Distracted Driving Related Crashes in Michigan: 2016-2018

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1.0 Executive Summary

This report examines distracted-driving crash patterns in Michigan from 2016 through 2018. Key findings include:

- About 5.5% of police-reported crashes from 2016-2018 involved at least one distracted motor vehicle driver.

- Crashes involving distracted drivers tended to be more severe than crashes involving non-distracted drivers.

- About 56.2% of distracted drivers were involved in rear-end collisions, compared with 36.9% of non-distracted drivers.

- Distracted drivers who were involved in rear-end crashes were overwhelmingly the striking vehicle rather than the struck vehicle.

- Distracted driving occurred more often in less demanding driving situations, such as in daylight and clear weather conditions.

- Distracted driving was more prevalent among drivers under the age of 35 compared with drivers 35 and older.

- Crash-involved drivers age 16 to 19 had a higher incidence of distracted driving (8.1%) than any other driver age group.

- Relatively more distracted drivers were reported to have been drinking at the time of the crash compared with non-distracted drivers.

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2.0 Introduction

This report examines distracted-driving traffic crash patterns in Michigan in 2016, 2017, and 2018. 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. Prior to 2016, Michigan crash data included one variable to indicate whether the driver was distracted and another to indicate whether the driver was using a cell phone. In 2016, a new variable was added to show whether the driver was distracted and to specify the type of distraction for those drivers who were distracted, thus removing the previous distracted driving variables. With this coding change, the number of distracted-driving crashes rose from about 4,000-5,000 a year to nearly 13,000 in 2016. The variable changes make it difficult to compare the number of distracted-driving crashes before and after the changes, so this report only focuses on distracted-driving crashes from 2016 through 2018.

Distracted driving is often underreported, as it is difficult to determine driver behaviors and actions at the time of the crash unless they are reported by involved parties or witnesses. Given that Michigan laws prohibit texting while driving and any cell phone use by teen drivers with Level 1 or Level 2 Graduated Driver Licenses, people may be reluctant to report distraction. However, cell phone use and general distracted driving contribute to many crashes, particularly for young drivers. The National Highway Traffic Safety Administration (NHTSA) estimates that 885,000 crashes (14% of all crashes) in 2015 involved a distracted driver. Among drivers in fatal crashes in 2017, NHTSA found that 15-19 year-old drivers were the most likely to be distracted, followed by drivers 20 to 29.

While pedestrians and bicyclists may be coded as being distracted, this report is confined to drivers of motor vehicles. The report analyzes police-reported crashes in Michigan from 2016-2018 and considers distracted-driving crashes to be those where at least one driver of a motor vehicle was coded under a type of distraction on the driver distraction variable. The UD-10 Instruction Manual notes that "distractions are actions or sources that may have influenced driver or non-motorist performance." The driver distraction variable has the following code levels:

- Not distracted
- Manually operating an electronic communications device (texting, typing, dialing)
- Talking on hands-free device
- Talking on hand-held device
- Other activity, electronic device (book player, navigation aid)
- Passenger
- Other activity inside vehicle (eating, personal hygiene, reaching for object, reading the paper, dog on lap, etc.)
- Activity outside vehicle (includes unspecified external distractions)
- Unknown (officer cannot determine if driver was distracted at the time of the crash)
- Uncoded & errors

Distracted drivers are those coded any level except not distracted, unknown, and uncoded & errors. The analyses in this report aim to highlight factors that are associated with distracted-driving crashes.

3.0 Distracted Driver Crash Counts, Types, and Severity

3.1 Crash Counts

Table 1 shows the number of crashes from 2016-2018 that involved at least one distracted motor vehicle driver. The percentage of distracted-driving crashes out of all crashes rose from 4.1% in 2016 to 6.4% in 2017 before falling slightly to 6.1% in 2018.

Table 1. Distracted-Driving Crashes, 2016-2018

Year	Distracted Crashes	All Crashes	Percent Distracted
2016	12,788	312,172	4.1%
2017	20,115	314,921	6.4%
2018	18,927	312,798	6.1%
Total	51,830	939,891	5.5%

Table 2 on the following page shows counts of all motor vehicle drivers involved in crashes from 2016-2018, categorized according to the different levels of the driver distraction variable. The 51,830 distracted-driving crashes in 2016-2018 involved a total 52,518 distracted drivers—one crash can potentially have more than one driver who is distracted. Cell phone use is captured by the code levels communication device, hands-free device, and hand-held device. Of all drivers in crashes from 2016-2018 who were reported to be distracted, cell phone use was the type of distraction for 15.0% of these drivers. In comparison, the type of distraction was other electronic devices for 10.8% of the distracted drivers, passengers for 6.5%, other activities in the vehicles for 34.0%, and activities outside the vehicles for 33.7%.

Driver Distraction	2016	2017	2018	Total
Not Distracted	221,214 (94.5%)	401,872 (95.2%)	402,646 (95.5%)	1,025,732
Communication Device	1,228 (0.5%)	2,146 (0.5%)	2,050 (0.5%)	5,424
Hands-Free Device	133 (0.1%)	172 (0.0%)	177 (0.0%)	482
Hand-Held Device	532 (0.2%)	758 (0.2%)	690 (0.2%)	1,980
Electronic Device - other	1,331 (0.6%)	2,161 (0.5%)	2,165 (0.5%)	5,657
Passenger	976 (0.4%)	1,353 (0.3%)	1,105 (0.3%)	3,434
Other Activity Inside Vehicle	4,258 (1.8%)	7,046 (1.7%)	6,536 (1.5%)	17,840
Activity Outside Vehicle	4,529 (1.9%)	6,728 (1.6%)	6,444 (1.5%)	17,701
Unknown	57,801	107,277	110,459	275,537
Null/Not entered	246,410	10,874	1,951	259,235
Total	538,412	540,387	534,223	1,613,022

One notable feature of Table 2 is the large number of "null/not entered" for 2016 compared with 2017 and 2018. The new reporting form was introduced at the beginning of 2016 and it is clear from the data (see also the "month of the year" section on p. 6) that police were learning to use this field throughout 2016. However, when we remove unknown and null/not entered, the relative proportion of each distraction is very similar between 2016 and 2017-2018. Thus, the remaining analyses exclude drivers marked unknown or null/not entered on the driver distraction variable.

3.2 Crash Severity

Table 3 shows drivers involved in crashes according to the different levels of the driver distraction variable (with "unknown" and "not entered" levels excluded). The crash involvements are tabulated according to the worst injury in the crash. Each cell of the table shows the count of drivers and the row percent. For example, the top left cell indicates that there were 1,878 drivers coded as not distracted who were involved in fatal crashes. These fatal crash involvements made up 0.2% of all crash involvements of non-distracted drivers. The crash severity column headed PDO stands for property damage only, meaning no injuries were reported in the crash.

Table 3 indicates that crash severity distributions were more severe for distracted drivers than non-distracted drivers for every type of distraction coded. For example, about 69.8% of drivers who were coded as being distracted by a communication device were in PDO crashes, while 30.2% of these distracted drivers were in injury or fatal crashes. For non-distracted drivers, 80.2% were PDO crashes and only 19.8% were injury or fatal crashes.

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Table 3. Drivers in Crashes by Driver Distraction and Crash Severity, 2016-2018

Driver Distraction	Fatal	Injury	PDO	Total
Not Distracted	1,878 (0.2%)	200,765 (19.6%)	823,089 (80.2%)	1,025,732 (100.0%)
Communication Device	24 (0.4%)	1,615 (29.8%)	3,785 (69.8%)	5,424 (100.0%)
Hands-Free Device	4 (0.8%)	140 (29.0%)	338 (70.1%)	482 (100.0%)
Hand-Held Device	16 (0.8%)	531 (26.8%)	1,433 (72.4%)	1,980 (100.0%)
Electronic Device - Other	18 (0.3%)	1,622 (28.7%)	4,017 (71.0%)	5,657 (100.0%)
Passenger	15 (0.4%)	1,112 (32.4%)	2,307 (67.2%)	3,434 (100.0%)
Other Activity Inside Vehicle	41 (0.2%)	5,064 (28.4%)	12,735 (71.4%)	17,840 (100.0%)
Activity Outside Vehicle	54 (0.3%)	4,072 (23.0%)	13,575 (76.7%)	17,701 (100.0%)
Total	2,050 (0.2%)	214,921 (19.9%)	861,279 (79.9%)	1,078,250 (100.0%)

Note: Drivers coded "unknown" or "not entered" on driver distraction are excluded from Table 3.

3.3 Crash Type

In Table 4, the levels of the driver distraction variable are categorized according to crash type. Table 4 has counts of driver involvements, and the "unknown" and "not entered" levels of driver distraction are excluded. Additionally, three code levels of crash type—rear-end, rear-end right turn, and rear-end left turn—have been combined into a "rear-end" category, and cases coded "other," "unknown," or "not entered" on crash type have been excluded. Each row of the table lists how many drivers with a particular distraction level were involved in each type of crash, as well as the distribution of the crash types.

Table 4 indicates that a higher proportion of distracted drivers were involved in rear-end crashes compared with non-distracted drivers. About 36.9% of non-distracted drivers were involved in rear-end crashes. Distracted drivers in each of the different distraction categories had a higher percentage of rear-end crash involvements, including 59.3% for drivers distracted by other electronic devices and 63.3% for drivers distracted by other activity inside the vehicle. Taking all distracted drivers together, 56.2% were involved in rear-end collisions. If we look at the first impact point on vehicles driven by distracted drivers in rear-end crashes, we find that 94.1% of the vehicles had front damage, 5.1% had rear damage, and 0.7% had damage to another area. This suggests that distracted drivers in rear-end collisions were overwhelmingly the striking vehicle rather than the struck vehicle.

Table 4. Drivers in Crashes by Driver Distraction and Crash Type, 2016-2018

Driver Distraction	Single Vehicle	Head-on	Head-on/ Left Turn	Angle	Rear-end	Side-swipe Same Dir.	Side-swipe Opp. Dir.	Back-ing	Total
Not Distracted	218,176 (22.4%)	11,224 (1.2%)	32,627 (3.3%)	183,360 (18.8%)	360,166 (36.9%)	132,211 (13.6%)	18,686 (1.9%)	18,407 (1.9%)	974,857 (100.0%)
Communication Device	1,184 (22.5%)	121 (2.3%)	86 (1.6%)	486 (9.2%)	2,856 (54.2%)	413 (7.8%)	108 (2.0%)	15 (0.3%)	5,269 (100.0%)
Hands-Free Device	88 (19.3%)	4 (0.9%)	13 (2.9%)	80 (17.5%)	198 (43.4%)	62 (13.6%)	9 (2.0%)	2 (0.4%)	456 (100.0%)
Hand-Held Device	308 (16.3%)	35 (1.9%)	64 (3.4%)	355 (18.8%)	808 (42.9%)	242 (12.8%)	44 (2.3%)	28 (1.5%)	1,884 (100.0%)
Electronic Device - other	898 (16.3%)	81 (1.5%)	65 (1.2%)	623 (11.3%)	3,275 (59.3%)	453 (8.2%)	99 (1.8%)	27 (0.5%)	5,521 (100.0%)
Passenger	704 (21.2%)	42 (1.3%)	65 (2.0%)	538 (16.2%)	1,623 (48.8%)	262 (7.9%)	41 (1.2%)	49 (1.5%)	3,324 (100.0%)
Other Activity Inside Vehicle	3,344 (19.2%)	307 (1.8%)	132 (0.8%)	1,191 (6.8%)	11,056 (63.3%)	952 (5.5%)	387 (2.2%)	91 (0.5%)	17,460 (100.0%)
Activity Outside Vehicle	2,313 (13.9%)	244 (1.5%)	391 (2.3%)	1,943 (11.7%)	8,627 (51.7%)	2,122 (12.7%)	355 (2.1%)	676 (4.1%)	16,671 (100.0%)
Total	227,015 (22.1%)	12,058 (1.2%)	33,443 (3.3%)	188,576 (18.4%)	388,609 (37.9%)	136,717 (13.3%)	19,729 (1.9%)	19,295 (1.9%)	1,025,442 (100.0%)

Note: Drivers coded "unknown" or "not entered" on driver distraction are excluded from Table 4 as are drivers in crash types coded "other," "unknown," or "not entered".

Table 4 also indicates that involvements in head-on and sideswipe/opposite direction crashes are slightly more common for distracted drivers than non-distracted drivers. About 1.2% of the crash involvements of non-distracted drivers were in head-on crashes, compared with 1.6% for all distracted drivers. The crash type was sideswipe/opposite direction for 1.9% of the non-distracted driver involvements and 2.1% for distracted drivers. While head-on and sideswipe/opposite direction crashes are much less common than rear-end crashes, they tend to be more severe than rear-end crashes (especially head-on crashes).

4.0 Temporal Factors

4.1 Month of Year

To facilitate the comparison of distracted and non-distracted drivers, the 1,025,732 non-distracted drivers in crashes in 2016-2018 were compared with the 52,518 drivers coded with any of the seven possible types of distraction to see if their crash involvements varied according to different factors. Table 5 shows the count and percentage of distracted and not-distracted drivers by month for 2016-2018. The 2016 data year is shown separately from 2017-2018 because the patterns in 2016 reflect the increased use of the distraction codes by police officers, whereas the 2017-2018 data reflect the patterns of distraction. In general, the number of non-distracted drivers peaks in the later months

(October through December), whereas distracted drivers are in crashes most often in the warmer months (May through October).

Table 5. Drivers in Crashes by Driver Distraction and Crash Month, 2016-2018

Month	2016				2017-2018			
	Not Distracted		Distracted		Not Distracted		Distracted	
January	1,283	0.6%	81	0.6%	72,449	9.0%	2,535	6.4%
February	2,314	1.0%	116	0.9%	58,719	7.3%	2,708	6.9%
March	2,855	1.3%	167	1.3%	62,182	7.7%	3,110	7.9%
April	7,653	3.5%	583	4.5%	55,433	6.9%	3,040	7.7%
May	14,042	6.3%	1,006	7.7%	65,256	8.1%	3,702	9.4%
June	16,000	7.2%	1,192	9.2%	65,608	8.2%	3,812	9.6%
July	17,277	7.8%	1,286	9.9%	59,232	7.4%	3,659	9.3%
August	20,133	9.1%	1,447	11.1%	60,860	7.6%	3,724	9.4%
September	30,553	13.8%	1,897	14.6%	62,982	7.8%	3,520	8.9%
October	33,547	15.2%	1,920	14.8%	79,268	9.9%	3,711	9.4%
November	34,768	15.7%	1,735	13.4%	79,650	9.9%	3,099	7.8%
December	40,789	18.4%	1,557	12.0%	82,879	10.3%	2,911	7.4%

4.2 Day of Week

Table 6 shows the breakdown of day of the week for crash-involved distracted and non-distracted drivers. There were no notable differences.

Table 6. Drivers in Crashes by Driver Distraction and Day of Week, 2016-2018

	Not Distracted		Distracted	
Day	Count	Percent	Count	Percent
Sunday	90,041	8.8%	5,030	9.6%
Monday	153,089	14.9%	7,854	15.0%
Tuesday	160,424	15.6%	8,085	15.4%
Wednesday	162,386	15.8%	8,233	15.7%
Thursday	165,033	16.1%	7,960	15.2%
Friday	176,851	17.2%	9,088	17.3%
Saturday	117,908	11.5%	6,268	11.9%
Total	1,025,732	100.0%	52,518	100.0%

4.3 Time of Day

Figure 1 plots the percentage of crash involvements according to the hour of the day for distracted and non-distracted drivers in 2016-2018. The two groups had generally similar crash involvement patterns across the hours of the day. Distracted-driver involvements were slightly more likely to occur during the evening rush and slightly less likely to occur during the morning rush.
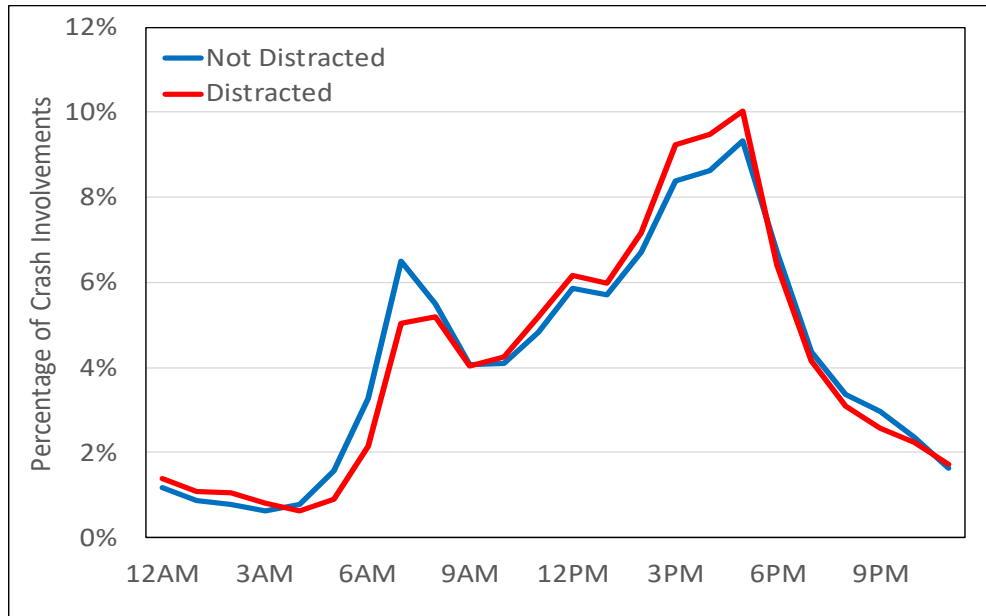
Figure 1 – Distracted and Non-Distracted Drivers in Crashes by Time of Day

5.0 External/Environmental Conditions

5.1 Light Conditions

Table 7 compares the two groups of drivers according to light condition at the time of the crash. A total of 74.8% of the distracted drivers were involved in crashes in daylight, compared with 69.0% of the non-distracted drivers. In contrast, 13.6% of the non-distracted drivers were involved in crashes during dark, unlighted conditions, compared with 8.9% of the distracted drivers. The data do not allow us to determine why the two distributions differ. It may be that drivers are less likely to engage in distracting activities during more challenging driving conditions such as darkness. Alternatively, a much greater share of crashes in dark, unlighted conditions are single-vehicle crashes, so distracted driving may be less likely to be reported for these crashes.

Table 7. Drivers in Crashes by Driver Distraction and Light Condition, 2016-2018

Light Condition	Not Distracted		Distracted	
	Count	Percent	Count	Percent
Daylight	707,967	69.0%	39,281	74.8%
Dawn	35,852	3.5%	1,240	2.4%
Dusk	26,656	2.6%	1,295	2.5%
Dark Lighted	113,727	11.1%	5,898	11.2%
Dark Unlighted	139,632	13.6%	4,662	8.9%
Other/Unknown	1,898	0.2%	142	0.3%
Total	1,025,732	100.0%	52,518	100.0%

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5.2 Weather Conditions

In a similar vein, Table 8 suggests that drivers are self-regulating to avoid distractions when the weather is worse. Compared with non-distracted drivers, distracted drivers were more likely to be involved in crashes in clear or cloudy weather and less likely to be involved in crashes when it was raining or snowing.

Table 8. Drivers in Crashes by Driver Distraction and Weather Condition, 2016-2018

Weather Condition	Not Distracted		Distracted	
	Count	Percent	Count	Percent
Clear	595,725	58.1%	33,496	63.8%
Cloudy	229,006	22.3%	12,662	24.1%
Rain	98,617	9.6%	3,975	7.6%
Snow	79,370	7.7%	1,576	3.0%
Other/unknown	23,014	2.2%	809	1.5%
Total	1,025,732	100.0%	52,518	100.0%

5.3 Speed Limit

Figure 2 shows the distributions of crash involvements for distracted and non-distracted drivers according to the speed limit at the crash site. The two distributions are similar, but the distribution for distracted drivers skews slightly towards lower speed limits. For example, while 15.8% of distracted driver crash involvements occurred in speed limit areas of 25 mph, this was the case for only 11.3% of non-distracted driver crash involvements. The non-distracted drivers had slightly higher percentages of crash involvements in 45 and 55 mph areas compared with the distracted drivers. Interestingly, crash involvements in 70 mph zones made up 11-12% of the crash involvements of both groups of drivers.
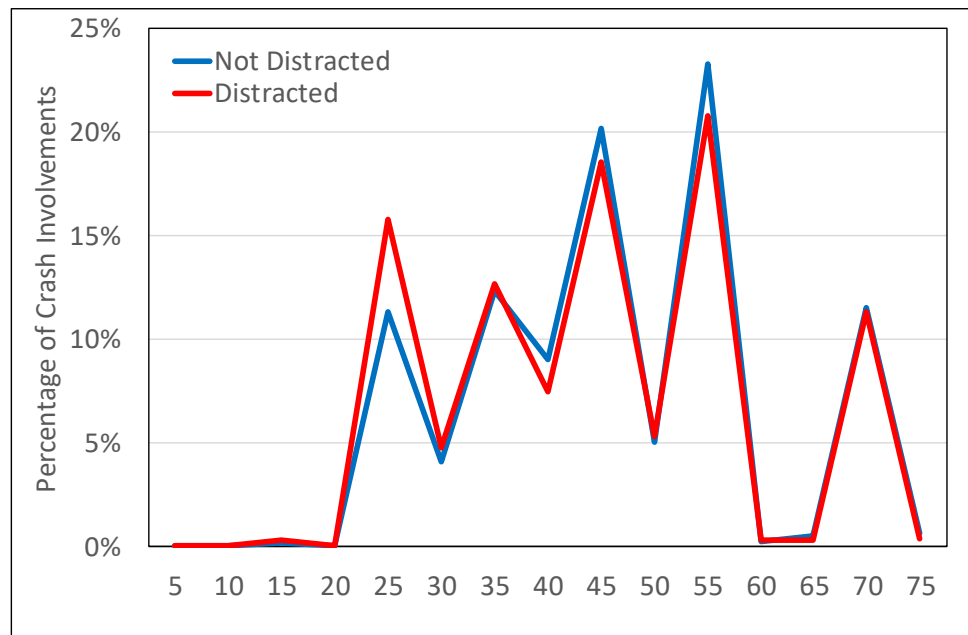

Figure 2 – Crash Involvements by Posted Speed Limit

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6.0 Driver Factors

6.1 Driver Age

Table 9 categorizes drivers of known age in terms of whether or not the drivers were reported to have been distracted. The distracted group of drivers has a younger age distribution than the non-distracted drivers. A total of 15.0% of the distracted drivers were in the 16-19 age group compared with 8.5% of the non-distracted drivers. Similarly, drivers 20-24 comprised 18.2% of the distracted group but just 12.6% of the non-distracted group. In contrast, drivers 65 and older accounted for 11.4% of non-distracted drivers and just 7.6% of distracted drivers.

Table 9. Crash Involvements by Driver Age and Distraction, 2016-2018

Driver Age	Not Distracted		Distracted	
	Count	Percent	Count	Percent
<16	1,529	0.1%	94	0.2%
16-19	87,056	8.5%	7,657	15.0%
20-24	128,496	12.6%	9,330	18.2%
25-34	208,821	20.5%	12,205	23.9%
35-44	164,787	16.2%	7,109	13.9%
45-64	312,624	30.7%	10,869	21.2%
65+	116,414	11.4%	3,888	7.6%
Total	1,019,727	100.0%	51,152	100.0%

Note: Drivers of unknown age are excluded from Table 9.

Figure 3 shows the percentage of crash-involved drivers in each age group who were reported to be distracted. Drivers 16-19 had the highest percent of distracted drivers at 8.1%. Next were drivers age 20-24 (6.8%), followed by drivers under age 16 (5.8%). The lowest percentages of distracted drivers were found among drivers 65 and older (3.2%) and drivers 45-64 (3.4%).
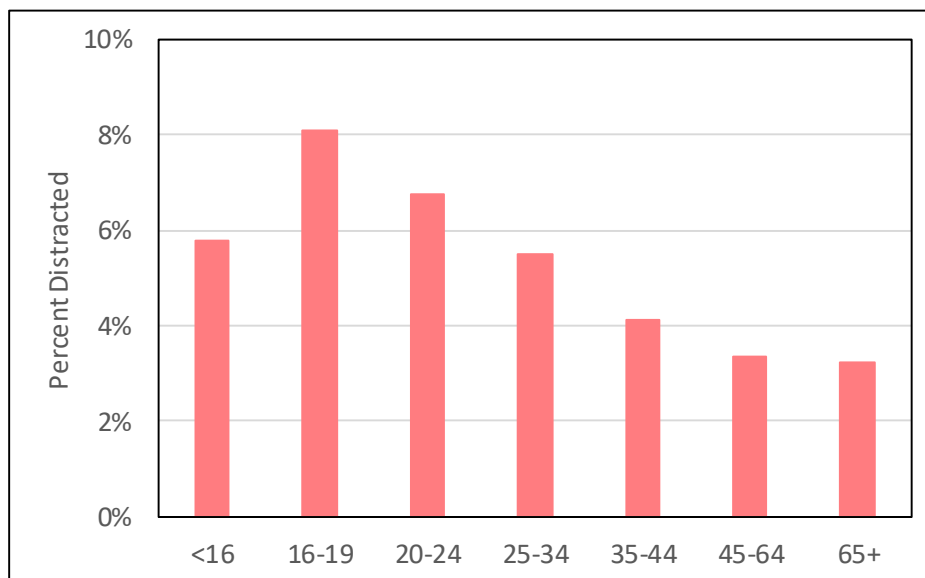

Figure 3 – Percentage of Drivers in Each Age Group Who Were Distracted
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6.2 Driver Drinking

Relatively more distracted drivers were reported to have been drinking at the time of the crash compared with non-distracted drivers (Table 10). While 3.9% of distracted drivers were reported to have been drinking, this was true of only 1.2% of non-distracted drivers. Looked at a different way, if we take all the drivers where distraction status was coded, 4.9% of the drivers were coded as distracted but 14.7% of the drinking drivers were coded as distracted. Previous research has suggested that drivers under the influence of alcohol are less able to manage divided attention compared with their sober counterparts[1].

Table 10. Crash Involvements by Driver Drinking and Distraction, 2016-2018

Driver	Not Distracted		Distracted	
Alcohol Use	Count	Percent	Count	Percent
Driver Not Drinking	1,013,649	98.8%	50,463	96.1%
Driver Drinking	11,858	1.2%	2,045	3.9%
Total	1,025,507	100.0%	52,508	100.0%

7.0 Summary

Because of coding changes in Michigan crash reports, this report examined distracted-driving crashes for only three data years, 2016, 2017, and 2018. The percentage of all police-reported crashes involving at least one driver who was considered to be distracted rose from 4% in 2016 to over 6% in 2017 and 2018, although the 2016 numbers were influenced by changes in how police used the new variable. Crashes involving distracted drivers were found to be more severe than those without distracted drivers. Distracted drivers were more likely to be in rear-end collisions (overwhelmingly as the striking vehicle) compared with non-distracted drivers, and they were slightly more likely to be involved in head-on and sideswipe/opposite direction crashes.

Compared with non-distracted drivers, distracted drivers were more likely to be involved in crashes during daylight, in favorable weather conditions, on lower speed roads, and during the months of April through September. This suggests that drivers are less prone to distractions when the driving task is more demanding. Younger drivers and drunk drivers were more likely to be distracted than older drivers and non-drinking drivers. Increased awareness, driver education (particularly among young drivers), and strict enforcement of cell phone laws may help in addressing distracted-driving crashes[1].

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[1] Emily L. R. Harrison and Mark T. Fillmore. "Alcohol and Distraction Interact to Impair Driving Performance," *Drug and Alcohol Dependence* 117(1):31-37, (August 2011).