REPORT OF THE

Navajo Epidemiology Center

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A Description of Fatal Car Crashes Occurring Within or Near the Navajo Nation

2010 - 2019

The purpose of this Report is to characterize fatal car crashes occurring within the Navajo Nation and its border towns, identify possible clusters of fatal car crashes, and identify key risk factors that may lead to fatalities in these severe crashes. Ideally this information would then be used to implement countermeasures to decrease the most serious car crash injuries. Crashes were included from border areas if it occurred (based on GPS coordinates) within 2 miles of the Navajo Nation legal jurisdiction boundaries. This report is limited because data for all types of car crashes were not available. There may be clusters of crashes that impact health and quality of life, although not fatal, that will not be identified in this report. It is also impossible to compare factors associated in fatal car crashes to other types of injury and non-injury crashes. Consequently, some important crash risk factors might not be identified.

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Introduction

Car crashes are a significant public health problem throughout the United States and within the Navajo Nation. According to the *Navajo Nation Mortality Report, 2006-2009* motor vehicle injuries and pedestrian injuries account for 10.6% of all Navajo deaths. The age adjusted death rate for motor vehicle injuries and pedestrian injuries were 44.80/100,000 and 18.61/100,000 respectively. The age adjusted death rate for all transport accidents in the U.S. in 2017 was 12.0/100,000, and the rate for all American Indian or Alaska Natives was 29.9.[1] The IHS report *Regional Differences in Indian Health 2002-2003 (accessed 11/16/16)* indicates that the leading cause of death among the Navajo Nation was unintentional injury (10.9% of all deaths) between 1999-2001. The Navajo Nation had the second highest motor vehicle crash death rate among the 12 IHS regions (Table 1). Approximately 1 in 7 (14.5%) of these motor vehicle deaths were pedestrian injuries. From 2015-2017 motor vehicle-related crashes were two times higher among American Indians than other residents of New Mexico .[2]

The purpose of this report is to characterize fatal car crashes occurring within the Navajo Nation and its border towns, identify possible clusters of fatal car crashes, and identify key risk factors that may lead to fatalities in these severe crashes. Ideally this information would then be used to implement countermeasures to decrease the most serious car crash injuries. Crashes were included from border areas if it occurred (based on GPS coordinates) within 2 miles of the Navajo Nation legal jurisdiction boundaries. This report is limited because data for all types of car crashes were not available. There may be clusters of crashes that impact health and quality of life, although not fatal, that will not be identified in this report. It is also impossible to compare factors associated in fatal car crashes to other types of injury and non-injury crashes. Consequently, some important crash risk factors might not be identified.

All data were taken from the Fatality Analysis Report System (FARS) managed by the National Highway Traffic Safety Administration (NHTSA). FARS is a census of fatal crash data for the U.S. collected from Police Accident Reports. NHTSA produces reports at the State level and county level but not on the tribal level. Data from car crashes occurring within and near the boundaries of the Navajo Nation were compiled by the author. Crashes included in this report came from the years 2008 through 2017 (2017 is the most recent year data were available at the time this report was completed). Within FARS there are 3 report levels: Crash, Vehicle, and Person. This report presents the results according to those 3 levels. Another limitation of this report is that many data fields are left empty by reporting agencies, which could lead to identifying false risk factors, missing true risk factors, and missing fatal crash clusters.

[1] Kochanek KD, Murphy SL, Xu JQ, Arias E. Deaths: Final data for 2017. National vital statistics reports; vol68 no 9. Hyattsville MD: National Center for Health Statistics 2019.

[2] Kunkel KM. Health Equity in New Mexico, 13th Edition. New Mexico Department of Health January 2019. Accessed September 25, 2019.

Table 1 Motor Vehicle Crashes by IHS Service Areas (1999-2001)

IHS Service Area	Age Adjusted Motor Vehicle Injury Death Rate per 100,000	Percent of Motor Vehicle Crash Deaths Pedestrian Related
Aberdeen	**69.1**	**11.6%**
Alaska	**32.2**	**7.8%**
Albuquerque	**45.5**	**23.4%**
Bemidji	**60.0**	**10.8%**
Billings	**81.2**	**4.3%**
California	**25.1**	**4.8%**
Nashville	**23.8**	**10.1%**
Navajo	**80.4**	**14.5%**
Oklahoma	**38.1**	**5.4%**
Phoenix	**60.3**	**5.1%**
Portland	**33.9**	**13.3%**
Tucson	**49.8**	**2.1%**

Table 2 Motor Vehicle Death Rates in New Mexico, 2015-2017 (NM IBIS, accessed September 25, 2019)

Race/Ethnicity	2015-2017 Rate (per 100,000)
American Indian	45.6
Hispanic	16.4
White	13.7
African American	22.4
Asian/Pacific Islanders	6.1*

*Based on fewer than 20 cases and may fluctuate from year to year.

Crash Level

There were 890 fatal crashes within the boundaries of or in the border towns of the Navajo Nation from 2010 through 2019 (Table 3). This is a 1.4% decrease from the previous report period (2008-2017). Crashes were selected based on State of crash occurrence and then by GPS coordinates. State of crash occurrence can be found in Table 4. If GPS coordinates were not available crashes were included if the crash was identified as occurring on a street or highway exclusively found within the Navajo Nation. Any crashes with GPS coordinates within 2 miles of the Navajo Nation were included and are considered "Border" crashes. Crashes occurring on Hopi lands were included if they occurred on State Highway 264 since this is a principal highway connecting the Western Agency and Ft. Defiance Agency of the Navajo Nation. A crash was "likely" within the Navajo Nation if GPS coordinates were unavailable and the road on which the crash occurred is primarily found within the Navajo Nation. A crash was a "possible" Navajo crash if GPS coordinates and road were unknown but the crash occurred on tribal lands and within a county found within the Navajo Nation boundaries (Apache, Coconino, & Navajo counties in Arizona; Bernalillo, Cibola, McKinley, Rio Arriba, Sandoval, San Juan & Socorro counties in New Mexico; San Juan County in Utah). These 890 crashes were stratified into the likelihood that the crash occurred within the Navajo Nation (Table 5). Among the crashes included in this report approximately 70% were reported to be on tribal lands. However, in some crash reports a crash is identified as occurring on non-tribal lands even though the GPS coordinates provided pinpoint the crash on tribal lands.

Three States contain a portion of Navajo Nation lands: Arizona, New Mexico and Utah. State of crash occurrence can be found in Table 4. Based on land mass there are more crashes in New Mexico than expected and fewer crashes in Utah than expected. Much of the Utah portion of the Navajo Nation is uninhabited and no Interstate highways are found in that portion of the State. The presence of Interstate 40 in the southern part of the New Mexico portion likely explains the high number of crashes in New Mexico. The Navajo Nation is organized into 5 geo-political areas (similar to counties). Crashes occurring within these Agencies can be found in Table 6, which includes the border areas, and Table 6a which condenses the border areas into the Agency they are nearest.

The roads with the highest number of crashes per mile of road are found in Table 7. While Interstate 40 is still the road with the highest number of crashes, crashes per mile have decreased by 4.3% since the previous report. Crashes have increased on US 550 and on NM State Route 118, both of which are on the edge of the Navajo Nation. One of the purposes of this report was to identify potential geographic crash clusters. An image of crash occurrence can be found in Map 1. Eighty-two percent of crashes had GPS coordinates recorded. Table 8 identifies the top crash

clusters that warrant additional investigation for prevention measures. Crashes were organized and mapped based on the 110 Navajo Nation Chapter boundaries (Maps 2-4). These maps include crashes per Chapter, crashes per Chapter population, and by Chapter residency of drivers. Chapter by residency of drivers (Map 4) is color coded by Navajo Council District boundaries. This was done because many people in more outlying, rural areas have a ZIP code in the largest community near them. This method allows the data to be smoothed so Chapters with small populations aren't overly influential in the analysis. Chinle had a high number of crashes occurring within its Chapter boundaries and a high number of drivers with a Chinle ZIP code involved. Of the 29 Chinle crashes 7 involved pedestrians, and 2 additional involved a person falling from the vehicle. Additionally, Table 9 displays the most common communities of residence for non-Navajo Nation drivers

The vast majority of these crashes occurred away from intersections and interchanges (Table 10) and where the roadway was straight (Table 11).

Crashes were categorized as occurring in 6 distinct time periods. Crashes were more likely to have occurred between 4:00 p.m. and midnight than any other time period. This is likely a time period of peak travel, but since miles driven per time period are not available further analysis in this regard is not possible currently. Results can be seen in Table 12.

Adverse road and weather conditions may contribute to the occurrence and frequency of car crashes. Among crashes with data recorded, 92.0% (n=513) occurred on blacktop, and 7.0% occurred on dirt or gravel (Table 13). Atmospheric conditions at the time of the crashes can be found in Table 14. The majority of crashes occurred with no adverse weather conditions. Among crashes with data recorded 89.3% (n=513) occurred on dry roads, only about 1 in 27 (3.7%) occurred with snow/slush, ice/frost on the road, and an additional 1 in 18 occurred on wet roads. Nearly half (44.7%, n = 788) of crashes occurred during daylight, and another 4.9% occurred at dawn or dusk. Among the 397 crashes that occurred in the dark, 9.3% were in lighted areas and 23.7% had unknown lighting conditions.

A crash could have up to 5 adverse conditions (Roadway Alignment, Roadway Surface Type, Roadway Surface Conditions, Light Conditions, and Atmospheric Conditions). There were 620 (70%) that had information recorded for adverse conditions. Among those with information recorded approximately 5 of 8 crashes had information for at least one of these adverse conditions. Table 15 displays the frequency of adverse events.

It is rare that crash time, EMS call time, and EMS arrival time were all recorded. EMS response time could be established for 351 crashes (39.4%). For these crashes the average EMS response time was 13 minutes, and average total response time was 27.6 minutes. EMS response time is the time it took for EMS to arrive at the scene after being notified of the crash. Total response time was the time it took for EMS to arrive from the time of the crash occurrence.

Only a handful of factors related to road conditions were recorded as contributing to the crash. These can be seen in Table 16. Table 17 displays the unique crash identifiers where road conditions were a factor. This information can be used to further investigate the physical location of the crash and if construction or engineering measures can improve road safety.

Crashes occurred throughout the year. There wasn't a significant difference in the number of crashes by month, (Table 18).

Table 3 Crashes by Year

Year	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2010	82	9.2	82	9.2
2011	100	11.2	182	20.5
2012	85	9.6	267	30.0
2013	86	9.7	353	39.7
2014	83	9.3	436	49.0
2015	98	11.0	534	60.0
2016	98	11.0	632	71.0
2017	91	10.2	723	81.2
2018	90	10.1	813	91.4
2019	77	8.7	890	100
Total	890			

Table 4a State of Crash Occurrence

State	Frequency	Percent	Cumulative Frequency	Cumulative Percent
AZ	475	53.4	475	53.4
NM	385	43.3	860	96.7
UT	30	3.4	890	100.00

Table 4b State of Crash Occurrence if crash is within the Navajo Nation

State	Frequency	Percent	Cumulative Frequency	Cumulative Percent
AZ	346	52.6%	346	52.6%
NM	282	42.9%	628	95.5%
UT	30	4.6%	658	100%

Table 5 Designation of Crashes Within the Navajo Nation

Within	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Yes	658	73.9	658	73.9
Likely	60	6.7	718	80.7
Probable	21	2.4	739	83.0
Border	90	10.1	829	93.2
Hopi	40	4.5	869	97.4
Possible	21	2.4	890	100.00

Table 6 Crashes by Agency

Agency	Count	Percent	Cumulative Percent
Northern	161	21.6	21.6
Eastern	149	20.0	41.6
Western	139	18.7	60.3
Ft. Defiance	102	13.7	74.0
Chinle	72	9.7	83.6
Border Eastern	64	8.6	92.2
Border Northern	18	2.4	94.6
Hopi	15	2.0	96.6
Border Western	13	1.7	98.4
Border Ft. Defiance	12	1.6	100

Table 6a Crashes by Agency with Border Areas Condensed (removed Hopi)

Agency	Frequency	Percent of Crashes	Percent of Population
Chinle	72	9.9	16.2
Eastern	213	29.2	19.4
Ft. Defiance	114	15.6	25.0
Northern	179	24.5	16.7
Western	152	20.8	22.7

Table 7 Most Common Roads of Fatal Crash Occurrence: minimum 1 crash per year

Road	Crashes	Percent	Approximate Miles of Road Within or Bordering Navajo Nation	Crashes per 100 road miles per year	Trend
Interstate 40	94	10.6%	83.6	11.244	↔
US 160	65	7.3%	160.2	4.057	↔
US 191	63	7.1%	179.1	3.518	↔
State Route 264	60	6.8%	90.1	6.659	↓
SR/US 491	59	6.6%	103.1	5.723	↔
BIA/US 64	40	4.5%	51.5	7.767	↔
BIA/IR/NR 12	29	3.3%	96.7	2.999	↔
US 89	24	2.7%	86.0	2.791	↔
US 550	23	2.6%	23.6	9.746	↑
BIA/IR/NR 36	21	2.4%	28.8	7.292	↔
SR 118	20	2.3%	24.1	8.299	↑
SR/US 98	19	2.1%	63.3	3.002	↔
SR 371	18	2.0%	97.9	1.839	↔
SR/US 163	17	1.9%	44.2	3.846	↔
BIA/NR 15	16	1.8%	103.1	1.552	↓
BIA/IR/NR 13	13	1.5%	44.6	2.915	↔
NR 59	11	1.2%	44.1	2.494	NA
NR 9	11	1.2%	58.9	1.868	NA

Table 8 Crash locations to investigate further

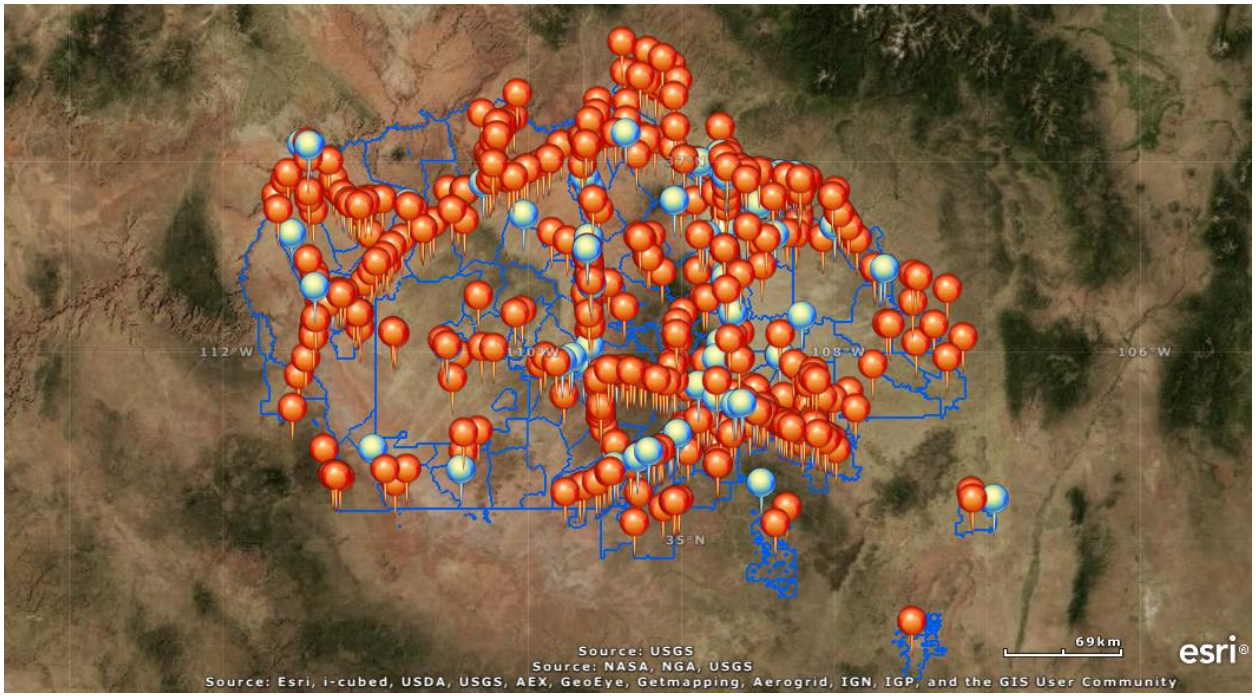
To be included there had to be at least 3 crashes with at least half of the crashes occurring since January 1, 2015 (within the previous 5 years)
The average distance between crashes needed to be less than half a mile apart
Does not include any of the crashes occurring on Interstate 40 as the Navajo Nation will likely have less influence in making engineering or enforcement changes

State	Road	Number of Crashes	Average distance between crashes	Chapter	Notes
AZ	US-191	8	0.17 Miles	Chinle	75% of these crashes were in the previous 5 Years; 1 Pedestrian crash included
AZ	US-160	5	0.15 Miles	Kayenta	100% were in the previous 5 years; 1 Pedestrian crash
UT	US-163/Monument Valley Clinic Rd.	7	0.31 Miles	Oljato	71% were in the previous 5 years; 1 Pedestrian crash
AZ	US-89	3	0.07 Miles	Coalmine Mesa	100% were in the previous 5 years
NM	US-64	13	0.37 Miles	Hogback	54% were in the previous 5 years; 4 Pedestrian crashes
NM	US-491/US-64	7	0.42 Miles	Gadiiahi/Shiprock	86% were in the previous 5 years; 4 Pedestrian crashes
NM	US-491	5	0.21 Miles	Rock Springs/Twin Lakes	60% were in the previous 5 years; 1 Pedestrian crash
NM	US-491	5	0.21 Miles	Sheepsprings	60% were in the previous 5 years; 3 Pedestrian crashes
AZ	US-160	3	0.008 Miles	Shonto	67% were in the previous 5 years
NM	US-491	3	0.37 Miles	Sanostee	100% were in the previous 5 years; 1 Pedestrian crash

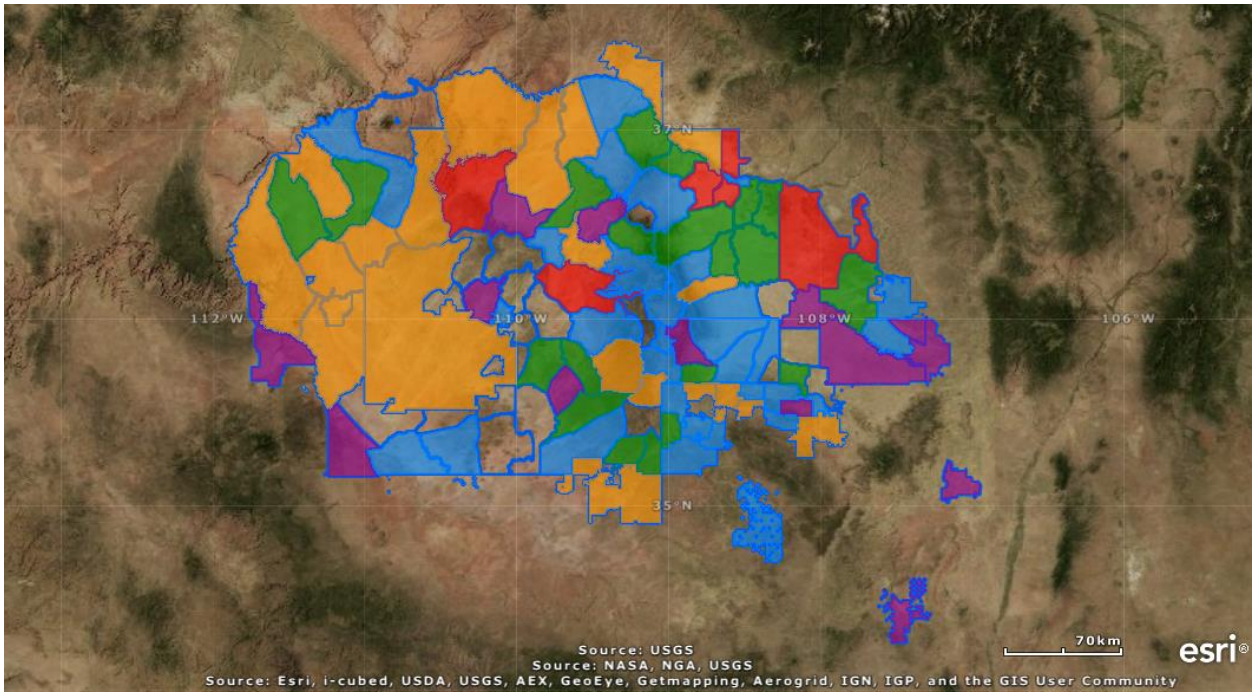
Map 1: Fatal Crashes 2010-2019

735 of 853 (86.2%) had GPS coordinates recorded

Red dots are strictly motor vehicle crashes, and blue dots indicate that pedestrians or bicyclists were involved.

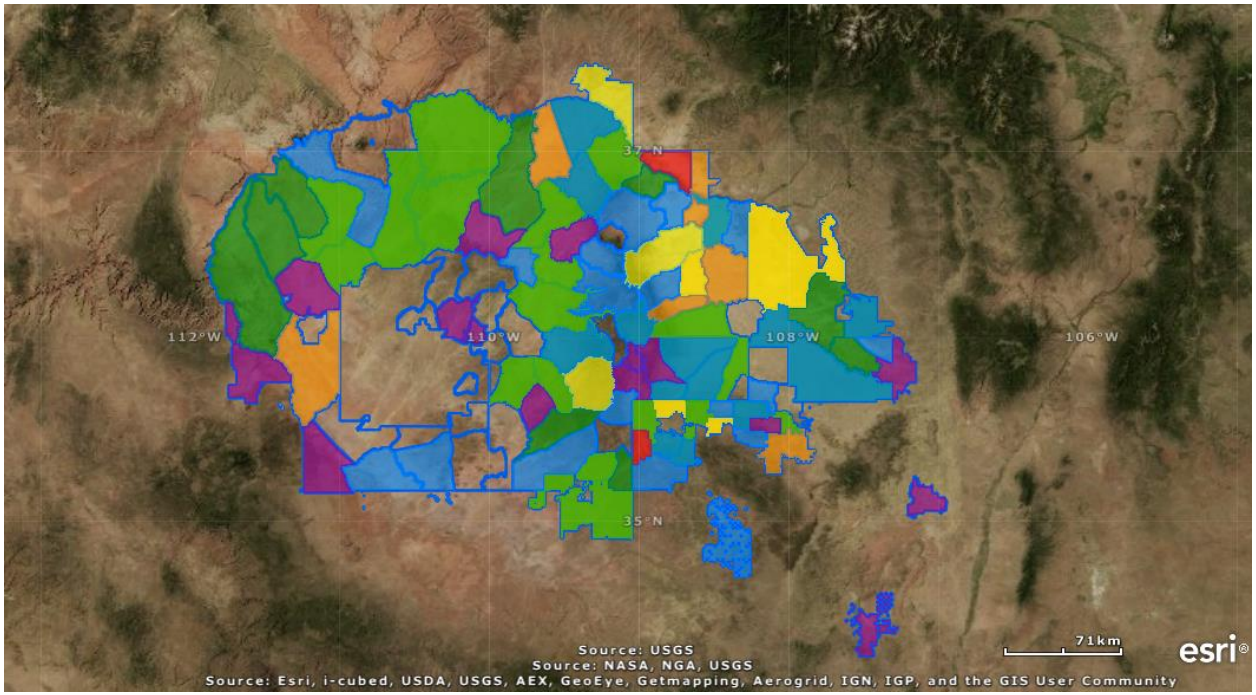


Map 2: Fatal Crash Counts by Chapter of Crash Occurrence



Violet = 1 Crash, Blue = 2-4 Crashes, Green = 5-9 Crashes, Orange = 10-16 Crashes, Red = 17 or more crashes

Map 3: Crashes per Chapter Population

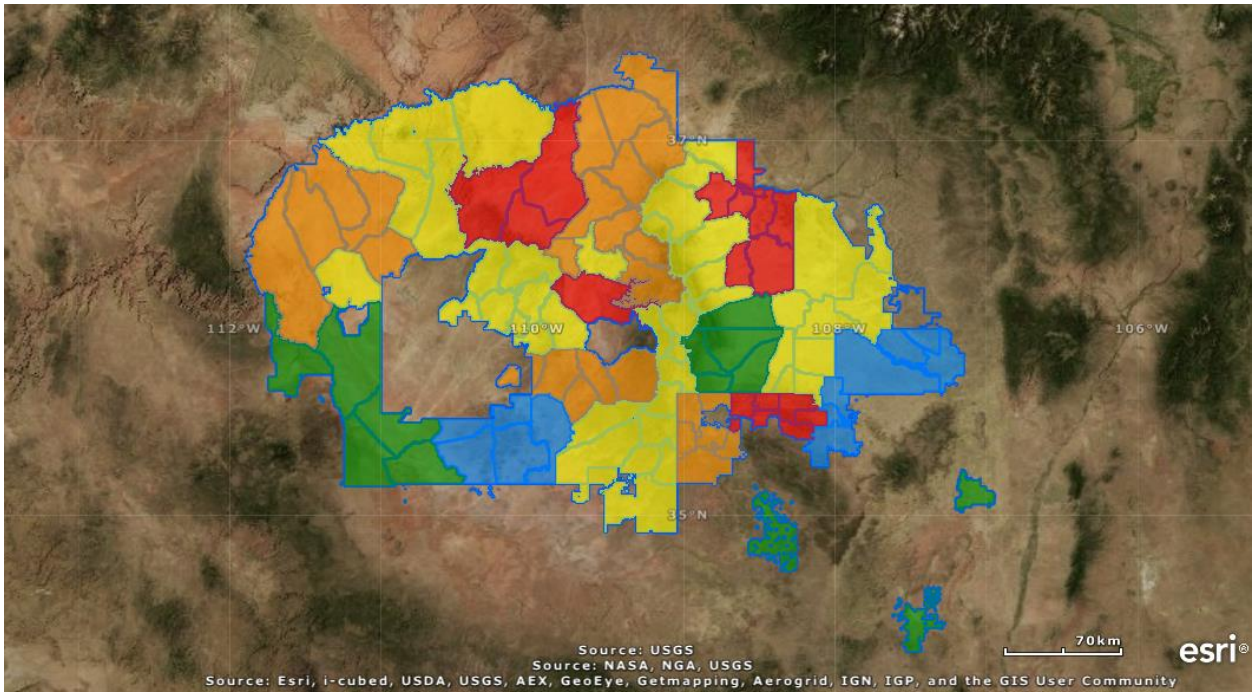


Violet = 15 crashes per 100,000 people, Blue = 15-29.9, Seafoam = 30-39.9

Lime Green = 40-59.9, Forest Green = 60-79.9, Yellow = 80-99.9, Peach = 100-149.9

Orange = 150-299.9, Red = 300+

Map 4: Driver (Ages 15+) ZIP, organized by Navajo Council Delegate District



Blue = <10 crashes per 100,000 per driver age, Green = 10-19.9 crashes per driver, Yellow = 20-39.9 crashes per driver, Orange = 40-59.9 crashes per driver, Red = 60+ crashes per driver

Table 9 Additional Driver License Communities

Community	Count	Percent of All Licensed Drivers	Percent of non-Navajo Nation Drivers
Other Arizona	62	6.5%	13.7%
Farmington, NM	42	4.4%	9.3%
Other New Mexico	33	3.5%	7.3%
Gallup, NM	31	3.3%	6.8%
California	28	3.0%	6.2%
Phoenix, AZ	24	2.5%	5.3%
Albuquerque, NM	21	2.2%	4.6%
Page, AZ	19	2.0%	4.2%
Flagstaff, AZ	16	1.7%	3.5%
Kirtland, NM	16	1.7%	3.5%
Other Colorado	16	1.7%	3.5%
Texas	15	1.6%	3.3%
Other Utah	12	1.3%	2.5%
Cuba, NM	11	1.2%	2.4%
Winslow, AZ	10	1.1%	2.2%
Aztec, NM	10	1.1%	2.2%
Cortez, CO	6	0.6%	1.3%
Bloomfield, NM	6	0.6%	1.3%
Waterflow, NM	4	0.4%	0.9%
Continental Divide, NM	3	0.3%	0.7%
Gamerco, NM	3	0.3%	0.7%
Milan, NM	2	0.2%	0.4%
Towaoc, CO	1	0.1%	0.2%
Blanding, UT	1	0.1%	0.2%
Bluff, UT	1	0.1%	0.2%
Monticello, UT	1	0.1%	0.2%
Holbrook, AZ	1	0.1%	0.2%
Bluewater, NM	1	0.1%	0.2%
Grants, NM	1	0.1%	0.2%
Jamestown, NM	1	0.1%	0.2%
Flora Vista, NM	1	0.1%	0.2%
Socorro, NM	1	0.1%	0.2%
All Other	53	5.6%	11.7%
Total (Among Known)	453	47.8%	

Total known 948

Table 10 Relation to Intersection

Location	Frequency	Percent	Percent Among Known
Crossover Related	1	0.1	0.1
Driveway Access Related	12	1.3	1.6
Entrance/Exit Ramp Related	4	0.4	0.5
Intersection Related	58	6.5	8.0
Non-Junction	645	72.6	88.5
Not Reported	5	0.6	NA
Other Location within Junction	4	0.4	0.5
Through Roadway	5	0.6	0.7
Unknown	155	17.4	NA

Table 11 Roadway Alignment

Roadway Alignment	Frequency	Percent	Percent Among Known Alignment
Curve	123	13.8	23.5
Non-Traffic	2	0.2	NA
Not reported	26	2.9	NA
Straight	400	44.9	76.5
Unknown	339	38.1	NA

Table 12 Time of Crash

Time Category, Military Time	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0:00-3:59	102	12.2	102	12.0
4:00-7:59	109	13.1	211	25.3
8:00-11:59	85	10.2	296	35.5
12:00-15:59	153	18.4	449	53.8
16:00-19:59	191	22.9	640	76.7
20:00-23:59	194	23.2	834	100.00

Table 13 Roadway Surface Type

Surface Type	Frequency	Percent	Percent Among Known
Blacktop	472	53.0	92.0%
Brick or Block	1	0.1	0.2
Concrete	1	0.1	0.2
Dirt	36	4.0	7.0
Non-Traffic	2	0.2	NA
Not reported	17	1.9	NA
Slag, Gravel, Stone	3	0.3	0.6
Unknown	358	40.2	NA

Table 14 Atmospheric Conditions

Atmospheric Conditions	Count	Percent	Percent Among Known
Blowing Sand, Soil, Dirt	2	0.2	0.3
Clear or No Adverse	581	65.3	87.8
Cloudy	26	2.9	3.9
Fog, Smog, Smoke	3	0.3	0.5
Not reported	89	10.0	NA
Other	6	0.7	0.9
Rain	27	3.0	4.1
Severe Crosswinds	2	0.2	0.3
Sleet or Hail	1	0.1	0.2
Snow	14	1.6	2.1
Unknown	139	15.6	NA

Table 15 Number of adverse conditions

Number of Adverse Conditions	Count	Percent	Cumulative Percent
0	231	37.3	37.3
1	281	45.4	82.7
2	85	13.7	96.5
3	16	2.6	99.0
4	5	0.8	99.8
5	1	0.2	100

Note: the average number of adverse conditions per crash was 0.85.

Table 16 Crash Related Factors (N=635)

Crash Related Factors	Count	Percent	Percent Among Known
None	755	84.8	96.7
Shoulder Design or Condition	1	0.1	0.1
Other Construction Created Condition	4	0.4	0.5
No or Obscured Pavement Marking	1	0.1	0.1
Surface Under Water	1	0.1	0.1
Inadequate Construction or Poor Design of Roadway, Bridge, Etc.	1	0.1	0.1
Surface Washed Out	1	0.1	0.1
Motor Vehicle Struck by Falling Cargo or Something that came loose or something that was set in motion by a vehicle	3	0.3	0.4
Date of accident and date of ems notification were not the same	2	0.2	0.3
Recent/Previous Accident Scene Nearby	3	0.3	0.4
Police Pursuit Involved	7	0.8	0.9
Indication of a stalled/disabled vehicle	3	0.3	0.4
Unstabilized Situation Began and All Harmful Events Occurred Off of the Roadway (	1	0.1	0.1

Table 17 Crash identifiers for crashes with Factors

Shoulder design or condition					
Year	**State**	**Case Number**	**Year**	**State**	**Case Number**
2013	NM	18			
Surface Under Water/Surface Washed Out					
Year	State	Case Number	Year	State	Case Number
2018	AZ	711			
Motor Vehicle Struck by Falling Cargo or Something that came loose or something that was set in motion by a vehicle					
Year	State	Case Number	Year	State	Case Number
2010	AZ	243	2013	NM	59
2013	NM	272			
Inadequate Construction or Poor Design of Roadway, Bridge, ETC					
Year	**State**	**Case Number**	**Year**	**State**	**Case Number**
2012	AZ	183			
Other Construction Created Condition					
Year	State	Case Number	Year	State	Case Number
2012	AZ	650	2013	AZ	431
2019	NM	77	2019	NM	186
No or Obscured Pavement Marking					
Year	State	Case Number			
2013	AZ	464			
Date of accident and date of EMS notification were not the same					
Year	State	Case Number	Year	State	Case Number
2016	AZ	729	2019	AZ	58
Recent/Previous Accident Scene Nearby					
Year	State	Case Number	Year	State	Case Number
2013	NM	241	2014	NM	227
2015	AZ	159			
Police Pursuit Involved					
Year	State	Case Number	Year	State	Case Number
2012	AZ	86	2012	AZ	587
2012	NM	335	2013	NM	48
2013	NM	139	2014	AZ	124
2016	NM	356			
Indication of a stalled/disabled vehicle					
Year	State	Case Number	Year	State	Case Number
2012	AZ	251	2012	AZ	751
2017	NM	228			
Unstabilized Situation Began and All Harmful Events Occurred Off of the Roadway					
Year	State	Case Number	Year	State	Case Number
2013	NM	18			

Table 18 Crashes by Month

Month	Count	Percent	Cumulative Frequency	Cumulative Percent
January	67	7.5	67	7.5
February	68	7.6	135	15.2
March	74	8.3	209	23.5
April	63	7.1	272	30.6
May	77	8.7	349	39.2
June	80	9.0	429	48.2
July	77	8.7	506	56.9
August	77	8.7	583	65.5
September	88	9.9	671	75.4
October	78	8.8	749	84.2
November	68	7.6	817	91.8
December	73	8.2	890	100.00

Table 19 Crashes by Quarter

Quarter	Count	Percent	Cumulative Frequency	Cumulative Percent
January through March	209	23.5	209	23.5
April through June	220	24.7	429	48.2
July through September	242	27.2	671	75.4
October through December	219	24.6	890	100.00

Vehicle Level

There were 1,182 vehicles involved in these 890 crashes. The average number of vehicles in each crash was 1.30. Almost three out of four crashes (74.7%) involved only one car, 22.0% involved 2 cars, and 3.3% involved 3 or more cars. The driver license state was recorded for 966 of these vehicles. Table 20 lists the driver license state if there were 10 or more drivers from the same State. Table 19a indicates if the driver was from the Navajo Nation or the surrounding area (i.e. border towns). Approximately half (49.6%) of drivers had a ZIP code found on the Navajo Nation. Almost 3 of 4 (72.6%) drivers involved in these fatal crashes have a ZIP code on the Navajo Nation, on Hopi, or in one of the border towns. Not all drivers were fully licensed, and some had legal actions against their license (Tables 21 & 22). Previous accidents, legal actions, and other harmful events were recorded for some drivers. Results can be found for each previous event individually in Tables 23-28, and whether or not there was at least one in Table 29.

Speed is cited as a contributing factor in about 1 in 3 crashes (30.9%, n = 879 drivers). Whether or not a violation was charged was only recorded for 691 (58.5%) drivers. At least one violation was given to 10.4% of drivers. The types of violations charged can be found in Table 30. Among the 72 drivers who had a violation recorded, there were 121 total violations. This is why the sum of the percent of violations can exceed 100%. Whether or not there was a driver related factor was recorded for 828 (70.1%) drivers, with about 41.8% of the drivers having one factor affecting them. The most commonly recorded driver factors (top 20) can be found in Table 31. Table 32 displays the most commonly recorded driver distractions. Cell phones are mentioned as a distraction for only 7 drivers. Whether a driver was distracted was recorded for only 50% of drivers. Among those drivers about 1 in 3 (29%) were in fact distracted.

The body type of vehicles involved were known for 925 (78.3%) of the 1,182 vehicles. The 43 unique body type codes were organized into 9 categories. Sedans and pickup trucks accounted for 60% of all vehicle types. Results for vehicle body type can be seen in Table 33. Travel speed was known for only 201 (17.0%) of the vehicles involved in these crashes. The average travel speed of these vehicles was 55.2 miles per hour. A histogram of travel speed can be found in Chart 1. A vehicle was recorded as speeding if the reported travel speed exceeded the recorded speed limit. Only 180 vehicles had both variables reported. Fewer than one in 4 (22.8%) vehicles were reported to be speeding. The maneuver of the vehicles at the time of the crash was recorded for 895 (75.7%) vehicles. The majority (68.2%) were simply going straight. Full results for vehicle maneuver can be seen in Table 34. Rollover was recorded for 1,182 of the vehicles, which occurred for 34.8% of vehicles. A crash occurring on a curve was 1.80 (95% CI: 1.50, 2.17 Z = 6.30, <p = 0.000) times more likely to involve a rollover than a crash on a straight section of road. Impact point is recorded for collisions using a traditional clock face as a reference. A crash with impacted point recorded as “12” indicated the first impact point was directly to the front of the vehicle, a “3” is a hit to the right side, a “6” is a rear end collision, and a “9” is a hit to the left side. An impact point of “14” indicates the undercarriage of the vehicle was the primary impact point. The first impact point for 693 vehicles

involved in collisions can be seen in Table 35. Car crashes frequently involve a number of events before and after the most harmful part of the collision or rollover. For the crashes included in this report up to 7 events were recorded. Sequence of events were recorded for 907 (76.7%) vehicles and can be seen in Tables 36-43. In the crash report both the First Harmful Event and Most Harmful Event are recorded. In 1,016 (86.2%, n =1,179) of known vehicles the first harmful and most harmful events were the same. The most common Most Harmful Events can be found in Table 44. Whether or not there was a vehicle related factor was recorded for 815 (69.0%) vehicles. Among those with information recorded only 0.2% of crashes had a vehicle related factor identified. Results for this field can be seen in Table 45.

Table 20 Driver License State (N=966)

License State	Count	Percent	Cumulative Frequency	Cumulative Percent
Arizona	433	44.8	433	44.8
New Mexico	364	37.7	797	82.5
Utah	29	3.0	826	85.5
California	28	2.9	854	88.4
Colorado	23	2.4	877	90.8
Texas	14	1.4	891	92.2
All other States	75	7.8	966	100

Table 20a Navajo Nation Resident Drivers, By Agency (N=956)

Navajo Nation Driver	Count	Percent	Cumulative Percent
Chinle	91	9.5	9.5
Eastern	80	8.4	17.9
Ft. Defiance	74	7.7	25.6
Northern	126	13.2	38.8
Western	103	10.8	49.6
From Border Town	205	21.4	71.0
Hopi	15	1.6	72.6
Other Location	262	27.4	100

Table 21 Driver License Type

	Count	Percent	Cumulative Frequency	Cumulative Percent	Percent Among Known
Full	827	70.7	827	70.7	87.8
Intermediate	2	0.2	829	70.9	0.2
Learner's Permit	3	0.3	832	71.2	0.3
Temporary License	1	0.1	833	71.3	0.1
No driver present	1	0.1	834	71.3	0.1
Not licensed	108	9.2	942	80.6	11.5
Unknown License Type	51	4.4	993	84.9	
Frequency Missing = 189					

Table 22 Driver License Status

	Count	Percent	Cumulative Frequency	Cumulative Percent	Percent Among Known
Canceled or Denied	7	0.6	7	0.6	0.7
Expired	8	0.7	15	1.6	0.8
No Driver Present	1	0.1	16	1.7	0.1
Not licensed	109	9.3	125	10.7	11.6
Revoked	42	3.6	167	14.3	4.5
Suspended	53	4.5	220	18.8	5.6
Unknown License Status	50	4.3	270	23.1	NA
Valid	723	61.8	993	84.9	76.7
Frequency Missing=189					

Table 23 Previous recorded Accidents

Number of Accidents	Count	Percent	Cumulative Percent	Percent Among Known & Reported
0	515	86.1	86.1	96.8
1	15	2.5	88.6	2.8
2	1	0.2	88.8	0.2
3	1	0.2	89.0	0.2
Not Reported	38	6.4	95.3	NA
Unknown	28	4.7	100.0	NA
Frequency Missing = 571				

Table 24 Previous Suspensions & Revocations (N= 906)

Number of Suspensions & Revocations	Count	Percent	Cumulative Percent	Percent Among Known & Reported
0	762	80.7	80.7	83.4
1	75	7.9	88.7	8.2
2	36	3.8	92.5	3.9
3	19	2.0	94.5	2.1
4	12	1.3	95.8	1.3
5	7	0.7	96.5	0.8
6	1	0.1	96.6	0.1
7	2	0.2	96.8	0.2
Unknown	30	3.2	100.00	
Frequency Missing = 225				

Table 25 Previous DWI Convictions (N=907)

Number of Convictions	Count	Percent	Cumulative Percent	Percent Among Known & Reported
0	851	90.1	90.1	93.0
1	48	5.1	95.1	5.2
2	12	1.3	96.4	1.3
3	3	0.3	96.7	0.3
4	1	0.1	96.8	0.1
Unknown	30	3.2	100.0	
Frequency Missing = 224				

Table 26 Previous Speeding Convictions (N= 945)

Number of speeding convictions	Count	Percent	Cumulative Percent	Percent Among Known & Reported
0	785	67.2	67.2	85.8
1	87	7.4	74.6	9.5
2	23	2.0	76.6	2.5
3	16	1.4	77.9	1.7
4	3	0.3	78.2	0.4
5	1	0.1	78.3	0.1
Unknown	30	2.6	80.8	NA
Frequency Missing = 224				

Table 27 Previous Other Harmful MV Convictions (N= 945)

Number of Previous Other Harmful MV Convictions	Count	Percent	Cumulative Percent	Percent Among Know & Reported
0	805	68.8	68.8	88.0
1	86	7.4	76.2	9.4
2	12	1.0	77.2	1.3
3	5	0.4	77.7	0.5
4	7	0.6	78.3	0.8
Unknown	30	2.6	80.8	NA
Frequency Missing = 224				

Table 28 Average Total Previous Harmful Events

N	Mean	Standard Deviation	Minimum	Maximum
915	0.83	1.59	0	10

Table 29 Any Previous Harmful Incidents

	Count	Percent	Cumulative Percent
Yes	305	33.3	33.3
No	610	66.7	100

Table 30 Violations Recorded

Violation	Count	Percent of all Known drivers (N=691)	Percent among those with at least one violation (N=72)
Manslaughter or homicide	27	3.9	37.5
Above legal limit	20	2.9	27.8
Willful reckless driving	14	2.0	19.4
Inattentive, careless, improper driving	10	1.4	13.9
Unsafe reckless (not willful, wanton reckless) driving	6	0.9	8.3
Driving while license withdrawn	6	0.9	8.3
Other driver license violations	5	0.7	6.9
Speeding	4	0.6	5.6
Failure to require restraint use	4	0.6	5.6
General alcohol, drug, or impairment violation	3	0.4	4.2
Speed greater than reasonable	3	0.4	4.2
Lane violation, generally	3	0.4	4.2
Hit and run	2	0.3	2.8
Fail to obey stop sign	2	0.3	2.8
Failure to yield, generally	2	0.3	2.8
Serious violation resulting in death	2	0.3	2.8
Brake Violation	1	0.1	1.4
Driving on left, wrong side of road	1	0.1	1.4
Driving while intoxicated	1	0.1	1.4
Failure to carry insurance card	1	0.1	1.4
Fleeing or eluding police	1	0.1	1.4
Non-moving violations, generally	1	0.1	1.4
Other Moving Violation (coasting, backing, opening door)	1	0.1	1.4
Vehicle registration violation	1	0.1	1.4

Table 31 Driver Related Factors

Driver Factor	Count	Percent of Known (n=828)	Percent among those with at least one driver factor (n=346)
Failure to keep in proper lane	86	10.4	24.9
Over Correcting	70	8.5	20.2
Inattentive	51	6.2	14.7
Manslaughter, homicide or other assault without malice	26	3.1	7.5
Failure to obey actual traffic sign	24	2.9	6.9
Driving on wrong side of road	23	2.8	6.6
Ice, snow, slush, water, sand, dirt, oil, wet leaves	20	2.4	5.8
Failure to yield right of way	18	2.2	5.2
Operating vehicle erratically	17	2.1	4.9
Passing with insufficient distance or visibility	11	1.3	3.2
Making other improper turn	9	1.1	2.6
Improper or erratic lane changing	9	1.1	2.6
Following improperly	9	1.1	2.6
Tire blown out or flat	8	1.0	2.3
Pedestrian, pedal cyclist, or other non-motorist	7	0.8	2.0
Police pursuing or in pursuit	6	0.7	1.7
License in more than one state	6	0.7	1.7

Table 32 Driver Distraction

Distraction	Frequency	Percent	Cumulative Percent	Percent Among Known
Not distracted	420	43.2	43.2	70.7
Not reported	65	6.7	49.9	NA
Inattention, details unknown	54	5.6	55.5	9.1
Looked but did not see	40	4.1	59.6	6.7
Distracted, details unknown	32	3.3	62.9	5.4
Distraction/Inattention	19	2.0	64.9	3.2
By other occupant(s)	9	0.9	65.8	1.5
While talking or listening to Cellular phone	3	0.3	66.1	0.5
Distracted by Outside person, object or event	3	0.3	66.4	0.5
While manipulating cell phone	2	0.2	66.6	0.3
While using other component/controls integral to vehicle	2	0.2	66.8	0.3
While using or reaching for device/object brought into vehicle	2	0.2	67.0	0.3
Other Cellular phone related	2	0.2	67.2	0.3
No driver present	2	0.2	67.4	0.3
Careless/Inattentive	2	0.2	67.6	0.3
Distracted/Careless	1	0.1	67.7	0.2
Other Distraction	1	0.1	67.8	0.2
Unknown	313	32.2	100	NA
Total	972			566

Table 33 Vehicle Body Type

Vehicle Category	Frequency	Percent	Cumulative Percent	Percent among Known
Off Road	11	0.9	0.9	1.2
Motor Cycle	28	2.4	3.3	3.0
Sedan	277	23.4	26.7	29.9
Van or Station Wagon	83	7.0	33.7	9.0
SUV	151	12.8	46.5	16.3
Pickup Truck	276	23.4	69.9	29.8
Commercial Vehicle	84	7.1	77.0	9.1
Other	15	1.3	78.3	1.6
Unknown or Missing	257	21.7	100.0	NA

Chart 1 Average Travel Speed

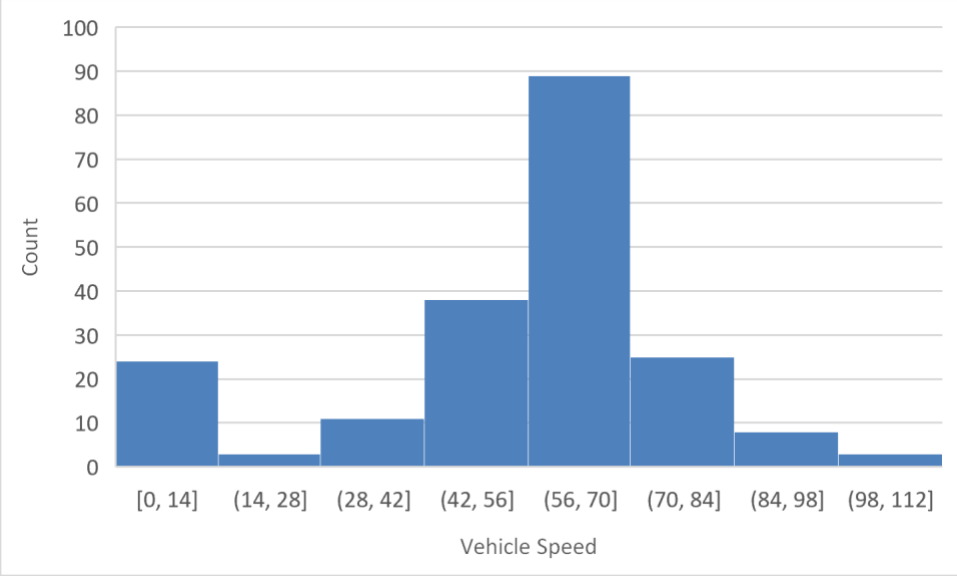


Table 34 Vehicle Maneuver at Time of Crash

Vehicle Maneuver	Frequency	Percent	Cumulative Percent	Percent of Known
Going Straight	610	54.8	54.8	68.2
Turning Right	2	0.2	55.0	0.2
Turning Left	24	2.2	57.1	2.7
Making a U Turn	4	0.4	57.5	0.4
Negotiating a Curve	173	15.5	73.0	19.3
Changing Lanes (or merging)	7	0.6	73.7	0.8
Successful Avoidance to a previous critical event	4	0.4	74.0	0.4
Decelerating in Traffic Lane	9	0.8	74.8	1.0
Accelerating in Traffic Lane	4	0.4	75.2	0.4
Passing or overtaking another vehicle	33	3.0	78.2	3.7
Disabled or parked in travel lane	1	0.1	78.3	0.1
Other	1	0.1	78.3	0.1
Unknown	218	19.6	97.9	NA
Backing Up	1	0.1	98.0	0.1
No driver present	3	0.3	98.3	0.3
Stopped in Road(way)	17	1.5	99.8	1.9
Leaving a parking position	1	0.1	99.9	0.1
Starting in road	1	0.1	100	0.1

Table 35 Impact Point

Impact Point	Count	Percent	Cumulative Percent	Percent of Known Collisions
12 o'clock	501	42.4	42.4	72.3
Non-collision	272	23.0	65.4	NA
Unknown	133	11.3	76.7	NA
Not reported	84	7.1	83.8	NA
6 o'clock	39	3.3	87.1	5.6
9 o'clock	30	2.5	89.6	4.3
10 o'clock	29	2.5	92.0	4.2
3 o'clock	24	2.0	94.0	3.5
1 o'clock	16	1.4	95.4	2.3
Undercarriage	12	1.0	96.4	1.7
2 o'clock	12	1.0	97.4	1.7
11 o'clock	10	0.8	98.2	1.4
4 o'clock	9	0.8	99.0	1.3
8 o'clock	7	0.6	99.6	1.0
7 o'clock	3	0.3	99.9	0.4
5 o'clock	1	0.1	100	0.1

Table 36 Sequence of Events 1

Event	Frequency	Percent	Cumulative Percent	Percent Among Known
Rollover	70	7.3	7.3	7.7
Fire/Explosion	3	0.3	7.6	0.3
Fell or Jumped from Vehicle	8	0.8	8.4	0.9
Injured in Vehicle	1	0.1	8.5	0.1
Pedestrian	157	16.5	25.1	17.3
Bicyclist	1	0.1	25.2	0.1
Live Animal	2	0.2	25.4	0.2
Motor Vehicle in Transport	316	33.1	58.5	34.8
Parked Motor Vehicle	1	0.1	58.6	0.1
Other Object not Fixed	1	0.1	58.7	0.1
Embankment	2	0.2	58.9	0.2
Shrubbery	1	0.1	59.0	0.1
Vehicle Struck by Cargo	3	0.3	59.3	0.3
Equipment Failure, blown tire, brake failure, etc.	5	0.5	59.8	0.6
Ran off Roadway right	162	17.0	76.8	17.9
Ran off Roadway left	67	7.0	83.8	7.4
Cross Median	3	0.3	84.1	0.3
Cross Centerline	93	9.8	93.9	10.3
End Departure	2	0.2	94.1	0.2
Ran off Roadway Direction Unknown	9	0.9	95.0	1.0
Unknown	47	4.9	100.00	NA
Frequency Missing = 228				

Table 37 Sequence of Events 2

Event	Count	Percent	Cumulative Percent
Rollover	87	19.5	19.5
Fire/Explosion	8	1.8	21.3
Pedestrian	8	1.8	23.1
Pedal cyclist	2	0.5	23.6
Motor Vehicle in Transport	87	19.5	43.1
Parked Motor Vehicle	2	0.5	43.6
Boulder	5	1.1	44.7
Other Object not Fixed	1	0.2	44.9
Bridge Rail	1	0.2	45.1
Guardrail Face	9	2.0	47.1
Concrete Traffic Barrier	1	0.2	47.3
Other Traffic Barrier	1	0.2	47.5
Utility Pole/Light Support	1	0.2	47.7
Other Post Other Pole or Other Supports	2	0.5	48.2
Culvert	1	0.2	48.4
Curb	1	0.2	48.6
Ditch	3	0.7	49.3
Embankment	13	2.9	52.2
Fence	4	0.9	53.1
Wall	1	0.2	53.3
Tree	8	1.8	55.1
Jackknife	3	0.7	55.8
Guardrail End	4	0.9	56.7
Vehicle Struck by Cargo	1	0.2	56.9
Traffic Sign Support	1	0.2	57.1
Ran off Roadway right	25	5.6	62.7
Ran off Roadway left	42	9.4	72.1
Cross Median	16	3.6	75.7
Vehicle Went Airborne	6	1.4	77.1
Cross Centerline	15	3.4	80.5
Re Entering Roadway	85	19.1	99.6
Non-harmful sway or jackknife	1	0.2	99.8
Object that had fallen from MV in transport	1	0.2	100.0

Table 38 Sequence of Event 3

Event	Count	Percent	Cumulative Percent
Rollover	56	20.0	20.0
Fire/Explosion	6	2.1	22.1
Pedestrian	3	1.1	23.2
Bicyclist	1	0.4	23.6
Motor Vehicle in Transport	28	10.0	33.6
Boulder	2	0.7	34.3
Guardrail Face	4	1.4	35.7
Other Post Other Pole or Other Supports	3	1.1	36.8
Culvert	3	1.1	37.9
Curb	1	0.4	38.2
Ditch	1	0.4	38.6
Embankment	18	6.4	45.0
Fence	7	2.5	47.5
Shrubbery	7	2.5	50.0
Tree	3	1.1	51.1
Working Motor Vehicle	1	0.4	51.4
Vehicle Struck by Cargo	2	0.7	52.1
Ground	1	0.4	52.5
Traffic Sign Support	2	0.7	53.2
Equipment Failure, blown tire, brake failure, etc.	1	0.4	53.6
Separation of Units	1	0.4	53.9
Ran off Roadway right	22	7.9	61.8
Ran off Roadway left	23	8.2	70.0
Cross Median	5	1.8	71.8
Vehicle Went Airborne	14	5.0	76.8
Cross Centerline	53	18.9	95.7
Re Entering Roadway	11	3.9	99.6
Cargo or Equipment loss or shift	1	0.4	100.0

Table 39 Sequence of Event 4

Event	Count	Percent	Cumulative Percent
Rollover	58	32.8	32.8
Fire/Explosion	6	3.4	36.2
Bicyclist	1	0.6	36.7
Motor Vehicle in Transport	12	6.8	43.5
Boulder	1	0.6	44.1
Guardrail Face	2	1.1	45.2
Concrete Traffic Barrier	1	0.6	45.8
Utility Pole/Light Support	1	0.6	46.3
Culvert	1	0.6	46.9
Ditch	3	1.7	48.6
Embankment	7	4.0	52.5
Fence	8	4.5	57.1
Shrubbery	3	1.7	58.8
Tree	5	2.8	61.6
Other Fixed object	1	0.6	62.2
Ground	2	1.1	63.3
Ran off Roadway right	8	4.5	67.8
Ran off Roadway left	41	23.2	91.0
Cross Median	2	1.1	92.1
Vehicle Went Airborne	5	2.8	94.9
Cross Centerline	7	4.0	98.9
Re Entering Roadway	2	1.1	100.0

Table 40 Sequence of Event 5

Event	Frequency	Percent	Cumulative Percent
Rollover	41	39.8	39.8
Fire/Explosion	2	1.9	41.8
Motor Vehicle in Transport	5	4.9	46.6
Boulder	1	1.0	47.6
Guardrail Face	2	1.9	49.5
Ditch	2	1.9	51.5
Embankment	6	5.8	57.3
Fence	7	6.8	64.1
Wall	2	1.9	66.0
Shrubbery	1	1.0	67.0
Tree	5	4.9	71.8
Other Fixed Object	3	2.9	74.8
Ground	2	1.9	76.7
Traffic Sign Support	1	1.0	77.7
Separation of Units	1	1.0	78.6
Ran off Roadway right	4	3.9	82.5
Ran off Roadway left	2	1.9	84.5
Cross Median	3	2.9	87.4
Vehicle Went Airborne	4	3.9	91.3
Cross Centerline	2	1.9	93.2
Re Entering Roadway	7	6.8	100.0

Table 41 Sequence of Event 6

Event	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Rollover	24	43.6	24	43.6
Fire Explosion	2	3.6	26	47.3
Motor Vehicle in Transport	4	7.3	30	54.6
Concrete Traffic Barrier	1	1.8	31	56.4
Culvert	2	3.6	33	60.0
Embankment-Earth	4	7.3	37	67.3
Fence	6	10.9	43	78.2
Tree	2	3.6	45	81.8
Ran off road right	3	5.5	48	87.3
Vehicle went airborne	3	5.5	51	92.7
Cross Centerline	3	5.5	54	98.2
Re-entering Roadway	1	1.8	55	100.0
Frequency Missing = 1127				

Table 42 Sequence of Event 7

Event	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Rollover	8	42.1	8	42.1
Motor Vehicle in Transport	1	5.3	9	47.4
Concrete Traffic Barrier	1	5.3	10	52.6
Utility Pole	1	5.3	11	57.9
Ditch	1	5.3	12	63.2
Embankment-Rock, Stone or Concrete	1	5.3	13	68.4
Fence	1	5.3	14	73.7
Ground	1	5.3	15	79.0
Ran off roadway-right	2	10.5	17	89.5
Vehicle went airborne	1	5.3	18	94.7
Re-entering roadway	1	5.3	19	100.0
Frequency Missing = 1160				

Table 43 All sequence of events combined

Event	Count	Percent of cars with 1 Event (N = 907)	Percent of all events (N=890)
Motor Vehicle in Transport	453	49.9%	50.9%
Rollover	344	37.9%	38.7%
Ran off roadway right	226	24.9%	25.4%
Ran off roadway left	175	19.3%	19.7%
Cross Centerline	173	19.1%	19.4%
Pedestrian	168	18.5%	18.9%
Re-entering roadway	107	11.8%	12.0%
Embankment	46	5.1%	5.2%
Fence	33	3.6%	3.7%
Vehicle Went Airborne	33	3.5%	3.7%
Cross Median	29	3.2%	3.3%
Fire/Explosion	27	3.0%	3.0%
Tree	23	2.5%	2.6%
Guardrail Face	17	1.9%	1.9%
Shrubbery	12	1.3%	1.3%
Ditch	10	1.1%	1.1%
Boulder	9	1.0%	1.0%
Ran off roadway-direction unknown	9	1.0%	1.0%
Fell or Jumped from Vehicle	8	0.9%	0.9%
Culvert	7	0.8%	0.8%
Vehicle Struck by Cargo	6	0.7%	0.7%
Equipment Failure, blown tire, brake failure, etc.	6	0.7%	0.7%
Ground	6	0.7%	0.7%
Other Post Other Pole or Other Supports	5	0.6%	0.6%

Bicyclist	5	0.6%	0.6%
Concrete Traffic Barrier	4	0.4%	0.4%
Traffic Sign Support	4	0.4%	0.4%
Embankment-Earth	4	0.4%	0.4%
Guardrail End	4	0.4%	0.4%
Other Fixed Object	4	0.4%	0.4%
Parked Motor Vehicle	3	0.3%	0.3%
Jackknife	3	0.3%	0.3%
Utility Pole/Light Support	3	0.3%	0.3%
Wall	3	0.3%	0.3%
Live Animal	2	0.2%	0.2%
Curb	2	0.2%	0.2%
End Departure	2	0.2%	0.2%
Other Object not Fixed	2	0.2%	0.2%
Separation of Units	2	0.2%	0.2%
Bridge Rail	1	0.1%	0.1%
Cargo or equipment loss or shift	1	0.1%	0.1%
Embankment-Rock, Stone, or Concrete	1	0.1%	0.1%
Injured in Vehicle	1	0.1%	0.1%
Non-harmful sway or jackknife	1	0.1%	0.1%
Object that had fallen from MV in transport	1	0.1%	0.1%
Other Traffic Barrier	1	0.1%	0.1%
Working motor vehicle	1	0.1%	0.1%

Table 44 Most Harmful Events (N=1116)

Event	Frequency	Percent	Cumulative Percent	Percent Among Known
Rollover	371	31.4	31.4	33.0
Fire/Explosion	15	1.3	32.7	1.3
Fell/jumped from vehicle	11	0.9	33.6	1.0
Pedestrian	199	16.9	50.5	17.7
Bicyclist	4	0.3	50.9	0.4
MV Crash Same Road	476	40.3	91.2	42.3
Parked Vehicle	2	0.2	91.4	0.2
Boulder	4	0.3	91.7	0.4
Building	1	0.1	91.8	0.1
Divider	1	0.1	91.9	0.1
Fence	1	0.1	92.0	0.1
Guardrail Face	5	0.4	92.4	0.4
Light Support	2	0.2	92.5	0.2
Impact Attenuator	1	0.1	92.6	0.1
Culvert	1	0.1	92.7	0.1
Ditch	1	0.1	92.8	0.1
Embankment	5	0.4	93.2	0.4
Wall	1	0.1	93.3	0.1
Tree	10	0.9	94.2	0.9
Other Fixed Object	3	0.3	94.4	0.3
Working Motor Vehicle	1	0.1	94.5	0.1
Guardrail End	3	0.3	94.8	0.3
Motor Vehicle in transport struck by Cargo	3	0.3	95.0	0.3
Other Not in-transport Motor Vehicle	1	0.1	95.1	0.1
Ground	1	0.1	95.2	0.1
Traffic Sign Support	2	0.2	95.3	0.2
Unknown	55	4.7	100	NA
Frequency Missing = 2				

Table 45 Vehicle Related Factors

Factor	Frequency	Percent	Cumulative Percent	Percent Among Known
None	813	98.2	98.2	99.8
Vehicle Registered for handicapped	2	0.2	98.4	0.2
Unknown	13	1.6	100	

Person Level

There were 2,511 people involved in these 890 crashes. The average age of a person involved in these crashes was 35.6 years (n=2,234). Chart 2 displays a histogram of age for those involved in a crash (median age was 33 years). The average age of the fatalities in these crashes was 38.1 years (n=1063, Chart 3, median age was 35 years). Gender was recorded for 2,290 (91.2%) of the people involved. Almost two thirds (64.6%) of people in these crashes were male. Injuries can be placed into one of 5 different classifications: No Injury, Possible Injury, Minor Injury, Serious Injury, Fatal Injury, and Injury Severity Unknown. Injury type by gender can be seen in table 46. After removing the data fields where gender or injury type were unknown, and all pedestrian crashes, males were 1.24 (95% CI: 1.03, 1.50, p=0.026) times more likely to be killed in these crashes than females.

Persons involved in these crashes could be classified into one of 6-person type categories (e.g. passenger, driver, bicyclist, pedestrian, Table 47). Seating position among car occupants can be seen in Table 48, and more than three quarters were in the front row of a vehicle. Restraint use can be recorded for car occupants, and was recorded for 1,656 persons (Table 49). Fewer than half (41.9%, Table 50) of the passengers involved were not restrained. Restraint use was organized into a new variable which identifies if the best possible restraint system was used based on vehicle type and age of passenger. A little more than half (57.6%) of persons utilized the best restraint. Best protection is impacted by age (Table 51). A simple logistic regression model indicates that for every one-year increase in age the likelihood that a person was properly restrained increased by 2.5%. A 40-year-old is more than 2 ½ times (264%) as likely to be properly restrained as a new born. However, best protection values are missing for many persons <10 years. Restraint use among motorcyclists can be seen in Table 52. Among those with known helmet use reported, a little more than half (56.5%) were wearing a helmet. Restraint use among passengers less than 11 years old was recorded for 83.7% of children, and results can be found in Table 53**.** A simple logistic regression model indicates that children under 11 who were not using a seat belt were 4.5 times more likely to be killed in a crash than children who were wearing a seat belt (p = <0.000). Children under 11 who were not in a child passenger safety seat were 5.9 times more likely to be killed in a crash than children who were restrained in a child safety seat (p =

0.02). Air bag deployment was applicable and known for 1,270 (55.6%) occupants**.** An air bag was not available for 17.3% of occupants, not deployed for 36.6% of occupants, and deployed for 19.6% of occupants (Table 54). Among those to whom it applied, 26.2% of vehicle occupants were ejected either entirely or partially (n=1,503). The location of non-motorists (pedestrians, bicyclists) was known for 186 persons (Table 55). No improper action, or being in the crosswalk was recorded for only 2.2% of non-motorists.

Alcohol use was recorded for 907 persons involved in these crashes and 42.2% of these persons had been drinking alcohol. The method of alcohol determination was recorded for 308 persons with "Observed" being the most common at 62.0%, followed by Evidential (Breathalyzer) at 25.6%. Blood Alcohol Content (BAC) was reported for 439 persons. The average BAC was 11.97% (Minimum 0%, Maximum 54%). Other drug involvement was reported for 26 persons, with an overlap of 14 who were using both alcohol and drugs.

Of the 1,078 fatalities, 876 (80.7%) died at the scene, 16 (1.5%) died in route to the hospital, 20 (1.8%) deaths occurred at an unknown (unrecorded) time, and the remaining 174 (16.0%) died sometime after receiving medical attention.

The average number of persons involved in each crash was 2.80. Table 56 displays the distribution of persons involved in crashes. The type of vehicle a person is traveling in might influence the injury severity of its occupant. Table 57 displays Vehicle Type and Injury Severity (among known injury), and Table 56a displays the percent for each category. The Chi-square for this table is 211.9 ($p<0.001$). More than half of the passengers of sedans and motorcycles were killed in these crashes. Passenger cars were classified as small (sedan) and large (Pickup, SUV, Van/Station Wagon), and injuries were categorized as fatal or non-fatal. After removing crashes involving pedestrians and bicyclists people in small cars were 1.67 (95% CI: 1.33, 2.08, $p < 0.001$) times more likely to be killed in these crashes than people in large cars. People in small cars were 1.51 (95% CI: 1.19, 1.91, $p = 0.001$) times more likely to have a severe or fatal injury than people in larger vehicles. Full tables for odds ratios by vehicle size can be found in Tables 58 and 59.

The age of the pedestrians was reported for 192 people, and the age of bicyclists was reported for 5. The average age was 37.6 years for pedestrians and 39.8 years for bicyclists. The age distribution can be seen in Chart 4. Among the 69 pedestrians who had alcohol involvement recorded, 72.4% had been drinking. None of the 5 bicyclists were reported to have been drinking alcohol. The average blood alcohol level for pedestrians involved in fatal crashes was 21.0%. The average driver age was 40.5 years. The distribution of driver age and driver age for pedestrian/bicyclist crashes can be seen in Charts 5 and 5a respectively. Among drivers involved in pedestrian and bicycle crashes with known gender (N=141), 74.5% were male. Among non-pedestrian and bicycle crashes 74.0% of drivers were male. The roadway where pedestrian crashes occurred can be seen in Table 60. Approximately 40 roads and highways were identified as locations for pedestrian and bicyclist crashes. The ten roads with the highest number of crashes can be seen in Table 61. Table 62 displays the type of vehicles involved in pedestrian crashes. There are more commercial vehicles involved in pedestrian crashes than expected. This could be due to pedestrians unsuccessfully trying to cross busy arteries or possibly due to intentional self-harm (i.e. pedestrians committing suicide by vehicle).

Chart 2 Average Age of All Persons involved in Crashes

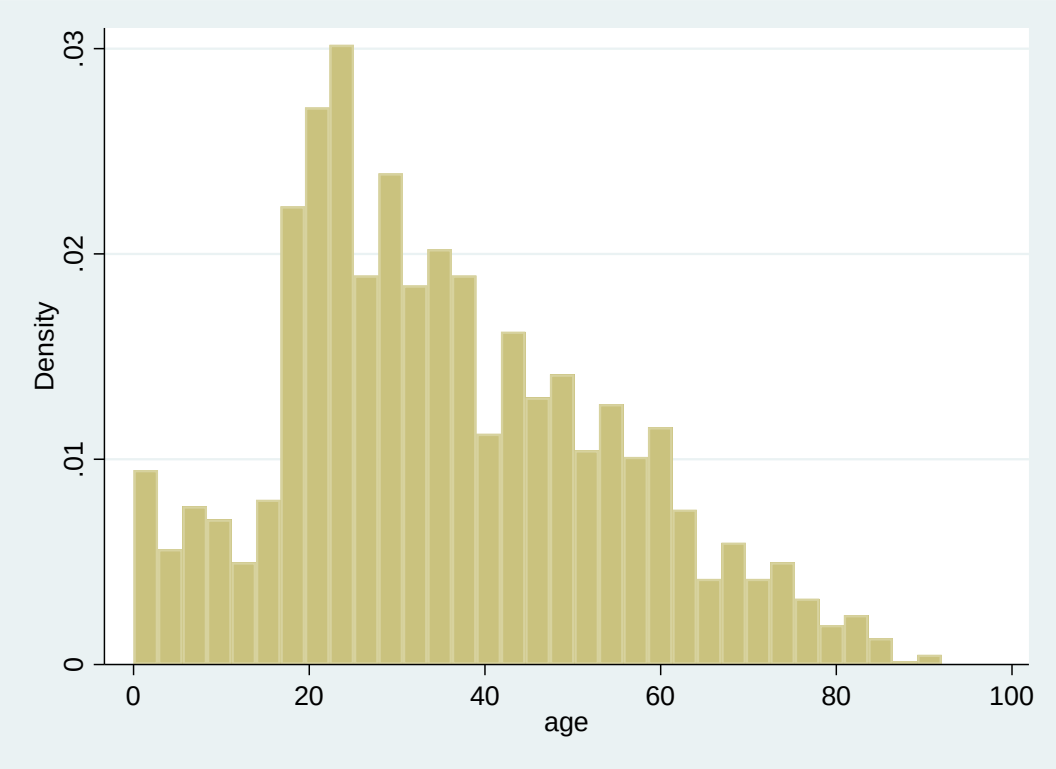


Chart 3 Average Age of Fatalities

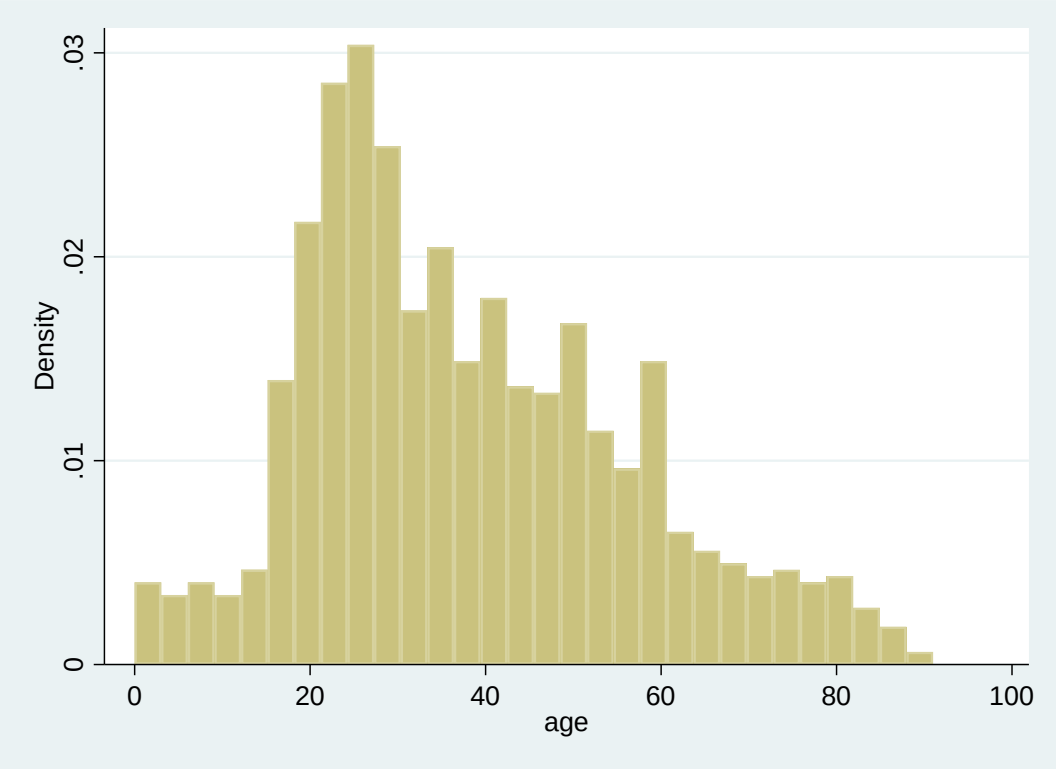


Table 46 Injury Severity by Sex

Sex	Injury Severity							
	No Injury	**Possible Injury**	**Minor Injury**	**Serious Injury**	**Fatal Injury**	**Injury: Severity Unknown**	**Unknown**	**Total**
Female Count	130	91	121	117	337	10	5	811
Percent of Total	5.7%	4.0%	5.3%	5.1%	14.7%	0.4%	0.2%	35.4%
Percent of Female	16.0%	11.2%	14.9%	14.4%	41.6%	1.2%	0.6%	
Percent of Injury Type	36.1%	39.7%	38.4%	43.8%	31.4%	37.0%	27.8%	
Male Count	230	138	194	150	737	17	13	1,479
Percent of Total	10.0%	6.0%	8.5%	6.6%	32.2%	0.7%	0.6%	64.6%
Percent of Male	15.6%	9.3%	13.1%	10.1%	49.8%	1.1%	0.9%	
Percent of Injury type	63.9%	60.3%	61.6%	56.2%	68.6%	63.0%	72.2%	
Total Count	360	229	315	267	1,074	27	18	2,290
Percent of total	15.7%	10.0%	13.8%	11.7%	46.9%	1.2%	0.8%	100.0%

Frequency Missing = 219 (169 are missing because of unknown gender)

Table 46a Injury Severity if sex is unknown or not reported

	No Injury	Possible Injury	Minor Injury	Serious Injury	Fatal Injury	Injury: Severity Unknown	Unknown	Total
Count	46	2	0	0	8	14	99	169
Percent	27.2%	1.25	0%	0%	4.7%	8.3%	58.6%	

Table 47 Person Type

Person Type	Count	Percent	cumulative Percent	Percent among known
Driver	1,113	44.4	44.4	47.1
Passenger	1,044	41.6	86.0	44.2
Pedestrian	200	8.0	93.9	8.5
Unknown Occupant	127	5.1	99.0	NA
Unknown	18	0.7	99.7	NA
Bicyclist	5	0.2	99.9	0.2
Occupant not in vehicle	2	0.1	100	0.1

Table 48 Seating Position

Seating Position	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Driver	1,115	55.4%	1,115	55.4%
Front Row	429	21.3%	1,544	76.7%
Second Row	349	17.3%	1,893	94.0%
Third Row	25	1.2%	1,918	95.3%
Fourth Row	4	0.2%	1,922	95.5%
Sleeper Section of Cab	10	0.5%	1,932	96.0%
Other Passenger Area	75	3.7%	2,007	99.7%
Riding on Exterior of Vehicle	6	0.3%	2,013	100%
Total	2,013			

Table 49 Motorist Restraint Use

Restraint system use	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Among App and Known (n=1656)
lap/shoulder	839	37.2	839	37.2	50.7
None used	680	30.1	1519	67.3	41.1
Unknown	475	21.0	1994	88.3	NA
Not reported	92	4.1	2086	92.4	NA
lap belt	40	1.8	2126	94.2	2.4
Child Restraint/Booster	38	1.7	2164	95.8	2.3
Not applicable	35	1.6	2199	97.4	NA
Shoulder belt	17	0.8	2216	98.1	1.0
No helmet	13	0.6	2229	98.7	0.8
Motorcycle helmet	7	0.3	2236	99.0	0.4
Other	5	0.2	2241	99.2	0.3
Restraint Used-type unknown	5	0.2	2246	99.5	0.3
Helmet-unknown if DOT compliant	5	0.2	2251	99.7	0.3
Helmet, unknown type	3	0.1	2254	99.8	0.2
Other helmet	2	0.1	2256	99.9	0.1
Used/unknown	1	<0.1	2257	100	0.1
Racing style harness	1	<0.1	2258	100	0.1

Table 50 Restraint Use among Car occupants only

Restraint Type	Frequency	Percent	Cumulative Percent	Percent Among Known (N=815)
None used	393	41.9	41.9	48.2
Lap/shoulder	342	36.4	78.3	42.0
Unknown	55	5.9	84.1	NA
Not reported	39	4.2	88.3	NA
Child Restraint/booster	38	4.0	92.3	4.7
Not applicable	30	3.2	95.5	NA
lap belt	26	2.8	98.3	3.2
Shoulder belt	9	1.0	99.3	1.1
Restraint Used-Type Unknown	4	0.4	99.7	0.5
Other	3	0.3	100	0.4

Table 51 Best Protection by Age Group

Group	Best Protection	N	Missing
All	57.6%	1525	709
<10 Years	44.9%	89	65
10-19 Years	45.0%	171	81
20-29 Years	50.3%	386	177
30-39 Years	59.1%	298	122
40-49 Years	59.5%	205	106
50-59 Years	70.4%	189	76
60-69 Years	80.7%	109	44
70-79 Years	82.1%	56	27
80+ Years	59.1%	22	11

Table 52 Helmet use among Motorcyclists and off-road vehicle passengers

Restraint/Helmet Use	Frequency	Percent	Cumulative Percent	Percent Among Known
No helmet	10	27.8	27.8	43.5
Unknown	8	22.2	50.0	NA
Motorcycle Helmet	6	16.7	66.7	26.1
Helmet: Unknown if DOT-Compliant	5	13.9	80.6	21.7
Not reported	4	11.1	91.7	NA
Other Helmet	2	5.6	97.2	8.7
Not Reported	1	2.8	100	NA

Table 53 Restraint Use if <11 years (Among Known, N = 144)

Restraint Use	Count	Percent	Cumulative Percent
None	66	45.8	45.8
Child Restraint/Booster	38	26.4	72.2
Belt Only	37	25.7	97.9
Other Restraint Used but Type Unknown	3	2.1	100

Table 54 Air Bag Deployment

Airbag Deployment	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Percent among known and available (n=1268)
Not deployed	825	36.6	825	36.6	65.1
Unknown	457	20.3	1,282	56.9	NA
Not Applicable	391	17.3	1,673	74.2	NA
Deployed-Front	277	12.3	1,950	86.5	21.8
Not reported	139	6.2	2,089	92.6	NA
Deployed-Combination	76	3.4	2,165	96.0	6.0
Deployed-unknown direction/location	53	2.4	2,218	98.4	4.2
Deployed-Side	27	1.2	2,245	99.6	2.1
Deployed-curtain (roof)	8	0.4	2,253	99.9	0.6
Deployed-Other	2	0.1	2,255	100	0.2

Table 55 Non-Occupant Location (n=197, n=157)

Location	Frequency	Percent	Cumulative Percent	Percent Among Known
Not at Intersection-On Roadway, Not in Marked Crosswalk	34	18.3	18.3	21.9
Unknown	31	16.7	34.9	NA
Crossing Roadway	31	16.7	51.6	16.7
In Roadway-Other (Working, Playing, etc.)	17	9.1	60.8	11.0
Intersection-On Roadway, Not in Crosswalk	9	4.8	65.6	5.8
Movement Along Roadway with Traffic	8	4.3	69.9	5.2
Shoulder/Roadside	7	3.8	73.7	4.5
Improper Crossing of Roadway or Intersection (Jaywalking)	5	2.7	76.3	3.2
Movement Along Roadway Against Traffic	5	2.7	79.0	3.2
At Intersection-Not in Crosswalk	5	2.7	81.7	3.2
In Roadway Improperly	4	2.2	83.9	2.6
No improper action	4	2.2	86.0	2.6
Reported as Unknown Location	4	2.2	88.2	2.6
Jogging/Running	3	1.6	89.8	1.9
At Intersection-Unmarked/Unknown If Marked Crosswalk	2	1.1	90.9	1.3
Not visible	2	1.1	91.9	1.3
On roadway, Not in Marked Crosswalk	2	1.1	93.0	1.3
Wrong Way Riding or Walking	2	1.1	94.1	1.3
Not reported	2	1.1	95.2	1.3
Non-Intersection-On Roadway, Crosswalk Availability Unknown	1	0.5	95.7	0.5
Dart/Dash	1	0.5	96.2	0.5
Failure to Yield Right of Way	1	0.5	96.8	0.5
In Roadway	1	0.5	97.3	0.5
In roadway Improperly, Not Visible	1	0.5	97.8	0.5
Intersection-Unknown Location	1	0.5	98.4	0.5
Movement Along Roadway-Direction Unknown	1	0.5	98.9	0.5
Not at Intersection-On Roadway, Crosswalk Availability Unknown	1	0.5	99.5	0.5
Other	1	0.5	100	0.5

Table 55a Non-Occupant Location regrouped

Location Category	Frequency	Percent	Cumulative Percent
Crossing/In Roadway	84	56.4	56.4
Jogging/running/Movement Along Roadway	34	22.8	79.2
Intersection	8	5.4	84.6
Shoulder/Roadside	7	4.7	89.3
Dart/Dash/Jay Walking	6	4.0	93.3
No Improper Action	4	2.7	96.0
Not visible	2	1.3	97.3
Wrong way riding or walking	2	1.3	98.7
Other	1	0.7	99.3
Failure to Yield Right of Way	1	0.7	100

Table 56 Number of persons involved in fatal crashes (N=722)

Number of persons	Count	Percent	Cumulative percent
One	138	19.1	19.1
Two	299	41.4	60.5
Three	105	14.5	75.1
Four	84	11.6	86.7
Five	34	4.7	91.4
Six	29	4.0	95.4
Seven	18	2.5	97.9
Eight	4	0.6	98.5
Nine	4	0.6	99.0
Eleven	2	0.3	99.3
Twelve	3	0.4	99.7
Seventeen	1	0.1	99.9
Nineteen	1	0.1	100
Unknown	168		

Table 57 Vehicle Type and Injury Severity (non-pedestrian crashes)

Injury	None	Possible	Minor	Severe	Fatal	Total
Pickup	45	54	87	73	189	448
Sedan	23	59	67	65	244	458
SUV	28	57	51	68	117	321
Van/Station Wagon	15	17	43	24	75	174
Commercial	36	19	29	8	15	107
Other	6	3	4	6	11	30
Motorcycle/ATV	1	6	3	4	36	50
Bus	1	0	23	13	9	46
Total	155	215	307	261	696	1634

Table 57a Vehicle Type and Injury Severity (Percent of Total)

Injury	None	Possible	Minor	Severe	Fatal
Pickup	10.0	12.1	19.4	16.3	42.2
Sedan	5.0	12.9	14.6	14.2	53.3
SUV	8.7	17.8	15.9	21.2	36.4
Van/Station Wagon	8.6	9.8	24.7	13.8	43.1
Commercial	33.6	17.8	27.1	7.5	14.0
Other	20.0	10.0	13.3	20.0	36.7
Motorcycle/ATV	2.0	12.0	6.0	8.0	72.0
Bus	2.2	0	50.0	28.3	19.6
Total	9.5	13.2	18.8	16.0	42.6

Table 58 Odds Ratios for Fatality by Vehicle type (Sedan is the reference)

Vehicle Type	Estimate	Lower Estimate	Upper Estimate
Motor Cycle	2.07	1.12	3.84
Van or Station Wagon	0.68	0.48	0.97
SUV	0.51	0.38	0.68
Pickup	0.64	0.50	0.83
Other	0.48	0.23	1.02
Bus	0.22	0.10	0.46
Commercial	0.15	0.08	0.26

Table 59 Odds Ratios for Severe Injury by Vehicle (Sedan is the reference)

Vehicle Type	Estimate	Lower Estimate	Upper Estimate
Motor Cycle	1.92	0.94	3.96
Van or Station Wagon	0.64	0.44	0.91
SUV	0.66	0.49	0.88
Pickup	0.68	0.52	0.89
Other	0.63	0.30	1.33
Bus	0.44	0.24	0.81
Commercial	0.13	0.08	0.22

Chart 4 Average age of Pedestrians and Bicyclists

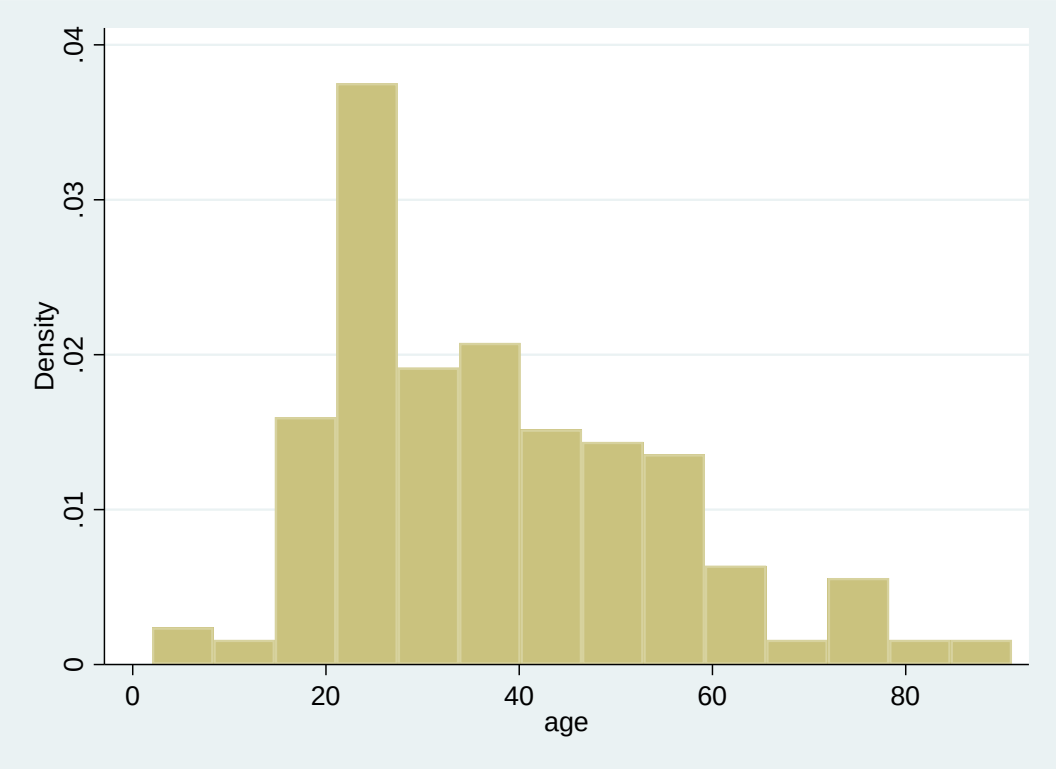


Chart 5 Average age of driver's involved in fatal crashes

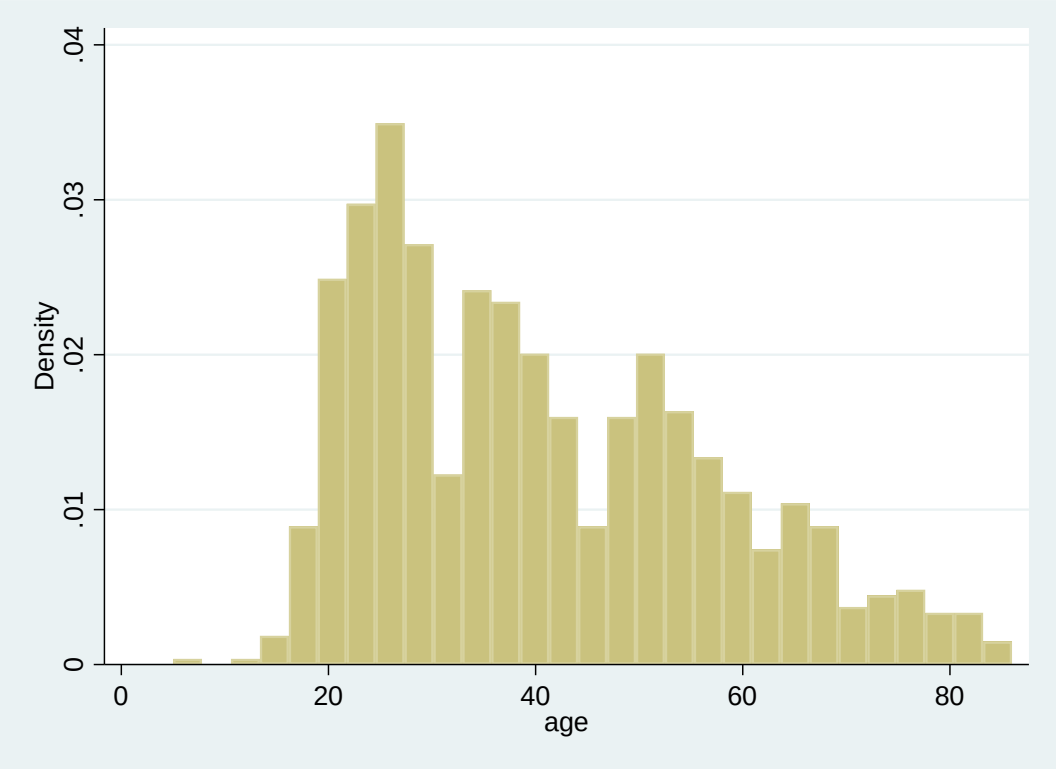


Chart 5a Average Age of Drivers involved in Pedestrian and Bicyclist Crashes (N=130)

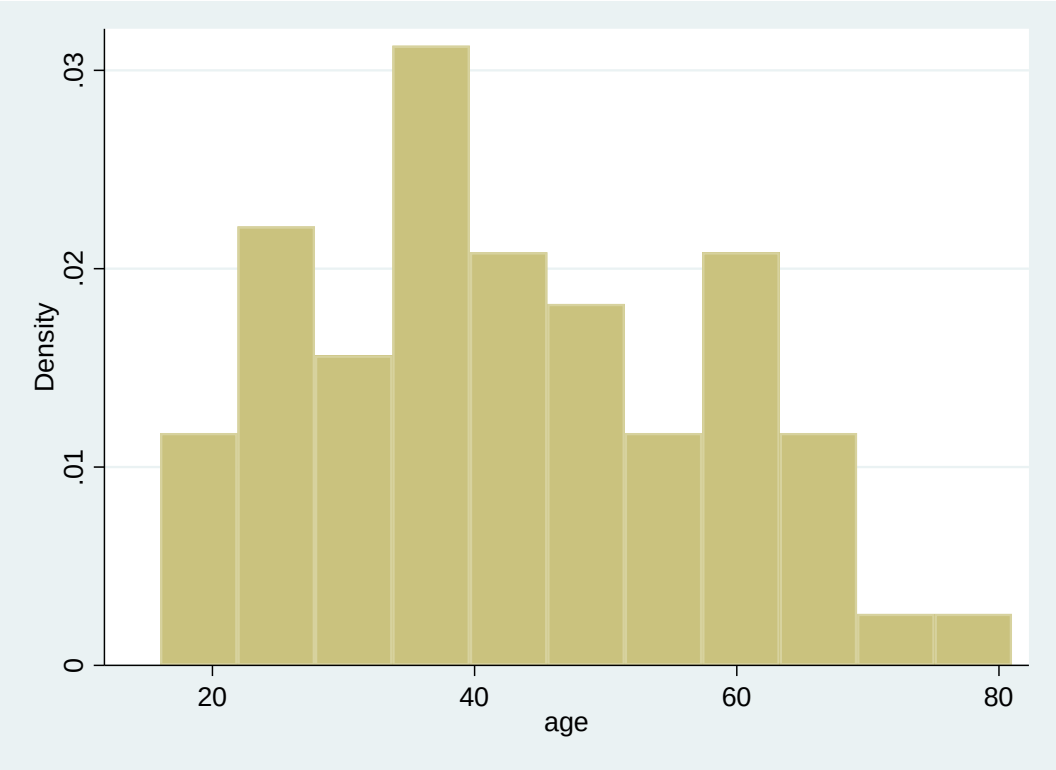


Table 60 Roadway type of crashes involving pedestrians and bicyclists

	Crashes		People	
Roadway Function Class	**Frequency**	**Percent**	**Frequency**	**Percent**
Interstate (1)	14	8.8	18	9.0
Principal Arterial: Freeways and expressways (2)	37	23.3	38	19.0
Principal Arterial other (3)	41	25.8	54	27.0
Minor Arterial (4)	23	14.5	31	15.5
Major Collector (5)	14	8.8	19	9.5
Minor Collector (6)	15	9.4	18	9.0
Local (7)	8	5.0	14	7.0
Unknown	7	4.4	8	4.0

Table 61 Most common roads of pedestrian and bicyclist crash occurrence

Road Name	**Count**	**Percent of all Ped/Bicyclist Crashes**	**Cumulative Percent of all Ped/Bicyclist Crashes**
US 491	19	11.9	11.9
US 64	17	10.7	22.6
Interstate 40	14	8.8	31.4
US 191	14	8.8	40.3
State Route 264	12	7.5	47.8
State Route 118/US 66	12	7.5	55.3
US 160	10	6.3	61.6
Navajo Route/BIA Route 12	5	3.1	64.8
Navajo Route 36	5	3.1	67.9
Navajo Route/BIA 15	4	2.5	70.4

Missing: 7

Table 62 Vehicle Type involved in Pedestrian and Bicycle Crashes

Car Category	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Percent of non-Ped and bike crashes
Commercial	17	16.3	17	16.3	8.8
Other	4	3.8	21	20.2	1.8
Pickup	32	30.8	53	51.0	28.8
Sedan	25	24.0	78	75.0	30.3
SUV	15	14.4	93	89.4	16.3
Van/Station Wagon	11	10.6	104	100	8.7
Frequency Missing = 55					

Logistic regression models were created to determine which variables, while controlling for each variable, were significantly associated with fatality as well as serious injury. If a variable was found to be statistically significant in a simple logistic model then it was considered for the multivariable model. Variables that were significantly associated with fatality (at alpha = 0.10) can be seen in Table 63. The most significant and meaningful variable associated with fatality in these car crashes was ejection of the passengers. Logistic regression analysis was conducted to determine which, if any, of the available crash variables were associated with ejection. One possible strategy of fatality prevention is to limit the possibility of ejection. Table 64 includes variables significantly associated with ejection. Rollover crashes are highly associated with ejection. A logistic regression model was created to determine which factors were associated with rollover crashes and results can be seen in table 64b.

Because there are so few pedestrian/bicycle crashes and even fewer individuals that survive this type of crash when at least one person dies, logistic regression analysis is not appropriate. Analysis was done, however, to determine if the circumstances surrounding fatal pedestrian/bicyclist crashes were different than non-pedestrian related crashes. This information may lead to more specific interventions that target pedestrian/bicyclist fatality. Table 65 displays the variables that were significantly different between these two collision types.

Table 63 Significant Variables for Fatality

Variable	Chi-square	P-value
Crash within the Navajo Nation	10.1939	0.0699
First harmful event (6 categories: Rollover, Motor Vehicle, Natural structures, Man-made structures, Other)	45.7701	<0.0001
Relation to Junction (dichotomous)	26.7625	0.0028
Travel speed (dichotomous for ≥65 mph, <65 mph)	11.3020	0.0008
Roadway Alignment (curved vs. not curved)	7.9917	0.0047
Roadway surface conditions (dry vs. non-dry)	3.2024	0.0735
Driver license status (Valid vs. Non-valid)	2.8860	0.0894
Police reported speed related crash	20.4528	<0.0001
Vehicle body type (Sedan, Pickup, SUV, Van/Station Wagon, Commercial, Motorcycle, Other)	88.0528	<0.0001
Rollover	46.98	<0.0001
Impact point (6 level: Front, Right Side, Rear, Left Side, Under carriage, Non-collision)	31.8158	<0.0001
Sex	3.3741	0.0662
Person Type (Driver, Passenger, Occupant not in vehicle, Unknown, Unknown type of occupant)	43.1005	<0.0001
Seating position (Driver, Front row, Second row, third row, Fourth row, Cargo Area)	64.8020	<0.001
Best occupant protection (e.g. Seat belt for adults, car seat for children <12, helmet for motorcyclist)	77.3093	<0.001
Air bag deployment	18.3992	0.0486
Ejection	315.4740	<0.0001
Police Reported Alcohol Involvement	44.0815	<0.0001
Police Reported Other Drug Involvement	2.9118	0.0879

Table 63a Multiple Logistic Model for non-pedestrian crashes without alcohol variables

	Statistical Significance	
Effect	Chi-square	P-value
First harmful event	8.4736	0.0757
Car type	69.0396	<0.0001
Seating Position	36.3559	<0.0001
Best seat/belt or car seat protection	8.4937	0.0036
Ejection	112.5108	<0.0001
Age	36.2607	<0.0001

Table 63b Multiple Logistic Model for non-pedestrian crashes with alcohol variables

		Statistical Significance	
Effect	Odds Ratio	Chi-square	P-value
Car type		47.1082	<0.0001
Commercial vs Van/Wagon	0.151		
Off-road Vehicle	0.265		
Other vs Van/Wagon	0.489		
Pickup vs Van/Wagon	0.470		
SUV vs Van/Wagon	0.704		
Sedan vs Van/Wagon	1.497		
Ejection	12.332	109.0322	<0.0001
Age	1.029	66.2943	<0.0001
Police reported alcohol involvement		30.7173	<0.0001
No: Yes	0.492		
Unknown: Yes	4.013		

Table 64 Variables associated with ejection

Variable	Odds Ratio	95% Confidence Interval	P value
Roadway Function (Interstate is the reference)			
Principal Arterial	0.25	0.094, 0.671	0.006
Major/Minor Collector	0.19	0.064, 0.552	0.002
Local Road	0.16	0.051, 0.510	0.002
Alcohol Use	3.69	1.81, 7.49	<0.000
Rollover	8.85	4.17, 18.77	<0.000
Seat Belt/Car Seat (for children)	0.063	0.30, 0.132	<0.000

Table 64b Variables associated with a rollover crash

Variable	Odds Ratio	95% Confidence Interval	P value
Curved roadway	1.47	1.10, 1.98	0.01
Seat Belt/Car Seat (for children)	0.16	0.10, 0.28	<0.000
Revoked/Suspended/Canceled/Expired License	1.71	1.08, 2.71	0.021
Alcohol Use	4.51	2.67, 7.61	<0.000

Table 65 Differences between pedestrian and non-pedestrian crashes.

Variable	Category	Pedestrian/Bicyclist Crash	Non-Pedestrian Crash
Roadway Function Class			
	Principal Arterial: Freeways & Expressways	24.3%	15.2%
	Principal Arterial: Other	27.0%	19.9%
	Local Road	5.3%	11.6%
Time of Crash			
	12:00-15:39	5.6%	21.0%
	20:00-23:59	43.4%	19.1%
Roadway Description			
	Curved	4.5%	28.4%
	Unpaved	2.6%	9.0%
	Dark (lighted & unlighted)	70.5%	28.9%
Driver Description			
	Full license	95.4%	86.9%
	Valid	86.8%	75.2%
	Previous traffic events (e.g. previous crash, suspension/revocation of license, DWI conviction, speeding conviction, other harmful motor vehicle convictions)	0.54	0.88
	Speeding	9.5%	34.9%
Vehicle type			
	Commercial Vehicle	14.7%	8.9%
Pedestrian Sex			
	Male	76.2%	63.5%
Alcohol Use			
	Victim	67.6%	40.0%
	Driver	8.2%	37.1%