

Analysis Report: Pedestrian-Involved Crashes in Michigan (2017-2021)



Jason Parks, Patrick Bowman, Colleen Peterson, Carol Flannagan

Contents

1.0 Executive Summary	2
2.0 Introduction	3
3.0 Crash Trends and Injury Severity	3
3.1 Crash Count Trends	3
3.2 Crash Severity	4
4.0 Temporal Variables	5
4.1 Month of Year	5
4.2 Day of Week	6
4.3 Time of Day	7
5.0 External/Environmental Conditions	8
5.1 Light Conditions	8
5.2 Weather Conditions	10
5.3 Speed Limit	11
6.0 Pedestrian and Driver Elements	12
6.1 Pedestrian Age	12
6.2 Driver Age	14
6.3 Pedestrian Actions	14
6.4 Driver Actions	16
7.0 Impairment-Related Crashes	19
8.0 Summary	22

Special Note

The Michigan Office of Highway Safety Planning and the University of Michigan Transportation Research Institute acknowledge the differences in traffic and commuting patterns in 2020 and 2021 due to the COVID-19 pandemic. Travel restrictions from the “Stay Home, Stay Safe” Executive Order (EO 2020-21) were initially in place starting on March 24, 2020. That order was then extended through additional executive orders. The stay-at-home order was officially lifted June 1, 2020.

The total number of police-reported crashes on Michigan roadways decreased from 2019 to 2020 by 21.9%, declining from 314,376 in 2019 to 245,432 in 2020, and then in 2021 increased slightly to 282,640 crashes which is still 10.1% less than the 2019 crash total. Despite the lower amount of crashes in 2020 and 2021, the fatality count has increased each year from 985 in 2019, to 1,083 in 2020 (9.9% increase from 2019), and 1,131 in 2021 (14.8% increase from 2019). In 2020, there was a decrease in vehicle miles traveled, licensed drivers, and vehicle registrations: vehicle miles traveled decreased 15.5% to 86.31 billion, motor vehicle registrations were down 0.5% to 9.04 million, and the number of licensed drivers was down 1.9% to 7.12 million. The increased 2020 fatality count in combination with the reduction of the exposure factors contributed to a fatality rate of 1.25 per 100 million miles of travel, a 30.2% increase from 2019 (0.96 per 100 million miles). The 2020 fatality rate is also above the 10-year (2011-2020) average of 1.01 fatalities per 100 million miles. In 2021, vehicle miles traveled was still 5.3% less than 2019 at 96.74 billion miles, and the fatality rate was 1.17 per million miles of travel – a slight decrease from the 2020 fatality rate but still much higher than the 2011-2020 average rate.

1.0 Executive Summary

This report provides an analysis of police-reported motor vehicle crashes involving pedestrians on public roadways in Michigan from 2017 through 2021. Key findings include:

- The number of pedestrian-involved crashes had been fairly steady from 2017-2019 (between 2,203 and 2,285 crashes), but in 2020 there was a decrease to 1,682 followed by a small increase to 1,790 in 2021.
- In the past 5 years, the number of pedestrian fatalities was the highest in 2021 (183).
- A total of 87.2% of pedestrian-involved crashes involved any level of injury or fatality (KABC), compared to 17.4% of motor-vehicle-only crashes.
- About 26.3% of all crash-involved pedestrians were killed or suffered suspected serious injuries (K or A). This rose to 30.6% of pedestrians age 65-74, 38.0% of pedestrians age 75 to 84, and 41.2% of pedestrians age 85 and over.
- Dark conditions were a factor in 43.1% of all pedestrian-involved crashes and 73.5% of fatal pedestrian-involved crashes.
- Impairment due to alcohol and/or drugs occurs more often in pedestrian-involved crashes than motor-vehicle-only crashes. In pedestrian-involved crashes involving alcohol, 74.2% of the pedestrians and 26.0% of the motor-vehicle drivers were reported to have been drinking.
- Among pedestrian-involved crashes occurring between midnight and 4 a.m., 33.6% involved alcohol use by the pedestrian and/or the driver, while the overall percentage of pedestrian and alcohol use involved crashes is 10.7%.
- The top pedestrian action prior to crash for pedestrians in non-fatal crashes was crossing at an intersection (40.6%), while for pedestrians in fatal crashes it was crossing not at an intersection (31.7%).
- The most common action prior to crash for drivers in pedestrian-involved crashes was going straight ahead (58.1%), followed by turning left (16.0%), and turning right (8.0%).
- No hazardous action was indicated in 46.4% for drivers in pedestrian-involved crashes with known actions. The most common hazardous action reported was failed to yield (23.7%).
- The most common posted speed limit for pedestrian-involved crashes was 25 mph.
- At posted speed limits under 50 mph, 6.0% of pedestrian crashes had a fatality, while at speed limits of 50+ mph, 20.3% of pedestrian crashes had a fatality.
- Pedestrian-involved crashes varied somewhat across the months of the year, with the fewest pedestrian crashes occurring in April and the most in October.
- Friday was the most common day for pedestrian-involved crashes (16.0% of the total).

2.0 Introduction

Michigan traffic crashes are defined as taking place on public roadways in Michigan, involving at least one motor vehicle in transport, and resulting in death, injury, or property damage of \$1,000 or more. The Michigan State Police *UD-10 Traffic Crash Report Instruction Manual* defines a pedestrian as a:

- Person on foot
- Person on skis, skates, or roller blades
- Rider of a horse
- Horse and buggy (each occupant, including the driver, will be listed as a separate pedestrian unit)
- Non-motorized wheelchair

The report describes pedestrian-involved crashes in terms of severity, temporal patterns, and roadway and environmental variables. One section examines pedestrian and motor-vehicle driver attributes, including age, action prior to the crash, and hazardous actions committed by drivers. The incidence of alcohol and drugs in pedestrian-involved crashes is considered, by the pedestrians or motor vehicle drivers.

In this report, injury severity of people involved in crashes is frequently categorized according to the KABCO scale:

- K - Fatal Injury
- A - Suspected Serious Injury
- B - Suspected Minor Injury
- C - Possible Injury
- O - No Apparent Injury

Similarly, crashes are sometimes classified according to the most severe injury suffered by anyone involved in the crash. Again, the KABCO scale is used, but for O-level severity this refers to crashes with property damage only (PDO) instead of no injury or fatality.

3.0 Crash Trends and Injury Severity

3.1 Crash Count Trends

Table 1 shows the counts of motor vehicle crashes involving pedestrians in Michigan over the past five years, both for all police-reported crashes and for those involving a fatality. The table also indicates the number of pedestrian fatalities each year. Between 2017 and 2021 there was a low of 145 fatalities in 2018, and since 2018 there has been an increase in pedestrian fatalities each year with a high of 183 in 2021.

Table 1. Pedestrian-Involved Crashes

Year	Pedestrian-Involved Crashes	Pedestrian-Involved Fatal Crashes	Pedestrian Fatalities
2017	2,285	156	158
2018	2,203	145	145
2019	2,260	143	149
2020	1,682	173	175
2021	1,790	182	183
Total	10,220	799	810

Figure 1 shows the five-year trend for pedestrian-involved crashes. The peak number for all pedestrian-involved crashes (2,285) occurred in 2017, and peak fatal pedestrian-involved crashes (182) occurred in 2021. The lowest number of all pedestrian-involved crashes (1,682) took place in 2020, while the low for fatal pedestrian-involved crashes (143) occurred in 2019. There is some evidence at the national level that more people were walking during the pandemic¹, suggesting a possible reason for the change in both crash and fatality rates for pedestrians in 2020 and 2021.

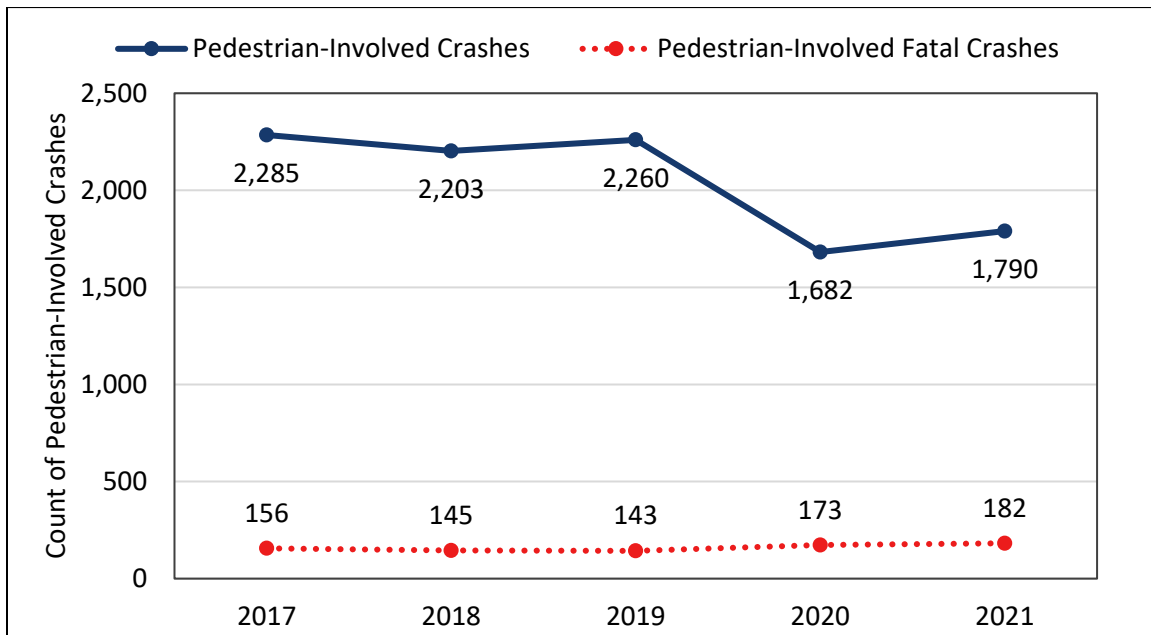


Figure 1 – Pedestrian-Involved Crashes by Year

3.2 Crash Severity

Table 2 compares crash severities for crashes involving a pedestrian and crashes involving only motor vehicles, with all non-motorist crashes excluded. Of pedestrian-involved crashes, 7.8% involved a fatality and 19.2% involved a suspected serious injury. Only 12.8% of pedestrian-involved crashes were without injury, compared with 82.6% of crashes involving only motor vehicles.

¹ Hunter, R. F., Garcia, L., de Sa, T. H., Zapata-Diomed, B., Millett, C., Woodcock, J., & Moro, E. (2021). Effect of COVID-19 response policies on walking behavior in US cities. *Nature communications*, 12(1), 1-9.

Table 2. Crash Severity of Pedestrian-Involved and Motor-Vehicle-Only Crashes, 2017-2021

Crash Severity – Worst Injury in Crash	Pedestrian-Involved Crashes	Motor Vehicle Only Crashes
Fatal Injury (K)	7.8%	0.3%
Suspected Serious Injury (A)	19.2%	1.5%
Suspected Minor Injury (B)	30.4%	5.0%
Possible Injury (C)	29.8%	10.7%
No Injury - Property Damage Only (O)	12.8%	82.6%
Total	100.0%	100.0%

Figure 2 illustrates the difference in crash severity distributions between pedestrian-involved crashes and motor-vehicle-only crashes. Both crash types are categorized according to the worst injury in the crash—fatal, injury (suspected serious, suspected minor, or possible), or no injury - property damage only (PDO). Pedestrian-involved crashes result in death or injury much more often than crashes involving only motor vehicles. These differences in police-reported crashes highlight the vulnerability of pedestrians compared with motor vehicle occupants.

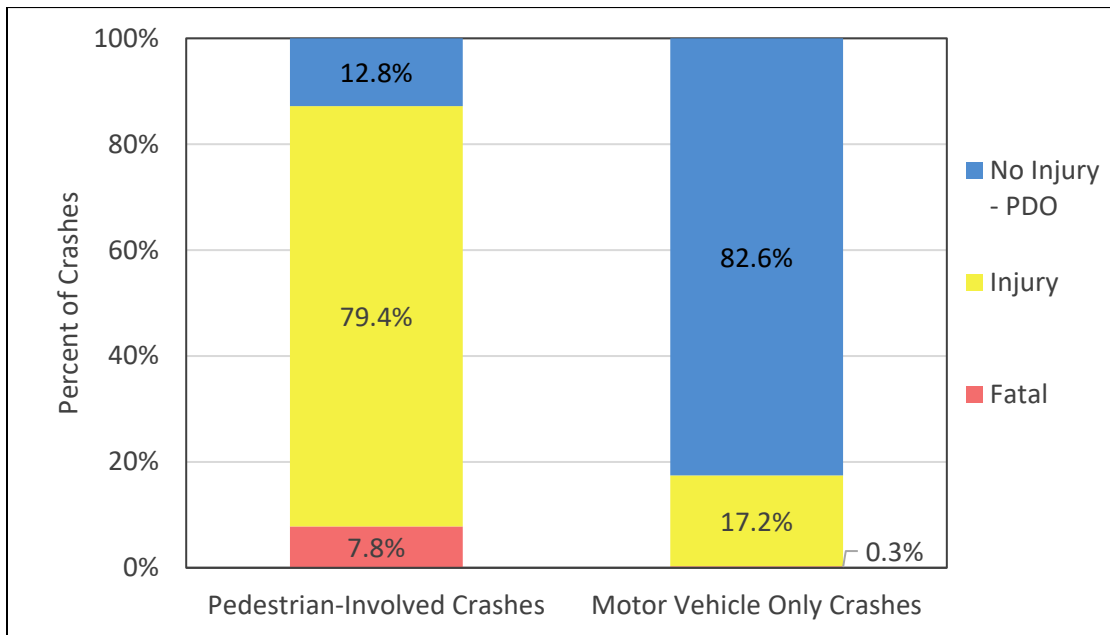


Figure 2 – Crash Severity of Pedestrian-Involved and Motor-Vehicle-Only Crashes, 2017-2021

4.0 Temporal Variables

4.1 Month of Year

Figure 3 shows the number of pedestrian-involved crashes across different months of the year. October was the peak month with 11.3% of the total, while April had the lowest percentage of pedestrian-involved crashes (5.9%). One might expect the number of pedestrian-involved crashes to be the highest in the warmest months when more people are out walking; however, the high numbers of pedestrian-involved crashes taking place during colder months suggests that other factors may also be relevant. For example, while there are likely fewer pedestrians out in colder months, those months also have more

hours of darkness. The risk of pedestrian-involved crashes is much higher in the dark, so this also probably contributes to the observed seasonal pattern.

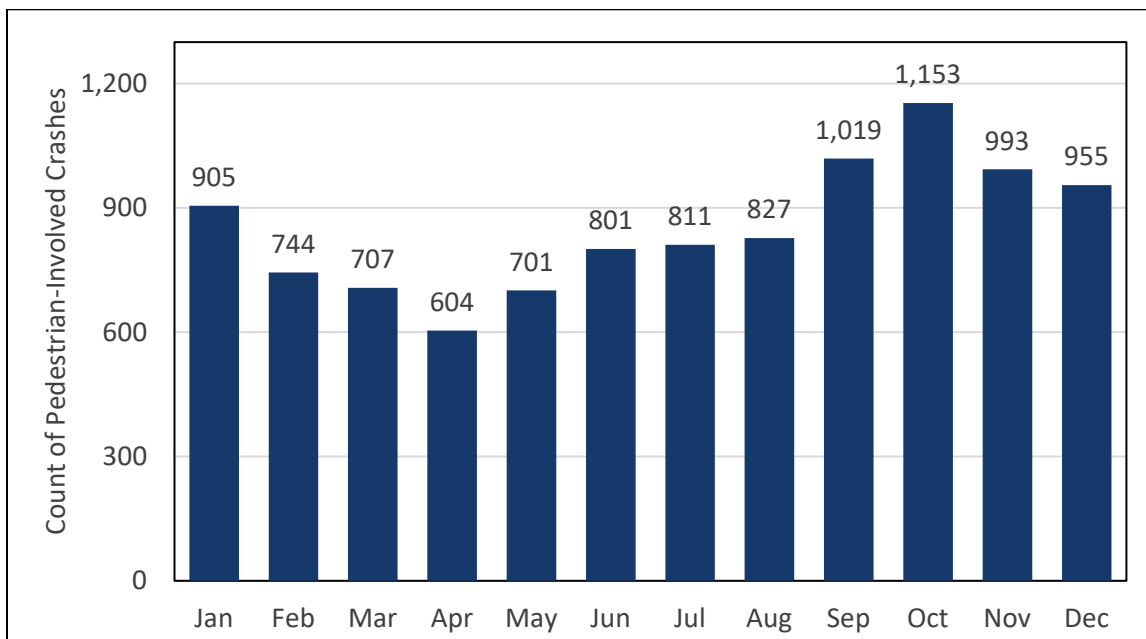


Figure 3 – Pedestrian-Involved Crashes by Month, 2017-2021

4.2 Day of Week

Figure 4 shows the number of pedestrian-involved crashes on each day of the week. The number of pedestrian-involved crashes steadily increased from Monday through Friday, with 16.0% taking place on Friday, the peak day of the week. About 23.3% of pedestrian-involved crashes occurred on weekends.

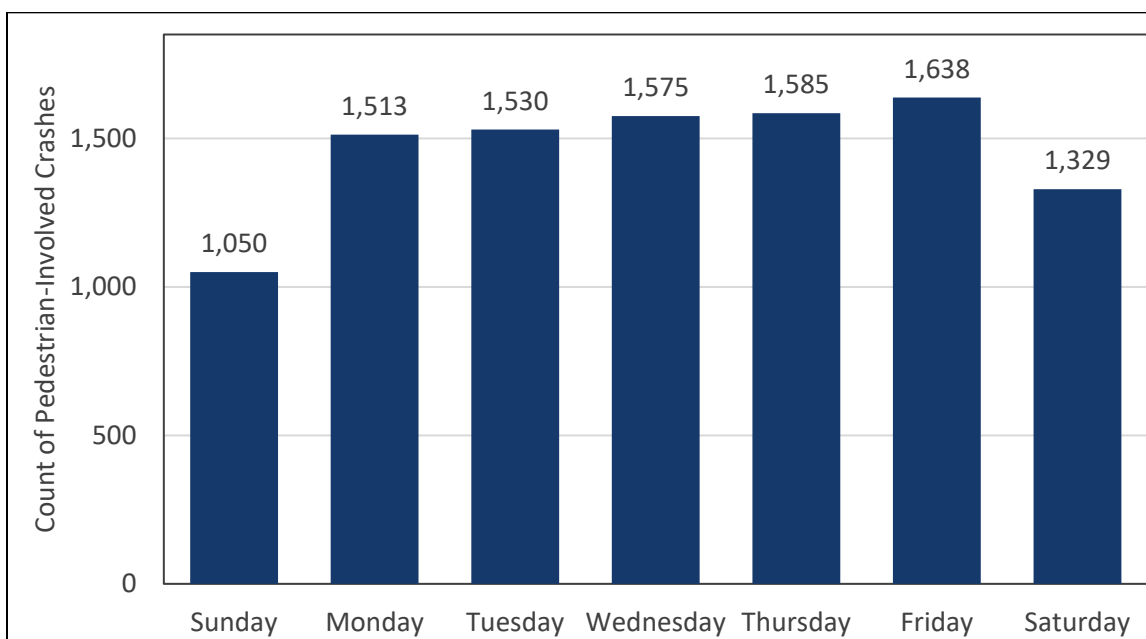


Figure 4 – Pedestrian-Involved Crashes by Day of Week, 2017-2021

4.3 Time of Day

Figure 5 shows the number of pedestrian-involved crashes across the hours of the day. Pedestrian-involved crashes were concentrated around the 6:00 p.m. hour (8.4%). High numbers of pedestrian-involved crashes persisted into the late evening hours. Across the first twelve hours of the day, a smaller peak of pedestrian-involved crashes occurred during the 7:00 a.m. hour, with 5.5% of all pedestrian-involved crashes. This likely corresponds to both more traffic during the morning rush hour and more pedestrians heading to school or work at that time.

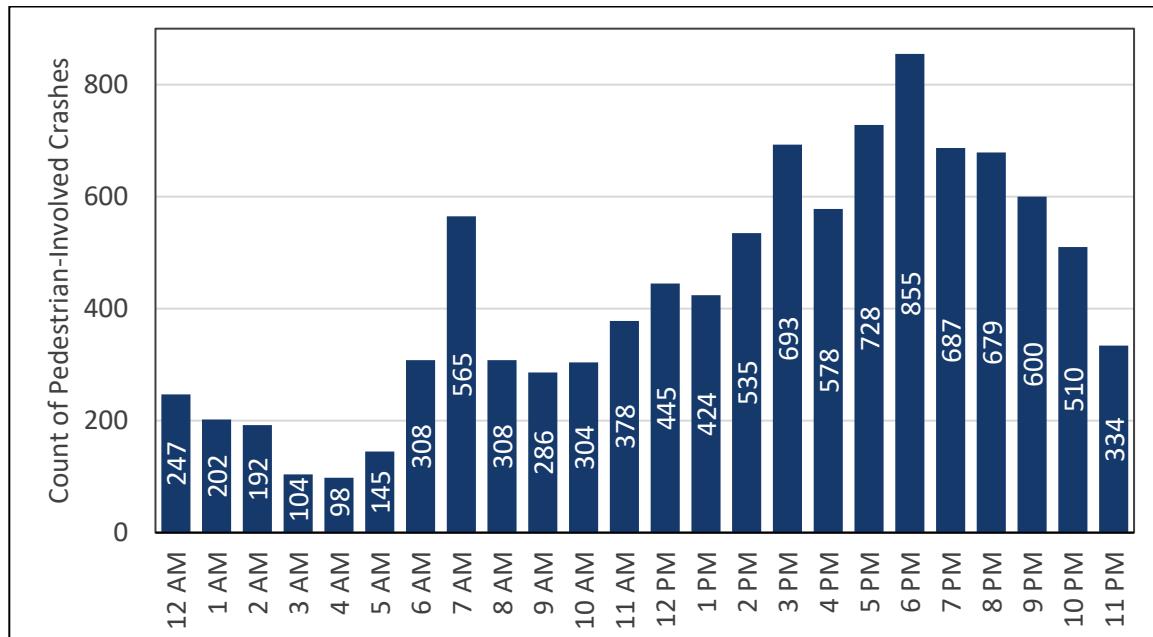


Figure 5 – Pedestrian-Involved Crashes by Time of Day, 2017-2021

Figure 6 shows pedestrians in crashes divided into two age groups, those 17 and younger and those 18 and older, excluding cases with unknown ages. The 17-and-under pedestrian group shows distinct peaks during the 7:00 a.m. and 3:00 p.m. hours, corresponding to the start and end of the school day. Pedestrians 18 and older involved in crashes show a small spike in the 7:00 a.m. hour, but are more concentrated in the later hours of the day, with a peak at 6 p.m. Nearly half (49.1%) of pedestrians 18 and older were involved in crashes between 4:00 p.m. and 11:59 p.m. Of the 4,245 pedestrians 18-and-older involved in crashes during these evening hours a total of 16.4% involved alcohol.

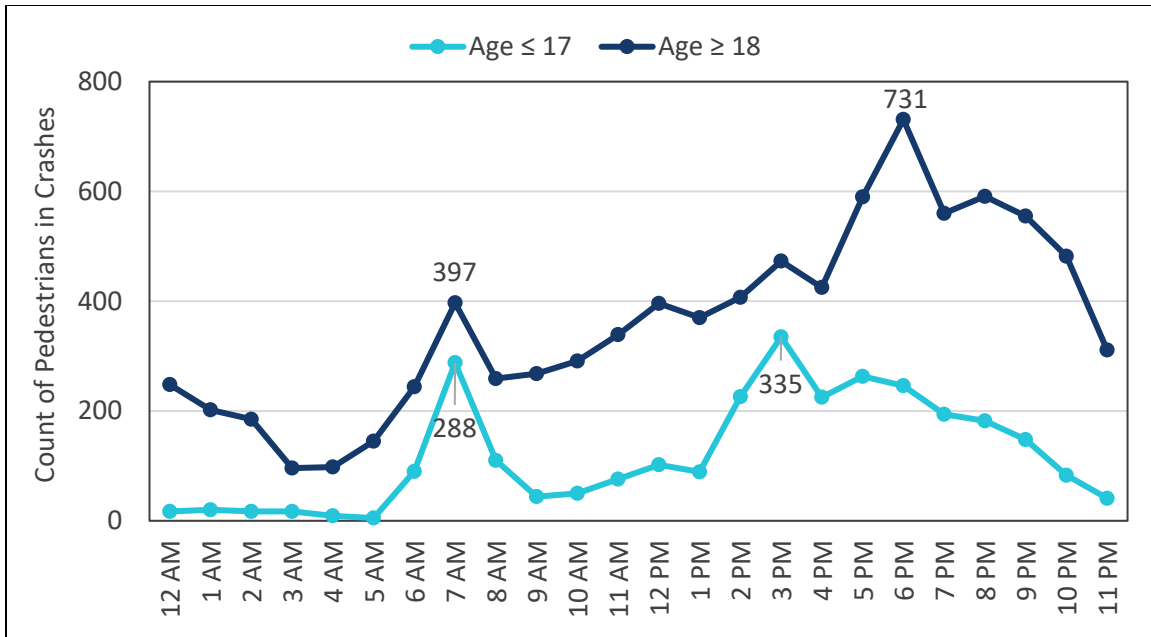


Figure 6 – Pedestrians in Crashes by Time of Day and Age Group, 2017-2021

5.0 External/Environmental Conditions

5.1 Light Conditions

Figure 7 shows crash counts by light condition for pedestrian-involved crashes. About 50.8% of pedestrian-involved crashes occurred in daylight conditions. A substantial proportion took place in dark-lighted (28.3%) and dark-unlighted (14.7%) conditions. In comparison, for crashes with no pedestrian involved, only 12.4% occurred in dark-lighted conditions and 18.8% in dark-unlighted conditions. While bicyclists who ride in the dark are required by state law to have a front white light and rear red reflector, no similar requirements exist for pedestrians. The generally low visibility of pedestrians at nighttime puts them at higher risk of crashes in dark conditions.

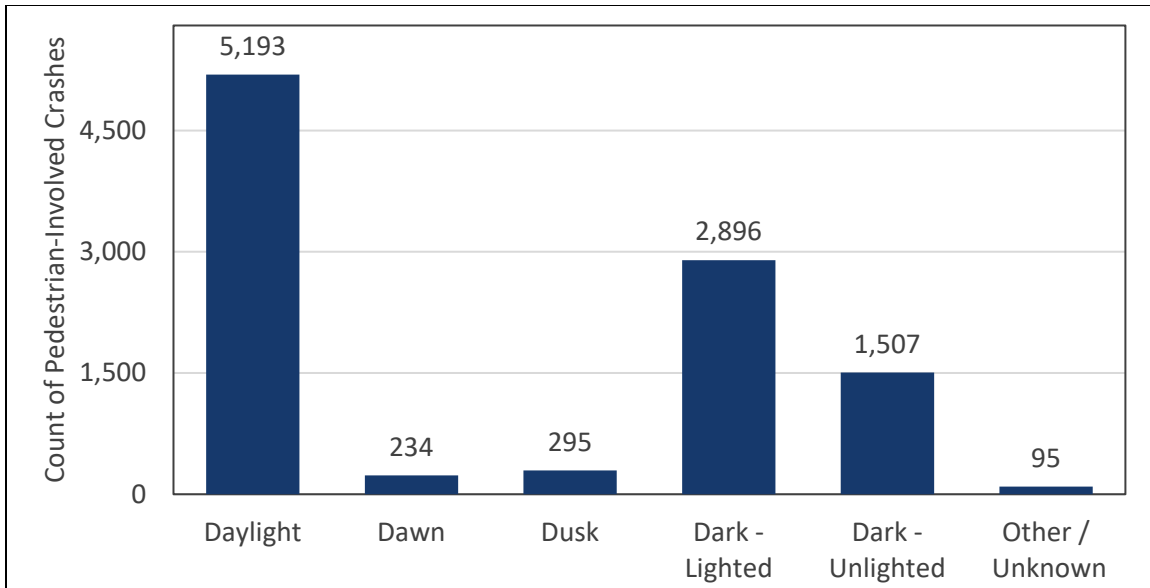


Figure 7 – Pedestrian-Involved Crashes by Light Condition, 2017-2021

Table 3 shows the number of pedestrian-involved crashes by light condition and severity. The column percentages show that the more severe the pedestrian crash, the greater the chance it took place under dark conditions. While only 36.0% of pedestrian-involved crashes with no injury occurred in either dark-lighted or dark-unlighted conditions, the same was true of 52.0% of suspected serious injury crashes and 73.5% of fatal pedestrian-involved crashes. Conversely, 57.6% of the no-injury pedestrian-involved crashes occurred in daylight, compared with 41.9% of suspected serious injury crashes and only 21.8% of fatal pedestrian-involved crashes.

Table 3. Pedestrian-Involved Crashes by Light Condition and Crash Severity, 2017-2021

Lighting Conditions	Fatal (K)	Suspected Serious Injury (A)	Suspected Minor Injury (B)	Possible Injury (C)	No Injury (O)	Total
Daylight	174 21.8%	824 41.9%	1,652 53.2%	1,790 58.9%	753 57.6%	5,193 50.8%
Dawn	15 1.9%	52 2.6%	69 2.2%	71 2.3%	27 2.1%	234 2.3%
Dusk	20 2.5%	54 2.7%	101 3.3%	80 2.6%	40 3.1%	295 2.9%
Dark - Lighted	323 40.4%	637 32.4%	821 26.4%	768 25.3%	347 26.5%	2,896 28.3%
Dark - Unlighted	264 33.0%	385 19.6%	432 13.9%	302 9.9%	124 9.5%	1,507 14.7%
Other / Unknown	3 0.4%	15 0.8%	30 1.0%	30 1.0%	17 1.3%	95 0.9%
Total	799 100.0%	1,967 100.0%	3,105 100.0%	3,041 100.0%	1,308 100.0%	10,220 100.0%

The impact of lighting conditions on crash severity is also highlighted in Figure 8, which displays the crash severity percentages for the three most common lighting conditions (daylight, dark-lighted, dark-unlighted). Dawn, dusk, other, and unknown light conditions account for only about 6% of all crashes. While 3.4% of all daylight crashes included a fatality, 11.2% of fatalities occurred in dark-lighted conditions, and 17.5% of fatalities occurred in dark-unlighted conditions.

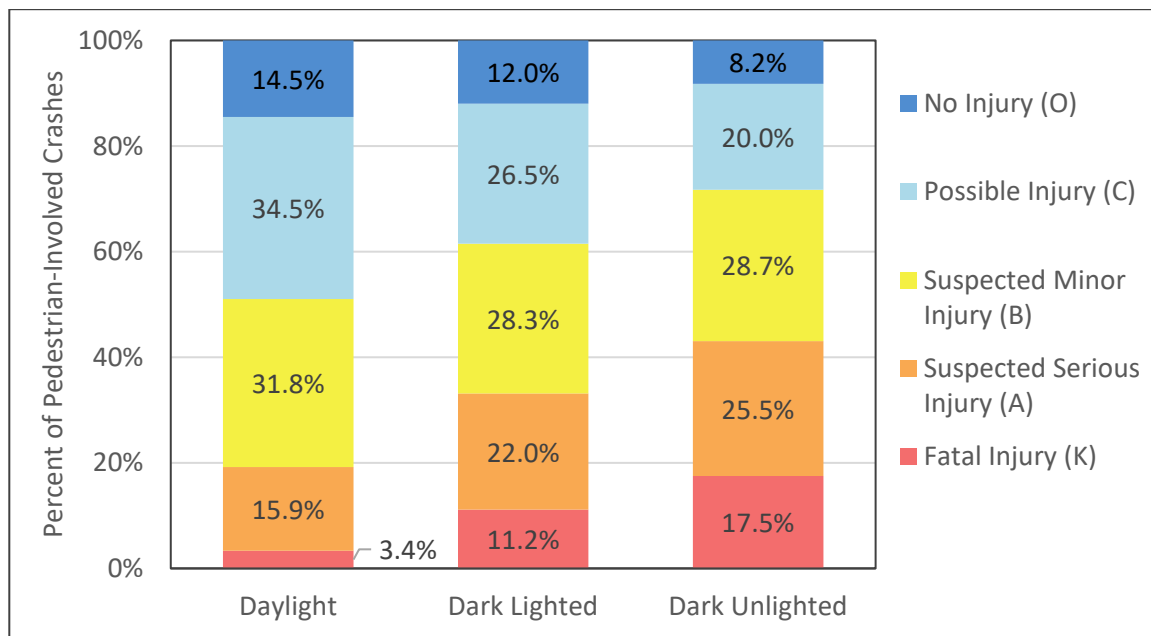


Figure 8 – Pedestrian-Involved Crashes by Crash Severity within Lighting Condition, 2017-2021

5.2 Weather Conditions

Figure 9 depicts weather conditions at the time of pedestrian-involved crashes. About 83.3% occurred in clear or cloudy conditions, 10.8% took place when it was raining, and 3.6% occurred in snow (which includes blowing snow). The “Other” category includes fog, severe crosswind, sleet/hail, blowing sand, and smoke. This weather-related crash pattern is likely related to exposure, with pedestrians less likely to be out during bad weather compared with favorable weather.

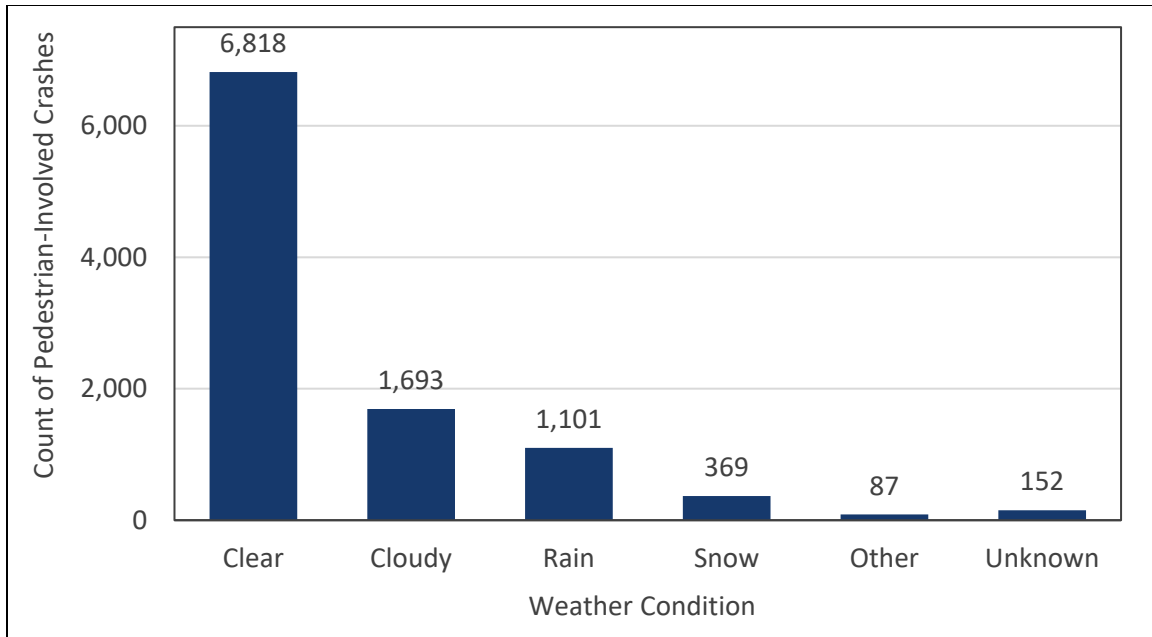


Figure 9 – Pedestrian-Involved Crashes by Weather Condition, 2017-2021

5.3 Speed Limit

To examine speed limit at the crash site, pedestrian-involved crashes were split into three groups according to levels of the KABCO scale of crash severity: fatal injury (K), all injuries (suspected serious - A, suspected minor - B, possible - C), and no injury with property damage only (O). Figure 10 shows the percentage of these three groups of crashes according to posted speed limit ranges at the crash site. Crashes with an unknown speed limit, about 3% of the total, were excluded.

There are relatively few crashes involving pedestrians at posted speed limits of 15 mph or less (1.5%) and 60 mph or more (2.2%). Most crashes occur within 20-35 mph (64.2%) and 40-55 mph (32.1%) posted speed limits. For the O-level crashes, 50.0% occurred at posted speeds of 30 mph or less. In contrast, 47.1% of A/B/C-level crashes and just 17.6% of crashes involving a fatality took place at posted speeds of 30 mph or less. The percentage of fatalities rises with increases in posted speed limits: 2.1% of crashes at posted speeds of 25 mph or less involved a fatal injury, 10.9% of crashes at posted speeds of 30 mph or higher involved a fatality, and 20.3% of crashes involved a fatality at speeds of 50 mph or higher. In general, pedestrians are more likely to use roadways in the lower speed limit ranges, but, unsurprisingly, when pedestrian-involved crashes occur in higher speed limit zones they are much more likely to be severe.

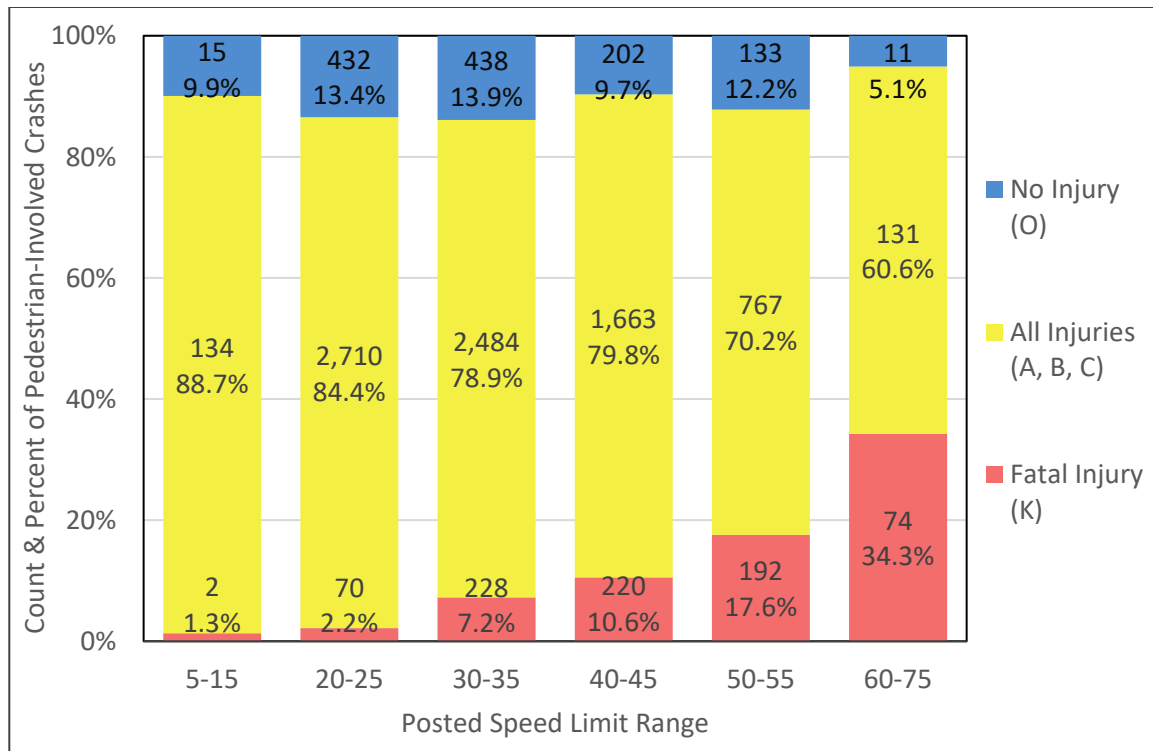


Figure 10 – Distribution of Pedestrian-Involved Crashes by Speed Limit at Crash Site, 2017-2021

6.0 Pedestrian and Driver Elements

6.1 Pedestrian Age

From 2017-2021, 10,806 pedestrians were involved in crashes on Michigan roadways. Table 4 shows the age group distribution of these pedestrians. This age group distribution is similar to that of the overall Michigan state population, however, the proportion of pedestrians involved in crashes age 9-54 is higher than the overall state population proportions (especially for ages 15-24), and the proportion of pedestrians involved in crashes for ages 8 and under and ages 55 and over is lower than the overall state population proportions. Age was unknown for 2.2% of pedestrians, but some of the pedestrians coded 0 on age (less than 1 year) may also be pedestrians of unknown age.

Table 4. Age Groups of Pedestrians Involved in Crashes, 2017-2021

Age Group	Pedestrians Involved in Crashes	Percent of All Pedestrians Involved in Crashes
0	55	0.5%
1-8	467	4.3%
9-14	785	7.3%
15-20	1,248	11.5%
21-24	839	7.8%
25-34	1,839	17.0%
35-44	1,338	12.4%
45-54	1,392	12.9%
55-64	1,478	13.7%
65-74	791	7.3%
75-84	263	2.4%
85+	68	0.6%
Unknown	243	2.2%
Total	10,806	100.0%

Table 5 shows the number and percent of pedestrians with fatal (K) or suspected serious (A) injuries out of all crash-involved pedestrians as a function of age. The probability that a pedestrian suffered KA injuries varies according to age group. While 22.5% of pedestrians age 1 to 8 suffered KA injuries, this declined to 16.6% of pedestrians age 9-14 and then rose slightly to 19.7% of pedestrians age 15-20. The percentage of pedestrians with KA injuries then generally rose with age, reaching 38.0% of pedestrians age 75-84 and 41.2% of pedestrians 85 and over.

Table 5. Age Groups and KA Injuries of Pedestrians Involved in Crashes, 2017-2021

Age Group	KA Injured Pedestrians	Pedestrians Involved in Crashes	Percent KA Injured Pedestrians within Age Group
0	9	55	16.4%
1-8	105	467	22.5%
9-14	130	785	16.6%
15-20	246	1,248	19.7%
21-24	193	839	23.0%
25-34	489	1,839	26.6%
35-44	405	1,338	30.3%
45-54	453	1,392	32.5%
55-64	428	1,478	29.0%
65-74	242	791	30.6%
75-84	100	263	38.0%
85+	28	68	41.2%
Unknown	13	243	5.3%
Total	2,841	10,806	26.3%

6.2 Driver Age

The age groups of motor vehicle drivers in pedestrian-involved crashes are shown in Table 6. Age was unknown for more than a quarter (27.2%) of drivers, and 81.1% of these unknown-age drivers were in hit-and-run pedestrian-involved crashes. Because age was unknown for such a large share of drivers, the rightmost column of Table 6 shows the age distribution based only on drivers in crashes with a known age. When age was known, about 19.1% of drivers in pedestrian-involved crashes were age 15-24, 65.3% were age 25-64, and 15.5% were age 65 and over. Drivers in pedestrian-involved crashes are rarely seriously injured as only 9 of the 11,058 drivers (0.1%) were killed and just 72 (0.7%) received suspected serious injuries.

Table 6. Age Groups of Drivers in Pedestrian-Involved Crashes, 2017-2021

Age Group	Driver Count	Percent of All Drivers	Percent of Drivers with Known Age
0-14	9	0.1%	0.1%
15-20	797	7.2%	9.9%
21-24	736	6.7%	9.1%
25-34	1,633	14.8%	20.3%
35-44	1,265	11.4%	15.7%
45-54	1,221	11.0%	15.2%
55-64	1,134	10.3%	14.1%
65-74	787	7.1%	9.8%
75-84	360	3.3%	4.5%
85+	103	0.9%	1.3%
Unknown	3,013	27.2%	--
Total	11,058	100.0%	100.0%

6.3 Pedestrian Actions

Table 7 and Figure 11 compare the action of the pedestrian prior to the crash for pedestrians involved in fatal and non-fatal crashes. Table 7 shows distributions of known pedestrian actions prior to the crash and the percentages represent the pedestrian actions within all fatal or non-fatal crashes. The variable used has one set of code levels intended for drivers and cyclists and another set intended for pedestrians. A few pedestrians were coded with driver/cyclist actions, so these cases were excluded, and cases coded “other” and “unknown” were also excluded. Altogether about 9% of the crash-involved pedestrians are omitted from Table 7 and Figure 11.

Table 7. Pedestrian Action Prior to Crash, 2017-2021

Pedestrian Action Prior to Crash	Fatal Crash Involvements	Non-Fatal Crash Involvements	Total Crash Involvements
Crossing at Intersection	138 16.8%	3,661 40.6%	3,799 38.6%
Crossing Not at Intersection	260 31.7%	2,005 22.2%	2,265 23.0%
Getting On/Off Vehicle	5 0.6%	111 1.2%	116 1.2%
In Roadway With Traffic	119 14.5%	881 9.8%	1,000 10.2%
In Roadway Against Traffic	22 2.7%	160 1.8%	182 1.9%
Standing/Lying in Roadway	96 11.7%	578 6.4%	674 6.9%
Pushing/Working on Vehicle	13 1.6%	76 0.8%	89 0.9%
Other Work in Roadway	9 1.1%	133 1.5%	142 1.4%
Playing in Roadway	1 0.1%	114 1.3%	115 1.2%
In Roadway Other Reason	98 11.9%	845 9.4%	943 9.6%
Not in Roadway	60 7.3%	448 5.0%	508 5.2%
Total	821 100.0%	9,012 100.0%	9,833 100.0%

The most common action for pedestrians involved in fatal crashes was crossing not at an intersection (31.7%), followed by crossing at an intersection (16.8%), and in roadway walking with traffic (14.5%). In contrast, the most common action prior to crash for pedestrians in non-fatal crashes was crossing at an intersection, with 40.6% of the cases over the five-year period. This was followed by crossing not at an intersection (22.2%) and in roadway walking with traffic (9.8%). The table illustrates the dangers for pedestrians crossing mid-block, walking with traffic as opposed to against it, and standing or laying in the roadway. Figure 11 focuses on four actions and shows the proportion of crashes resulting in a fatality vs. non-fatality which highlights the decreased likelihood of a fatal crash for crossing at an intersection (3.6%) in contrast to crossing not at an intersection (11.5%). It also shows the combined seven pedestrian actions occurring within the roadway (11.4%) compared to not in a roadway or other (10.4%).

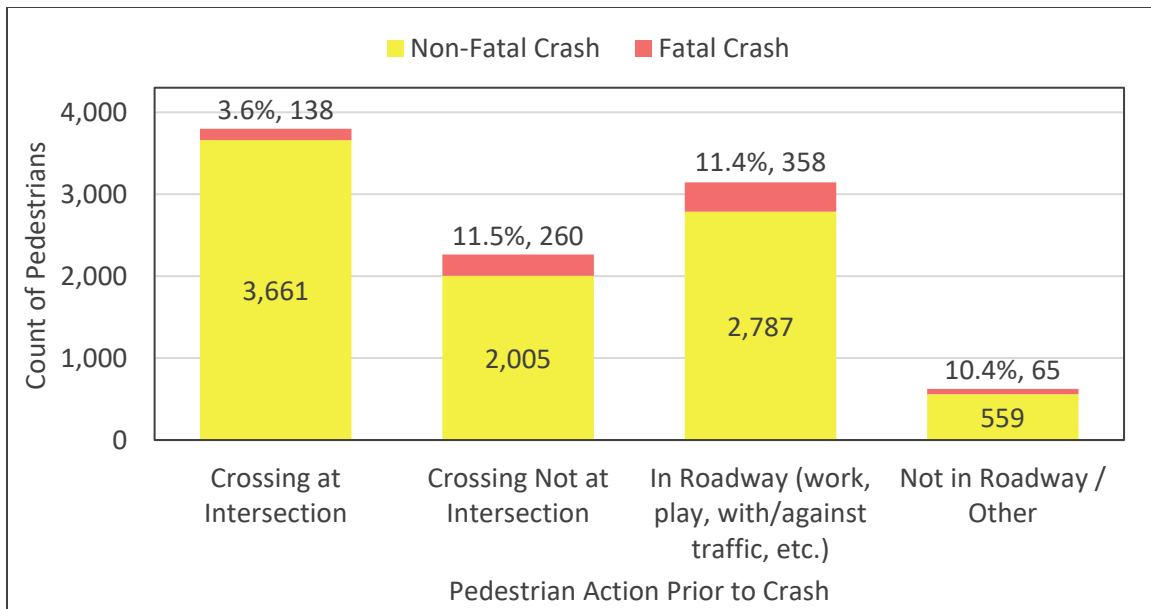


Figure 11 – Pedestrian Actions Prior to Crash in Pedestrian-Involved Crashes, 2017-2021

6.4 Driver Actions

Table 8 and Figure 12 show the action prior to the crash for motor-vehicle drivers in pedestrian-involved crashes. Driver actions that were unknown or that were coded as pedestrian actions are excluded from the table and chart (a total of 3.2%). The percentages in the table represent the driver actions for all fatal or non-fatal crashes. The most common driver action was simply going straight ahead, which represented 58.1% of vehicle involvements in all pedestrian-involved crashes. The next four most common driver actions were turning left (16.0%), turning right (8.0%), parked (3.6%), and backing (2.6%). It may seem counterintuitive that being parked was the fourth most common driver action in pedestrian-involved crashes, but there is usually at least one other vehicle in these crashes apart from the parked vehicle. A common scenario is a passing vehicle strikes both a pedestrian and a disabled vehicle on the side of the roadway. Typically, the pedestrian is associated with the disabled vehicle as a driver, passenger, police officer, tow-truck operator, etc.

Among fatal pedestrian-involved crashes, the most common driver action was going straight, with 77.6% of the fatal involvements, compared with just 56.3% of non-fatal involvements. The next two most common driver actions in fatal pedestrian-involved crashes were parked (5.6%) followed by turning left (2.7%). Again, pedestrian-involved crashes where one vehicle was stopped on the roadway typically involved at least one other vehicle in the crash. Occasionally, however, a pedestrian (usually intoxicated) collided with a single stopped vehicle. It is notable that turning left, the second-most common driver action overall in pedestrian-involved crashes, was represented in only 2.7% of driver involvements in fatal pedestrian-involved crashes, compared with 17.2% of involvements in non-fatal pedestrian-involved crashes.

Table 8. Driver Action Prior to Crash, 2017-2021

Driver Action Prior to Crash	Fatal Crash Involvements	Non-Fatal Crash Involvements	Total Crash Involvements
Going Straight Ahead	726 77.6%	5,496 56.3%	6,222 58.1%
Turning Left	25 2.7%	1,684 17.2%	1,709 16.0%
Turning Right	8 0.9%	852 8.7%	860 8.0%
Stopped on Roadway	16 1.7%	166 1.7%	182 1.7%
Involved in Prior Crash at Same Location	7 0.7%	20 0.2%	27 0.3%
Changing Lanes	16 1.7%	67 0.7%	83 0.8%
Backing	8 0.9%	275 2.8%	283 2.6%
Slowing/Stopping on Roadway	18 1.9%	229 2.3%	247 2.3%
Slowing/Stopping Other Area	1 0.1%	12 0.1%	13 0.1%
Starting Up on Roadway	7 0.7%	234 2.4%	241 2.3%
Starting Up in Other Area	0 0.0%	7 0.1%	7 0.1%
Entering Parking	0 0.0%	17 0.2%	17 0.2%
Leaving Parking	1 0.1%	29 0.3%	30 0.3%
Entering Roadway	6 0.6%	87 0.9%	93 0.9%
Leaving Roadway	1 0.1%	16 0.2%	17 0.2%
Making U-Turn	0 0.0%	13 0.1%	13 0.1%
Overtaking or Passing	7 0.7%	48 0.5%	55 0.5%
Avoiding Object	1 0.1%	8 0.1%	9 0.1%
Avoiding Pedestrian	21 2.2%	75 0.8%	96 0.9%
Avoiding Vehicle (front/back)	4 0.4%	25 0.3%	29 0.3%
Avoiding Vehicle (angle)	0 0.0%	11 0.1%	11 0.1%
Driverless Moving	7 0.7%	41 0.4%	48 0.4%
Parked	52 5.6%	337 3.5%	389 3.6%
Avoiding Animal	0 0.0%	1 0.0%	1 0.0%
Negotiating a Curve	4 0.4%	17 0.2%	21 0.2%
Total	936 100.0%	9,767 100.0%	10,703 100.0%

Figure 12 depicts how going straight ahead is the driver action with most crashes. The percent of fatal crashes are highest while being parked (13.4%), going straight ahead (11.7%), and the actions grouped as “other” (9.4%). Actions with a lower percentage of fatal crashes are backing at 2.8%, turning left (1.5%), and turning right (0.9%).

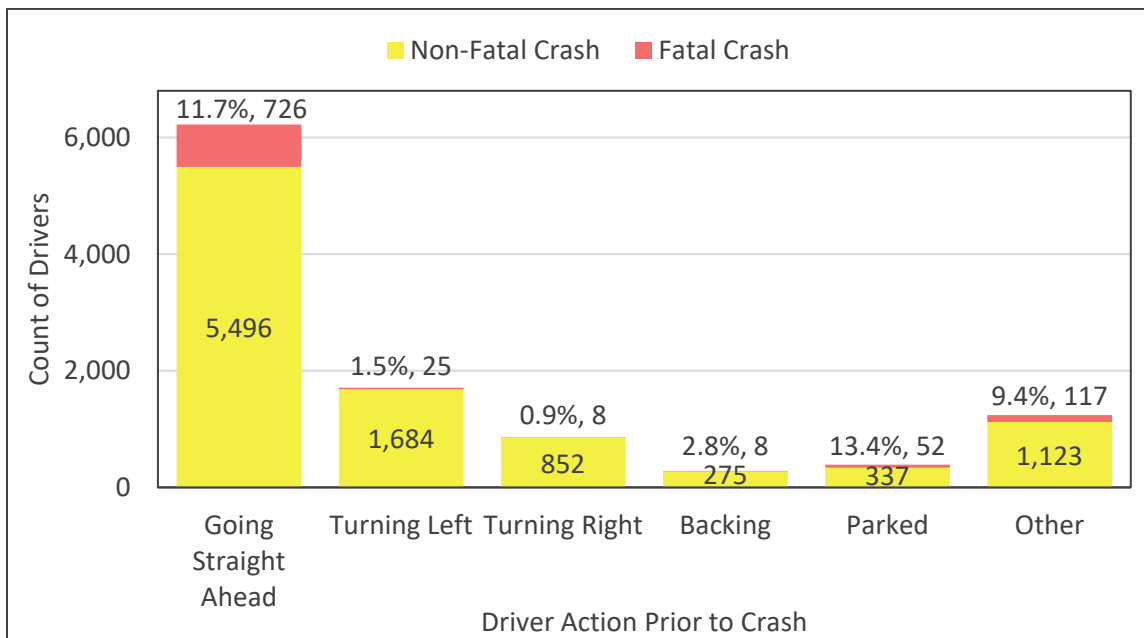


Figure 12 – Driver Actions Prior to Crash in Pedestrian-Involved Crashes, 2017-2021

Table 9 has counts and percentages of hazardous actions by motor-vehicle drivers in pedestrian-involved crashes for both fatal and non-fatal crashes. Hazardous action was unknown or missing for 20.1% of the driver involvements in pedestrian-involved crashes, and these are excluded from Table 9. When hazardous action for drivers was known, no hazardous action was recorded for 46.4% of driver involvements overall, 44.7% of non-fatal involvements, and 63.7% of fatal involvements. For non-fatal involvements, the most common hazardous actions recorded were failed to yield (25.5%), “other” (8.5%), careless/negligent driving (6.2%), and unable to stop in assured clear distance (4.4%). The most common hazardous actions indicated in fatal involvements were “other” (10.1%), careless/negligent driving (6.1%), speed too fast (5.9%), and failed to yield (4.5%).

Table 9. Hazardous Action, 2017-2021

Hazardous Action	Fatal Crash Involvements	Non-Fatal Crash Involvements	Total Crash Involvements
None	498 63.7%	3,602 44.7%	4,100 46.4%
Speed Too Fast	46 5.9%	209 2.6%	255 2.9%
Speed Too Slow	0 0.0%	1 0.0%	1 0.0%
Failed to Yield	35 4.5%	2,056 25.5%	2,091 23.7%
Disregard Traffic Control	9 1.2%	153 1.9%	162 1.8%
Drove Wrong Way	0 0.0%	9 0.1%	9 0.1%
Drove Left of Center	3 0.4%	22 0.3%	25 0.3%
Improper Passing	4 0.5%	31 0.4%	35 0.4%
Improper Lane Use	6 0.8%	89 1.1%	95 1.1%
Improper Turn	2 0.3%	59 0.7%	61 0.7%
Improper/No Signal	0 0.0%	1 0.0%	1 0.0%
Improper Backing	2 0.3%	122 1.5%	124 1.4%
Unable to Stop in Assured Clear Distance	28 3.6%	355 4.4%	383 4.3%
Other	79 10.1%	687 8.5%	766 8.7%
Reckless Driving	22 2.8%	160 2.0%	182 2.1%
Careless/Negligent Driving	48 6.1%	499 6.2%	547 6.2%
Total	782 100.0%	8,055 100.0%	8,837 100.0%

7.0 Impairment-Related Crashes

Table 10 compares impairment distributions for pedestrian-involved crashes and crashes involving only motor vehicles (no pedestrians or bicycles involved). Impairment status is based on what is reported by the police officer at the time of the crash for both pedestrians and drivers. The crashes are categorized into those not involving alcohol or drugs, involving alcohol-only, involving drugs-only, and crashes involving both alcohol and drugs. Pedestrian-involved crashes had higher levels of all three kinds of impairment compared with motor-vehicle-only crashes. About 9.1% of pedestrian-involved crashes involved alcohol only, 1.6% involved drugs only, and 1.6% involved both alcohol and drugs.

Table 10. Impairment Distributions for Pedestrian-Involved and Motor-Vehicle-Only Crashes, 2017-2021

Impairment	Pedestrian-Involved Crashes	Motor-Vehicle-Only Crashes
Alcohol Only	9.1%	2.8%
Drugs Only	1.6%	0.5%
Alcohol & Drugs	1.6%	0.4%
None	87.7%	96.2%
Total	100.0%	100.0%

In the five-year period, there were 1,098 pedestrian-involved crashes involving alcohol. Figure 13 shows the drinking status for the pedestrians and motor vehicle drivers in those crashes (25 drivers with unknown alcohol use were excluded). Of the 1,172 pedestrians in these crashes, 870 (74.2%) were drinking, while 315 (26.0%) of the 1,211 drivers were drinking. In pedestrian-involved fatal crashes, 70.5% of pedestrians and 30.7% of drivers were drinking.

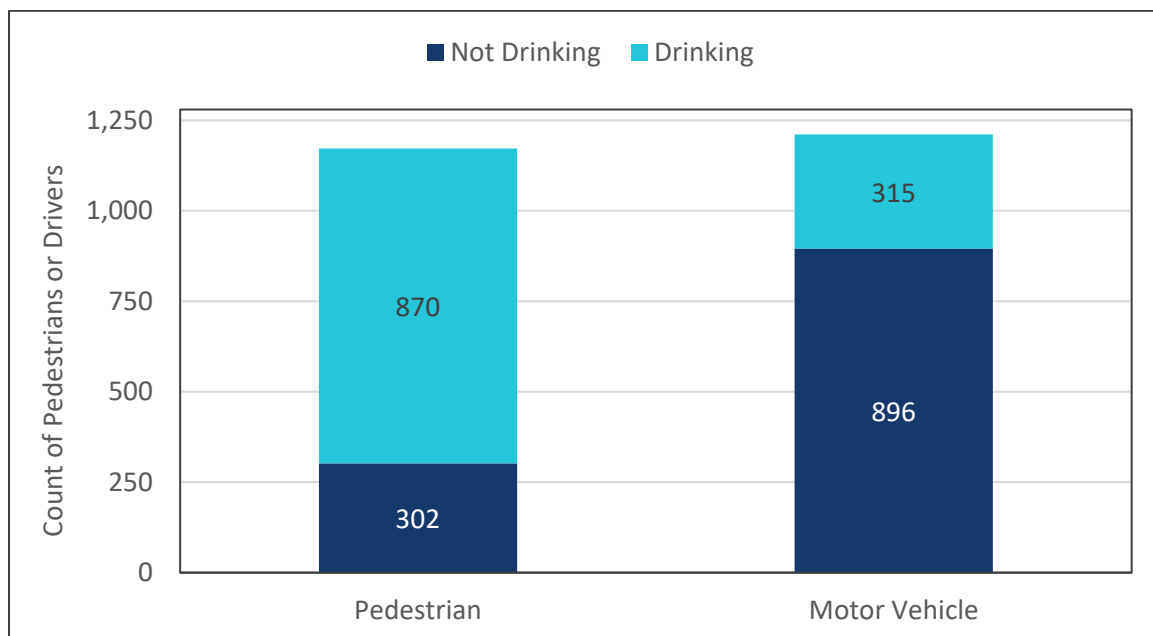


Figure 13 – Pedestrians and Drivers in Alcohol-Involved Pedestrian-Involved Crashes, 2017-2021

Figures 14 and 15 show day and time data for alcohol-involved pedestrian crashes, respectively. Figure 14 shows all pedestrian-involved crashes by day of the week according to whether the crash involved alcohol. Saturday had the highest number of pedestrian-involved crashes involving alcohol (233) followed by Friday and Sunday (both at 178). Pedestrian-involved crashes involving alcohol occurred more frequently on the weekends, with 17.5% on Saturday and 17.0% on Sunday.

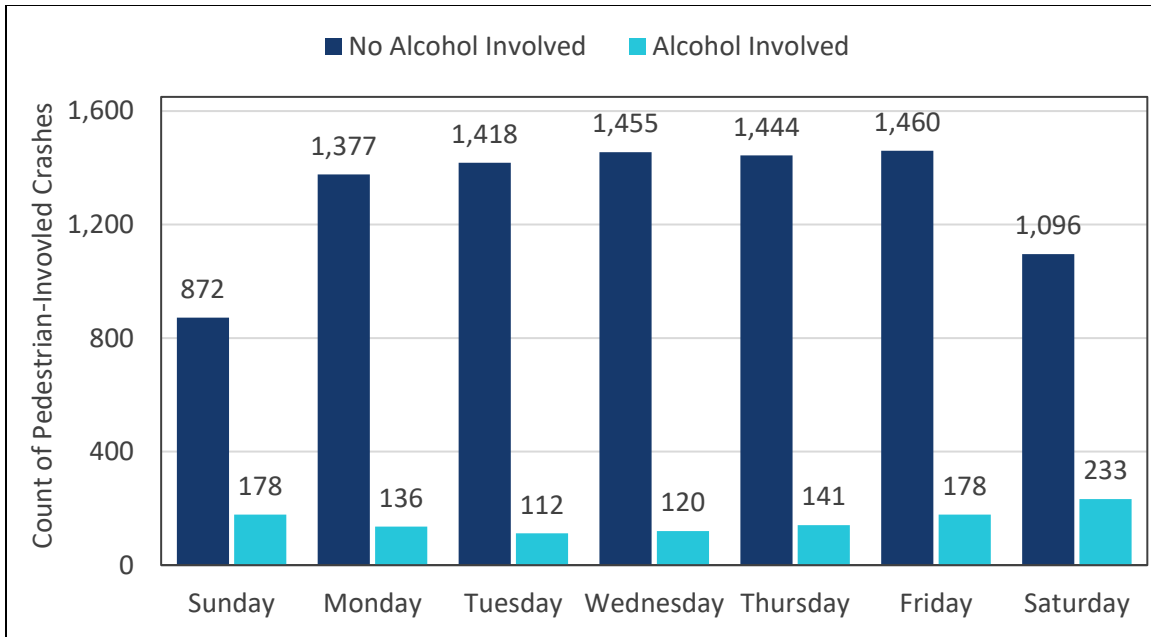


Figure 14 – Pedestrian-Involved Crashes by Day of Week and Alcohol Involvement, 2017-2021

Figure 15 depicts pedestrian-involved crashes by time of day, again split according to whether the crash involved alcohol. Late-night hours had the greatest percentages of alcohol-involved pedestrian-involved crashes, starting as early as 5 p.m. and extending until 6 a.m. Between midnight and 4 a.m., about 34% of pedestrian-involved crashes also involved alcohol, where either or both the pedestrian and the driver had been drinking.

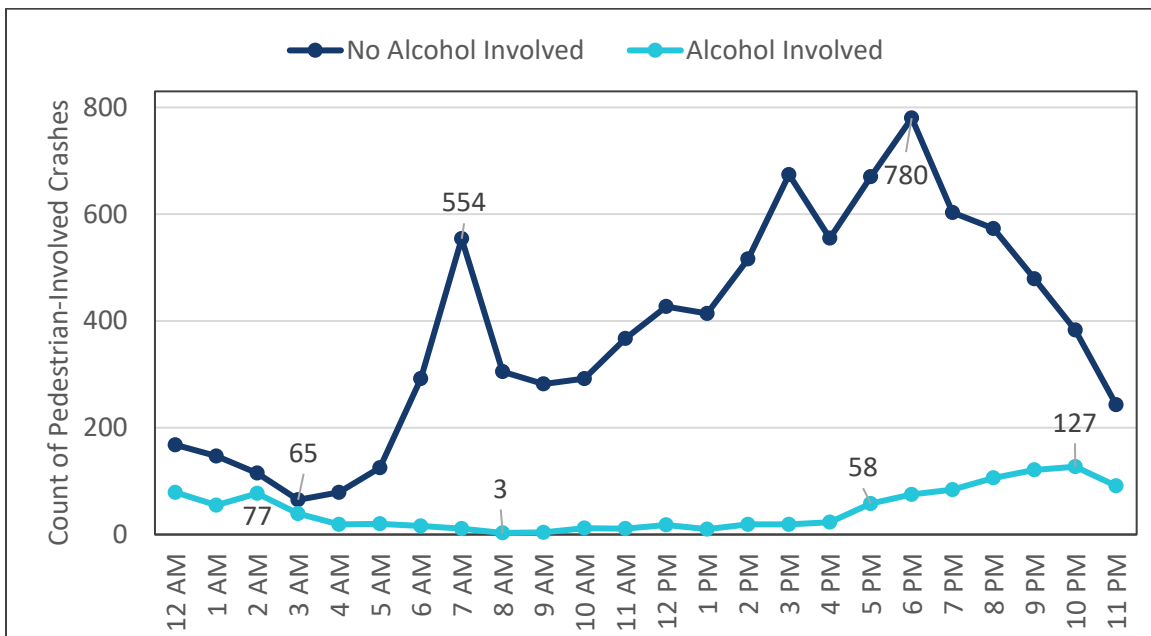


Figure 15 – Pedestrian-Involved Crashes by Time of Day and Alcohol Involvement, 2017-2021

8.0 Summary

From 2017 through 2021 in Michigan, an average of 2,044 motor vehicle crashes involving a pedestrian occurred each year. On average, 160 pedestrian-involved crashes involved at least one fatality each year. Incidence of death or injury in pedestrian-involved crashes is much higher than in crashes involving only motor vehicles. While only 17.4% of crashes involving just motor vehicles resulted in death or injury, 87.2% of pedestrian-involved crashes resulted in death or injury to at least one person, almost always a pedestrian.

Pedestrian-involved crashes commonly occurred during daylight, although 52.0% of suspected serious injury crashes and 73.5% of fatal pedestrian-involved crashes took place under dark conditions. More pedestrian-involved crashes occurred on each of the weekday days than the weekend days. Late afternoon/evening hours and during the 7:00 a.m. hour were peak times for pedestrian-involved crashes.

A comparison of pedestrian actions prior to fatal and non-fatal crashes showed the actions crossing not at intersection, in roadway with traffic, and standing/laying in roadway to be over-represented among fatal pedestrian-involved crashes. For drivers in pedestrian-involved crashes, the actions going straight ahead, changing lanes, avoiding pedestrian, and parked were more common in fatal crashes than non-fatal crashes. Crashes with one parked vehicle typically involved a pedestrian associated with that vehicle in some way and another vehicle that struck both the pedestrian and the parked vehicle.

Impairment was a particular problem in pedestrian-involved crashes. Alcohol and/or drugs were a factor in 12.3% of pedestrian-involved crashes, compared with 3.8% of crashes involving only motor vehicles. In contrast to overall pedestrian-involved crashes, more alcohol-involved pedestrian crashes occurred on the weekends, including Friday. For pedestrian-involved crashes that involved alcohol, alcohol use was reported for the pedestrians almost three times as often as for the motor vehicle drivers.