 (21.8%) | 3,846 (6.4%) |
| Middle 20% | 493 (1.4%) | 226 (2.9%) | 1,574 (19.3%) | 210 (17.8%) | 2,568 (4.9%) |
| 2nd lowest 20% | 325 (1.0%) | 160 (2.3%) | 1,050 (17.3%) | 162 (16.6%) | 1,749 (3.8%) |
| 20% least vulnerable | 295 (0.9%) | 133 (1.9%) | 652 (15.0%) | 93 (13.0%) | 1,203 (2.6%) |

Percentages are hit-and-run fatalities as a percentage of all fatalities for each road user type and urbanicity & Social Vulnerability Index
 * Population-weighted quintiles of CDC Social Vulnerability Index based on Zip Code Tabulation Area of crash location.

crashes across all levels of vulnerability was much higher than any other road user type. Vastly more hit-and-run fatalities occur in areas with higher levels of vulnerability, both in absolute terms and as a percentage of total fatalities in those areas. This pattern was observed overall and for every individual road user type. The most vulnerable quintile of zip codes, comprising the most vulnerable 20% of the U.S. population, had more than three times as many hit-and-run fatalities as the middle quintile, and more than six times as many hit-and-run fatalities as the least vulnerable quintile.

Characteristics of Hit-and-Run Drivers

Because the defining characteristic of a hit-and-run crash is a driver leaving the scene, understanding the characteristics of the hit-

and-run drivers can be challenging. Information about the drivers who left the scene (and their vehicles) is available only in cases where they were later apprehended. Table 5 shows characteristics of known hit-and-run drivers and vehicles. Of the known hit-and-run drivers (those who were caught), nearly three quarters were between the ages of 18 and 44 (71.4%) and the large majority were male (78.3%). Two in five hit-and-run drivers in fatal crashes lacked a valid driver’s license, and nearly three in five were driving a vehicle that they personally did not own. Over 90% of known hit-and-run vehicles were either passenger cars (44.6%) or light trucks or vans (46.8%). Over 70% of hit-and-run crashes occurred less than 10 miles from the driver’s home zip code and nearly 85% occurred within 25 miles of the driver’s home zip code.

Table 5. Characteristics of Known Hit-and-Run Drivers and Vehicles, United States, 2017–2023

| | Number | % |
|---------------------------------|--------|------|
| <i>Age</i> | | |
| <18 | 229 | 2.8 |
| 18–24 | 1,798 | 22.0 |
| 25–34 | 2,519 | 30.8 |
| 35–44 | 1,523 | 18.6 |
| 45–54 | 947 | 11.6 |
| 55–64 | 596 | 7.3 |
| 65+ | 364 | 4.5 |
| <i>Sex</i> | | |
| Male | 6,403 | 78.3 |
| Female | 1,546 | 18.9 |
| <i>License Status</i> | | |
| Valid | 4,901 | 60.0 |
| Not licensed | 1,390 | 17.0 |
| Suspended or revoked | 1,432 | 17.5 |
| Expired or cancelled | 238 | 2.9 |
| <i>Owner of Vehicle</i> | | |
| Hit-and-run driver | 3,553 | 43.5 |
| Other person (not the driver) | 3,229 | 39.5 |
| Company or government | 587 | 7.2 |
| Rental | 94 | 1.2 |
| Stolen | 133 | 1.6 |
| Not registered | 232 | 2.8 |
| <i>Vehicle Type</i> | | |
| Passenger car | 3,645 | 44.6 |
| Light truck or van | 3,823 | 46.8 |
| Motorcycle | 64 | 0.8 |
| Large truck or bus | 468 | 5.7 |
| Other | 25 | 0.3 |
| <i>Vehicle Age (Years)</i> | | |
| 0–5 | 1,963 | 24.0 |
| 6–10 | 1,684 | 20.6 |
| 11–15 | 1,997 | 24.4 |
| 15–20 | 1,576 | 19.3 |
| 20+ | 749 | 9.2 |
| <i>Miles from Home Zip Code</i> | | |
| <10 | 5821 | 71.2 |
| 10–24.9 | 1115 | 13.6 |
| 25–49.9 | 405 | 5.0 |
| 50–99.9 | 192 | 2.3 |
| 100+ | 419 | 5.1 |

Note. Percentages calculated for drivers/vehicles with known data only. Each variable in the table was unknown for 2% to 4% of all drivers/vehicles.

DISCUSSION

This research estimated numbers of hit-and-run crashes, injuries, and deaths within the United States, and investigated contributing factors that lead to hit-and-run crashes as well as characteristics of drivers who flee the scene of such crashes. Overall trends show hit-and-run fatalities have been trending upwards since 2011, neared what then were historic highs in 2016–2019, and then surged to unprecedented levels during the COVID-19 pandemic. The number of hit-and-run fatalities reached its highest level ever recorded in 2022, and hit-and-run fatalities as a percentage of total traffic fatalities reached its highest-ever level in 2023. Hit-and-run crashes accounted for 15% of all police-reported crashes in 2023, the highest percentage in any recent year. The proportions of pedestrian injuries and fatalities resulting from hit-and-run crashes increased by approximately 5 percentage points over the study period from 2017 to 2023.

Regarding crash characteristics and risk factors, hit-and-run fatalities most frequently occur in the late night and early morning hours in dark lighting conditions. While a larger number of hit-and-run fatalities occurs in suburban areas, the percentage of fatalities that occurs in hit-and-run crashes is by far the highest in large urban areas. Numbers of hit-and-run fatalities are disproportionately high in vulnerable communities. Pedestrians and pedalcyclists remain the most vulnerable road users overall and are vastly overrepresented among the victims of hit-and-run crashes. Additionally, for drivers who fled the scenes of fatal hit-and-run crashes, the majority were young males and crashed within a short distance of their home zip code. While most had valid licenses, 40% did not. More than half were driving vehicles that they personally did not own.

The results of the current study complement and extend the findings of previous work. MacLeod et al. (2012) examined the characteristics of hit-and-run crashes in which

pedestrians were killed and found that lack of a valid license was the “leading driver factor.” The current study confirms that drivers without valid licenses remain heavily represented in hit-and-run crashes, with nearly one in five drivers in fatal hit-and-run crashes having a suspended or revoked license and a similar number having never had any driver’s license. Previous studies, both in the U.S. (e.g., MacLeod et al., 2012; Benson et al., 2018; Zhang et al., 2025) and internationally (e.g., Sivasankaran & Balasubramanian, 2022), have reported that drivers who crashed at night and in urban areas were disproportionately likely to leave the scene. The current study confirms that drivers involved in fatal crashes in the late night/early morning hours are vastly more likely to flee. Extending previous research, the current study finds that beyond simple dichotomous notions of urban/rural, there is a strong “dose-response” relationship between the degree of urbanicity and the likelihood of a driver leaving the scene of a fatal crash. Kasha et al. (2025) showed that vulnerable communities have elevated rates of traffic fatalities overall; the current study finds that these disparities are even greater in hit-and-run crashes. This may be due at least in part to differences in infrastructure. Mukherjee & Mitra (2025) found that vehicle speeds, lack of pavement markings, and poor infrastructure were associated with hit-and-run crashes involving vulnerable road users, and such conditions may be more likely to be present in more vulnerable communities.

Other research has examined hit-and-run crashes from various perspectives using data sources beyond traditional crash databases alone. French & Gumus (2024) studied state-level traffic fatalities in 1982–2008 in relation to alcohol laws and found that lower Blood Alcohol Concentration limits were associated with higher rates of hit-and-run fatalities (but not non-hit-and-run fatalities). Relatedly, a previous study focused on the role of alcohol in crashes (not on hit-and-run crashes per se) observed that drivers who left the scene but were apprehended quickly were much

more likely to be intoxicated compared with drivers who remained at the scene (Blomberg et al., 2005). Collectively, these results suggest that while being intoxicated clearly increases the risk of crashing, concern about being caught while driving intoxicated may be a specific motivating factor for intoxicated drivers to flee after crashing.

Other studies have looked at hit-and-run crashes through a social lens. Castriota et al. (2023) suggested that communities with higher social capital have lower instances of hit-and-run crashes, which the authors suggested may be due to pro-social norms (e.g., duty, cooperation) being more prevalent in communities with greater social capital and thus reducing a community member’s likelihood of fleeing after a crash. Another study looked at hit-and-run crashes from a criminal justice perspective and reported that higher “judicial effectiveness,” essentially a composite measure of how quickly criminal cases are handled and how likely they are to lead to a conviction, contributes to reducing hit-and-run crashes, which the authors note is consistent with more general research on how the effectiveness of the justice system can function to deter crime (Denti & Modica, 2024).

Reducing Hit-and-Run Crashes

Reducing hit-and-run incidents requires a multi-pronged approach as no singular countermeasure can fully address this traffic safety issue. In the most general sense, countermeasures that prevent crashes should help to prevent hit-and-run crashes, as the defining characteristic of a hit-and-run crash (i.e., a driver leaving the scene without rendering aid or contacting authorities) is itself a post-crash action.

Collective actions should also be considered in the context of the Safe System Approach (SSA). The current study has highlighted the vulnerabilities of pedestrians and pedalcyclists, further illuminating the need to promote the Safer People and Safer Roads objectives of the SSA, as well as improving Post-Crash Care to increase victims’ chances of survival and improve health

outcomes (U.S. Department of Transportation, 2025). Particularly regarding post-crash care, a key mechanism by which hit-and-run crashes produce adverse safety outcomes is by delaying post-crash care. Thus, measures that automatically alert authorities in the event of a crash may help improve outcomes for victims in the event of a hit-and-run crash, especially at night or in remote areas where there may not be witnesses who call authorities promptly. Anecdotally, there have been documented instances of vehicles equipped with automatic crash notification alerting authorities of a hit-and-run crash despite the driver's attempt to flee (e.g., Salomon, 2015).

Additionally, previous research by AAAFTS suggests it may be beneficial to implement countermeasures designed for specific groups to reduce hit-and-run incidents. For example, it is important to develop and implement countermeasures designed specifically for pedestrians but also for drivers who may flee the scene of a crash (Benson et al., 2018). While these traditional approaches may help mitigate hit-and-run crashes, injuries, and fatalities, they are also known to be applied to other traffic safety issues and therefore should be viewed as one of many strategies to improve road safety.

Second, non-traditional countermeasures aimed at reducing the likelihood that an individual flees the scene of a crash should be considered. These countermeasures may include strategies that increase people's perceived likelihood of being apprehended and efforts to communicate with the public about hit-and-run incidents.

Individuals may feel they are more likely to be apprehended for hit-and-run violations if they know that the crash was captured on camera or believe that it may have been. Federal funding has been previously allocated to allow police departments "to purchase new traffic cameras to assist with criminal and motor vehicle investigations," including hit-and-run crashes (U.S. Representative Lori Trahan, 2024). Dash cams/cameras have also been shown to be an effective tool in fatal vehicle–pedestrian crash

reconstruction (Giovannini et al., 2021). This tool may be beneficial when dash cams/cameras are known to be installed in vehicles that flee and are apprehended, or in vehicles of victims or witnesses of hit-and-run crashes. Another potential strategy that law enforcement agencies may use to discourage drivers from fleeing the scene of a crash are large-scale data sources such as Automated License Plate Readers, which help law enforcement to efficiently identify vehicles that they are searching for (National Conference of State Legislatures, 2022). In instances where the license plate of a hit-and-run vehicle is known (e.g., from a witness), this technology may be beneficial in locating the fleeing driver. Automatic crash notification (Institute of Transportation Engineers, 2019) may similarly help to alert authorities more quickly when a hit-and-run crash has occurred, potentially increasing the likelihood of apprehending the fleeing driver.

Another countermeasure that may increase the likelihood of apprehending hit-and-run drivers, or increase their perceived risk of being apprehended, is the use of "Yellow Alerts." Yellow Alerts are similar to Amber Alerts, a tool for quickly notifying the public and media by disseminating information on a large scale, but instead are used in serious injury or fatal hit-and-run crashes to help identify drivers who flee the scene. Yellow Alerts may be utilized when a complete or partial license plate number and descriptors of the hit-and-run vehicle are available. At the current time, at least three states implement Yellow Alerts – California, Colorado, and Maryland (in Colorado these alerts are called "Medina Alerts") (California Highway Patrol, n.d.; Colorado Department of Public Safety, n.d.; Bergal, 2022).

Public service announcements, like traditional billboard campaigns, have also been used to address hit-and-run crashes. In 2015, the City of Los Angeles displayed billboards that featured various actors to help broadcast "important safety messages and important information which would be critical to solving these crimes" (CBS

Broadcasting Inc., 2015). Billboards have also been used by local police departments to generate tips about specific hit-and-run instances, and by family members of hit-and-run victims to help identify vehicles known to have been involved in the fatality (Macinnis, 2023; Timmons, 2021).

An additional perspective to consider is the relationship between driving licensure and hit-and-run crashes. Results from the current study show that of known hit-and-run drivers, two in five lacked a valid license, perhaps incentivizing them to attempt to avoid apprehension. One study found that increasing access to licensure reduced the rate of hit-and-run crashes (Lueders et al., 2017). While many drivers' licenses are suspended or revoked due to numerous or severe driving offenses (e.g., driving while intoxicated), some states also suspend or revoke drivers' licenses for non-driving-related reasons, such as so-called "debt-based" suspensions wherein a driver's license may be suspended for reasons such as failure to pay fines or failure to appear in court (National Conference of State Legislators, 2024). While it is unknown how many drivers who flee the scene of a crash are unlicensed due to debt-based licensing actions, various efforts have been made to reduce the financial burdens of drivers whose licenses have been suspended or revoked for non-driving reasons (American Association of Motor Vehicle Association, 2021; Schladen, 2023).

Finally, drivers involved in hit-and-run crashes who choose to flee the scene should be encouraged to take responsibility for their decision. The current study found that of known hit-and-run drivers, more than half were driving a vehicle that was not registered under their name at the time of the crash. While a small number were driving vehicles that had been reported stolen, most were driving a vehicle that was registered to another private individual and not reported stolen, likely owned by a family member or friend. Some jurisdictions offer rewards for information on hit-and-run drivers; however, no published research evaluating the impact of such programs was identified.

Limitations

This research has limitations that should be noted. Data on characteristics of hit-and-run drivers is based only on the 47% of all hit-and-run drivers for whom data were available (i.e., those who were eventually caught). However, no information was available for 53% of all hit-and-run drivers, in many cases likely because they were never apprehended; those drivers could not be included in analyses. While the characteristics of hit-and-run drivers who are eventually apprehended may provide some useful insights into the characteristics of hit-and-run drivers who flee successfully, it is also possible that these groups differ in some important ways. For example, 7 in 10 hit-and-run drivers with available data lived within approximately 10 miles of the crash location; however, it is possible that drivers who live further away are less likely to be caught. Similarly, most were driving vehicles that they did not own. This may be generalizable to all hit-and-run drivers, but it is also possible that driving a vehicle owned by another party may increase the likelihood of their being apprehended (e.g., if the owner turns them in). MacLeod et al. (2012) noted that among drivers who struck and killed a pedestrian and left the scene, the driver was more likely to be identified if the victim was a child or if the crash occurred during daylight or in a rural area, which may in turn be associated with other differences in driver characteristics. Additionally, previous studies have suggested that a very high proportion of hit-and-run drivers apprehended shortly after crashing were impaired by alcohol (Blomberg et al., 2005). However, alcohol impairment was not examined in the current study because only 11% of hit-and-run drivers had alcohol test results reported, and even among these, available data did not indicate how soon after the crash the alcohol test was conducted. Drug use and impairment was not examined for similar reasons. The study was also unable to examine factors not reported in crash data, e.g., whether the driver may have perceived

other non-driving-related reasons to attempt to flee (e.g., having an outstanding warrant).

Implications

An estimated 15% of all police-reported crashes, 10% of injuries, 7% of all deaths, and 25% of pedestrian injuries and deaths in 2023 occurred in hit-and-run crashes, all of which are, or are close to, the highest levels ever recorded. As hit-and-run crashes and fatalities trend upwards, it is important to prioritize additional research and action to reverse this trend. While

few countermeasures have been evaluated and shown to reduce hit-and-run crashes, many jurisdictions are working to attempt to address this growing problem. Promising efforts to reduce hit-and-run crashes should be evaluated, so that if proven successful, they can be replicated in other jurisdictions, and so that if proven ineffective, limited resources can be channeled to other approaches. With limited validated countermeasures to address this traffic safety concern, researchers and practitioners alike need to find new solutions to address this problem.

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APPENDIX A: STATE-LEVEL DATA

Traffic Fatalities by Type of Road User Killed, Percent Hit-and-Run, and State, 2017–2023

| | Vehicle Occupants | | Motorcyclists | | Pedestrian/Bicyclist | | Total ^a | |
|----------------------|-------------------|-------------|---------------|-------------|----------------------|-------------|--------------------|-------------|
| | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run |
| Alabama | 5,122 | 0.7% | 603 | 3.6% | 874 | 20.6% | 6,710 | 3.6% |
| Alaska | 321 | 1.2% | 51 | 0.0% | 98 | 28.6% | 502 | 7.0% |
| Arizona | 3,968 | 2.1% | 1,315 | 3.1% | 1,957 | 23.2% | 7,857 | 7.6% |
| Arkansas | 2,916 | 1.4% | 567 | 2.3% | 527 | 19.2% | 4,132 | 3.8% |
| California | 15,519 | 3.1% | 3,994 | 4.9% | 8,491 | 26.4% | 28,494 | 10.5% |
| Colorado | 2,974 | 2.1% | 870 | 3.4% | 789 | 21.7% | 4,674 | 5.8% |
| Connecticut | 1,253 | 1.5% | 403 | 5.0% | 419 | 30.1% | 2,099 | 8.1% |
| Delaware | 548 | 1.6% | 120 | 1.7% | 234 | 19.7% | 911 | 6.4% |
| District of Columbia | 91 | 7.7% | 41 | 4.9% | 105 | 36.2% | 238 | 19.7% |
| Florida | 12,196 | 2.0% | 4,370 | 3.9% | 6,409 | 19.6% | 23,450 | 7.3% |
| Georgia | 7,699 | 1.3% | 1,267 | 3.2% | 2,158 | 20.7% | 11,415 | 5.3% |
| Hawaii | 298 | 1.7% | 190 | 4.7% | 223 | 22.0% | 720 | 9.0% |
| Idaho | 1,247 | 0.2% | 215 | 0.9% | 151 | 9.3% | 1,680 | 1.1% |
| Illinois | 5,454 | 3.3% | 1,066 | 6.2% | 1,462 | 28.6% | 8,170 | 8.2% |
| Indiana | 4,352 | 1.6% | 960 | 2.0% | 843 | 23.7% | 6,289 | 4.8% |
| Iowa | 1,693 | 0.2% | 382 | 2.4% | 220 | 8.2% | 2,397 | 1.3% |
| Kansas | 2,208 | 1.2% | 369 | 3.0% | 276 | 19.6% | 2,922 | 3.2% |
| Kentucky | 3,850 | 0.9% | 688 | 2.6% | 676 | 24.6% | 5,382 | 4.2% |
| Louisiana | 3,751 | 1.5% | 621 | 4.5% | 1,273 | 24.1% | 5,784 | 6.8% |
| Maine | 780 | 0.0% | 174 | 0.0% | 122 | 4.9% | 1,100 | 0.6% |
| Maryland | 2,317 | 1.5% | 560 | 3.6% | 997 | 23.7% | 3,928 | 7.7% |
| Massachusetts | 1,562 | 1.4% | 402 | 2.5% | 568 | 15.8% | 2,572 | 4.9% |
| Michigan | 4,770 | 2.1% | 1,132 | 4.6% | 1,320 | 23.9% | 7,435 | 6.5% |
| Minnesota | 1,919 | 1.3% | 446 | 1.3% | 362 | 16.9% | 2,838 | 3.3% |
| Mississippi | 3,819 | 0.6% | 330 | 3.3% | 665 | 20.8% | 4,939 | 3.5% |
| Missouri | 4,732 | 2.5% | 979 | 3.1% | 861 | 23.2% | 6,785 | 5.2% |
| Montana | 1,052 | 0.6% | 187 | 1.1% | 132 | 20.5% | 1,426 | 2.5% |
| Nebraska | 1,269 | 1.0% | 181 | 0.0% | 145 | 15.9% | 1,631 | 2.3% |

| | Vehicle Occupants | | Motorcyclists | | Pedestrian/Bicyclist | | Total ^a | |
|----------------|-------------------|-------------|---------------|-------------|----------------------|-------------|--------------------|-------------|
| | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run |
| Nevada | 1,290 | 2.6% | 477 | 3.2% | 653 | 24.7% | 2,468 | 8.7% |
| New Hampshire | 543 | 0.0% | 197 | 0.5% | 97 | 8.2% | 848 | 1.2% |
| New Jersey | 2,287 | 2.3% | 585 | 2.9% | 1,400 | 20.8% | 4,318 | 8.5% |
| New Mexico | 1,893 | 2.2% | 363 | 4.4% | 672 | 26.9% | 2,981 | 8.1% |
| New York | 3,751 | 2.0% | 1,249 | 4.4% | 2,208 | 20.6% | 7,401 | 8.1% |
| North Carolina | 7,335 | 1.0% | 1,452 | 3.9% | 1,794 | 21.3% | 10,728 | 4.8% |
| North Dakota | 519 | 1.2% | 102 | 2.0% | 59 | 22.0% | 726 | 2.9% |
| Ohio | 5,763 | 1.7% | 1,355 | 4.2% | 1,169 | 27.2% | 8,500 | 5.7% |
| Oklahoma | 3,389 | 1.1% | 592 | 2.9% | 688 | 24.6% | 4,795 | 4.8% |
| Oregon | 2,420 | 1.1% | 522 | 2.3% | 702 | 17.8% | 3,729 | 4.7% |
| Pennsylvania | 5,143 | 1.4% | 1,434 | 2.1% | 1,313 | 22.0% | 8,135 | 5.0% |
| Rhode Island | 267 | 3.4% | 94 | 2.1% | 87 | 23.0% | 453 | 6.8% |
| South Carolina | 4,914 | 0.6% | 1,083 | 3.2% | 1,373 | 17.3% | 7,436 | 4.1% |
| South Dakota | 665 | 0.6% | 137 | 2.2% | 85 | 12.9% | 927 | 2.2% |
| Tennessee | 5,844 | 2.3% | 1,133 | 4.1% | 1,218 | 30.0% | 8,380 | 6.7% |
| Texas | 18,637 | 2.4% | 3,493 | 4.6% | 5,535 | 25.5% | 28,074 | 7.4% |
| Utah | 1,290 | 1.5% | 296 | 0.7% | 328 | 16.5% | 1,988 | 3.9% |
| Vermont | 315 | 1.0% | 86 | 0.0% | 47 | 17.0% | 465 | 2.4% |
| Virginia | 4,396 | 1.2% | 782 | 2.4% | 972 | 18.4% | 6,232 | 4.1% |
| Washington | 2,704 | 2.1% | 716 | 2.9% | 930 | 21.9% | 4,441 | 6.5% |
| West Virginia | 1,371 | 0.7% | 240 | 2.5% | 189 | 21.7% | 1,933 | 3.2% |
| Wisconsin | 2,878 | 2.4% | 668 | 2.1% | 468 | 28.4% | 4,188 | 5.3% |
| Wyoming | 687 | 0.0% | 119 | 0.0% | 62 | 12.9% | 896 | 0.9% |

^aNumbers of vehicle occupants, motorcyclists, and pedestrians/bicyclists may not add to the value shown in the total column due to small numbers of other types of road users included in the total.

APPENDIX B: DATA FOR LARGE URBAN AREAS

Top 50 Large Urban Areas by % of Fatalities Occurring in Hit-and-Run Crashes, Among Urban Areas of Population 500,000 or Greater, United States, 2017–2023

| | Vehicle Occupants | | Motorcyclists | | Pedestrian/Bicyclist | | Total ^a | |
|------------------------------------|-------------------|-------------|---------------|-------------|----------------------|-------------|--------------------|-------------|
| | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run |
| San Francisco–Oakland, CA | 459 | 8.7% | 154 | 8.4% | 487 | 30.4% | 1,123 | 18.5% |
| Fresno, CA | 175 | 7.4% | 63 | 6.3% | 215 | 29.8% | 468 | 18.2% |
| Milwaukee, WI | 446 | 11.7% | 90 | 4.4% | 172 | 40.7% | 712 | 18.0% |
| Albuquerque, NM | 275 | 5.1% | 125 | 6.4% | 294 | 32.7% | 701 | 17.0% |
| Bakersfield, CA | 196 | 3.1% | 74 | 8.1% | 225 | 29.8% | 507 | 16.4% |
| Memphis, TN–MS–AR | 907 | 5.8% | 143 | 7.7% | 417 | 41.0% | 1,489 | 16.3% |
| New Orleans, LA | 293 | 5.1% | 109 | 10.1% | 256 | 30.9% | 667 | 15.9% |
| Los Angeles–Long Beach–Anaheim, CA | 2,373 | 5.4% | 912 | 5.7% | 2,575 | 28.9% | 5,947 | 15.7% |
| Houston, TX | 1,902 | 5.5% | 501 | 9.0% | 1,169 | 34.0% | 3,623 | 15.4% |
| San Jose, CA | 291 | 6.9% | 88 | 3.4% | 282 | 26.2% | 671 | 15.1% |
| Sacramento, CA | 474 | 3.4% | 175 | 5.7% | 513 | 27.1% | 1,192 | 14.6% |
| McAllen, TX | 187 | 6.4% | 25 | 8.0% | 92 | 33.7% | 308 | 14.6% |
| Rochester, NY | 131 | 4.6% | 47 | 8.5% | 92 | 31.5% | 272 | 14.3% |
| Chicago, IL–IN | 2,216 | 6.2% | 468 | 10.0% | 1,042 | 32.8% | 3,762 | 14.2% |
| San Antonio, TX | 593 | 5.1% | 154 | 7.8% | 474 | 27.6% | 1,234 | 14.2% |
| Nashville-Davidson, TN | 520 | 3.8% | 109 | 8.3% | 263 | 36.9% | 902 | 14.2% |
| Detroit, MI | 1,127 | 5.0% | 303 | 9.2% | 595 | 33.3% | 2,058 | 14.1% |
| Tucson, AZ | 303 | 6.6% | 141 | 5.7% | 301 | 25.2% | 772 | 14.1% |
| Columbus, OH | 469 | 3.2% | 118 | 7.6% | 210 | 38.6% | 811 | 13.7% |
| Louisville/Jefferson County, KY–IN | 474 | 3.2% | 154 | 7.8% | 248 | 34.7% | 884 | 13.0% |
| New Haven, CT | 195 | 3.6% | 72 | 9.7% | 98 | 32.7% | 368 | 12.8% |
| Oklahoma City, OK | 296 | 3.0% | 124 | 4.8% | 216 | 30.1% | 648 | 12.7% |
| Denver–Aurora, CO | 690 | 5.1% | 276 | 5.1% | 421 | 29.2% | 1,402 | 12.5% |
| Riverside–San Bernardino, CA | 902 | 3.4% | 262 | 8.4% | 621 | 27.4% | 1,830 | 12.5% |
| St. Louis, MO–IL | 1,015 | 6.3% | 193 | 8.8% | 360 | 31.1% | 1,584 | 12.4% |
| Portland, OR–WA | 347 | 4.0% | 153 | 3.9% | 328 | 23.5% | 860 | 12.3% |
| Austin, TX | 462 | 4.8% | 135 | 5.9% | 333 | 25.2% | 941 | 12.3% |
| Indianapolis, IN | 612 | 3.6% | 171 | 7.0% | 274 | 32.8% | 1,069 | 12.2% |
| Baton Rouge, LA | 384 | 2.3% | 83 | 9.6% | 211 | 31.3% | 688 | 12.2% |
| Las Vegas–Henderson–Paradise, NV | 521 | 5.4% | 281 | 4.3% | 470 | 24.3% | 1,308 | 12.1% |

| | Vehicle Occupants | | Motorcyclists | | Pedestrian/Bicyclist | | Total ^a | |
|------------------------------------|-------------------|-------------|---------------|-------------|----------------------|-------------|--------------------|-------------|
| | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run | # Fatalities | % Hit & Run |
| New York–Jersey City–Newark, NY–NJ | 2,214 | 3.6% | 783 | 6.1% | 2,265 | 21.5% | 5,340 | 11.7% |
| San Diego, CA | 596 | 3.0% | 233 | 4.7% | 617 | 22.0% | 1,467 | 11.7% |
| Dallas–Fort Worth–Arlington, TX | 2,173 | 3.8% | 559 | 4.5% | 1,020 | 30.8% | 3,800 | 11.5% |
| Philadelphia, PA–NJ–DE–MD | 1,422 | 2.7% | 417 | 4.8% | 953 | 27.5% | 2,831 | 11.5% |
| Seattle–Tacoma, WA | 712 | 3.8% | 221 | 6.3% | 445 | 25.6% | 1,397 | 11.3% |
| Dayton, OH | 270 | 4.4% | 55 | 10.9% | 88 | 33.0% | 417 | 11.3% |
| Tulsa, OK | 266 | 1.9% | 88 | 4.5% | 148 | 31.1% | 508 | 11.2% |
| Cleveland, OH | 487 | 3.1% | 129 | 9.3% | 153 | 37.3% | 777 | 11.1% |
| Baltimore, MD | 578 | 2.6% | 170 | 5.3% | 405 | 24.9% | 1,171 | 11.0% |
| El Paso, TX–NM | 240 | 5.4% | 100 | 5.0% | 151 | 23.8% | 494 | 10.9% |
| Phoenix–Mesa–Scottsdale, AZ | 1,217 | 3.4% | 594 | 4.5% | 1,051 | 23.0% | 2,960 | 10.8% |
| Washington–Arlington, DC–VA–MD | 906 | 2.2% | 263 | 3.8% | 645 | 25.0% | 1,828 | 10.6% |
| Salt Lake City, UT | 236 | 4.2% | 72 | 2.8% | 137 | 24.8% | 458 | 10.5% |
| Miami–Fort Lauderdale, FL | 2,179 | 3.0% | 918 | 5.4% | 1,648 | 22.6% | 4,841 | 10.4% |
| Kansas City, MO–KS | 700 | 5.6% | 176 | 7.4% | 224 | 27.2% | 1,117 | 10.3% |
| Cape Coral, FL | 282 | 2.1% | 116 | 4.3% | 173 | 26.6% | 587 | 9.9% |
| Charlotte, NC–SC | 454 | 3.1% | 105 | 8.6% | 227 | 23.3% | 797 | 9.7% |
| Akron, OH | 167 | 4.8% | 50 | 6.0% | 57 | 26.3% | 277 | 9.7% |
| Orlando, FL | 657 | 3.3% | 226 | 1.8% | 527 | 19.9% | 1,430 | 9.6% |
| Hartford, CT | 302 | 2.0% | 103 | 3.9% | 126 | 31.0% | 539 | 9.6% |

^aNumbers of vehicle occupants, motorcyclists, and pedestrians/bicyclists may not add to value shown in the total column due to small numbers of other types of road users included in the total.

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.

SUGGESTED CITATION

Kasha, A. & Tefft, B.C. (2026). *Understanding the Increase in Fatal Hit-and-Run Crashes: Prevalences of Crashes, Injuries, and Deaths, United States, 2017–2023* (Research Brief). Washington, DC: AAA Foundation for Traffic Safety.