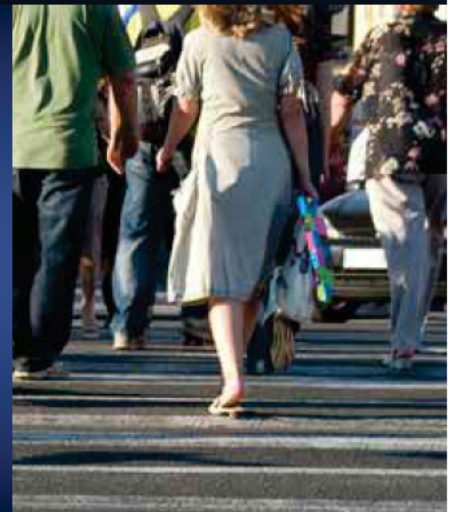


# North Carolina Pedestrian Crash Facts

## 2011 - 2015



Prepared for  
The North Carolina Department of Transportation  
Division of Bicycle and Pedestrian Transportation

Prepared by



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January 2018

# **North Carolina Pedestrian Crash Trends and Facts 2011-2015**

**Prepared for  
The North Carolina Department of Transportation  
Project RP 2017-42  
Division of Bicycle and Pedestrian Transportation**

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**January 2018**

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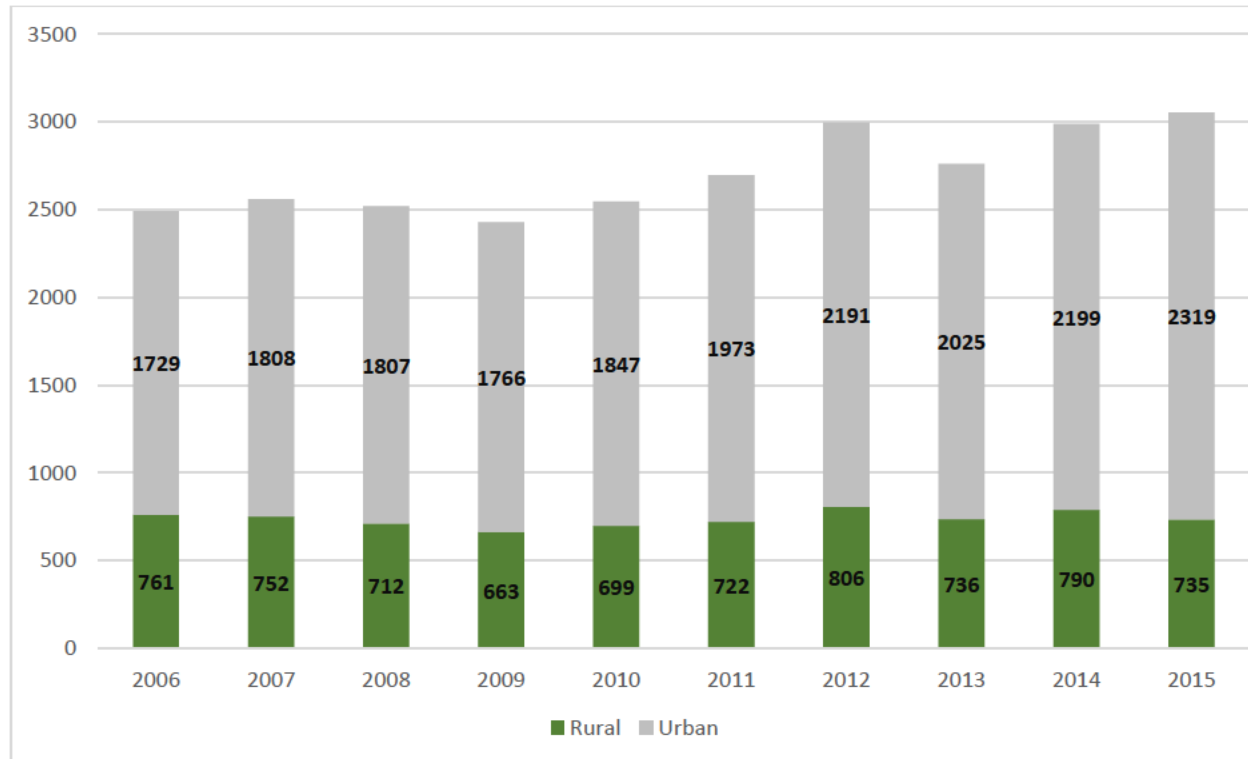
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## General Trends

Between 2006 and 2015, North Carolina public safety agencies reported 27,050 collisions between pedestrians and motor vehicles to the North Carolina Division of Motor Vehicles. The highest yearly total of pedestrian-motor vehicle crashes for the entire ten-year period occurred in 2015 (Figure 1). The 2015 peak is only part of an increasing trend of pedestrian crashes and injuries. The first five years of this period averaged 2,509 total pedestrian crashes per year, while the five years from 2011-2015 averaged 2,899 per year, a 13.5 percent increase.



**Figure 1** From 2011-2015, the average annual number of crashes reported has been about 13.5 percent higher than for 2006 – 2010

Across all ten years, an average of 73 percent of pedestrian-motor vehicle crashes occurred in urban areas, with 27 percent in areas designated as rural (thought to be outside any municipal boundaries). The number of crashes in urban areas in 2012, 2014 and 2015 exceeded that for all other years in this ten-year period. The largest number of crashes in rural areas occurred in 2012 followed by 2012 and 2006. Urban areas reported an average of 16 percent more crashes from 2011-2015 compared to 2006-2010, while rural areas reported an average 5 percent more. Thus, the rise in crashes over the decade has occurred more in urban areas compared with rural areas. Increasing urbanization of the State could potentially contribute to the trend as well as an increasing trend of walking in cities and towns relative to unincorporated areas, but we lack sufficient data on amounts of walking to verify the contributing factors.

The remainder of this summary will focus on the most recent five-year period (2011-2015). For 2011-2015, a total of 14,498 pedestrian crashes were reported to authorities. An average of 176 of these crashes resulted in fatal injuries to one or more people in the crash each year. An additional 188 crashes were reported to lead to one or more disabling-type injuries in each of those years, with the observed numbers varying year-to-year (Figure 2).<sup>1</sup> Thousands more people received evident or possible injuries. Unfortunately, 2015 also observed the highest number of fatal crashes while 2012 had the highest number of fatal and disabling-injury crashes combined. Crashes, and especially more severe crashes tend to fluctuate year-to-year with fewer severe crashes in 2011 and 2013. An ambulance was requested in 73 percent of all reported crashes over the five-year period (data not shown).

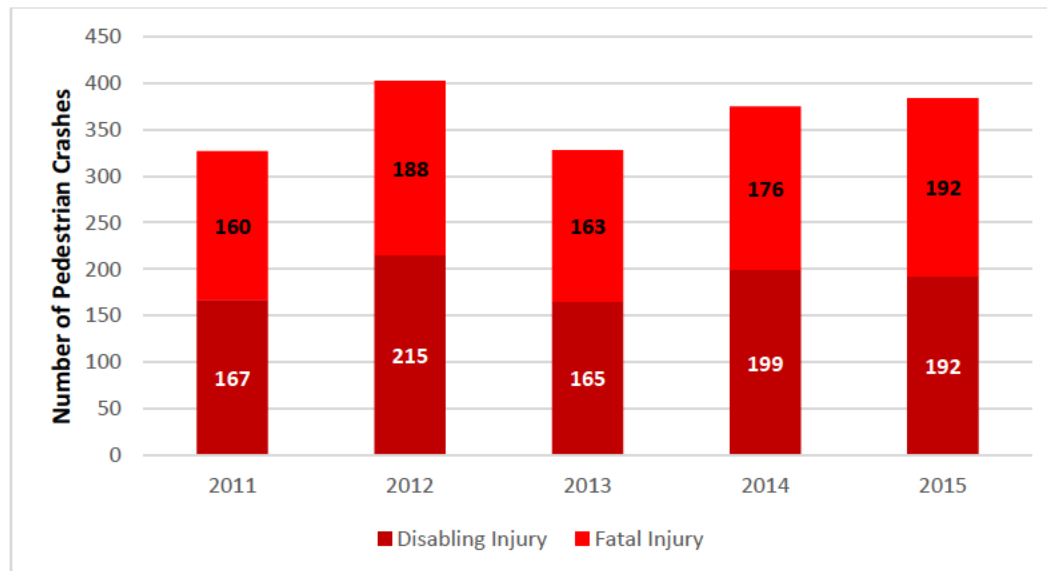


Figure 2 NC Fatal and Disabling Injury Pedestrian Crashes

**Number of pedestrians involved and total fatalities and injuries.** Beginning in 2014, the project team began compiling the total number of pedestrians involved in crashes since some collisions involve more than one pedestrian being struck. That year, approximately 3,159 pedestrians were indicated to be involved in 2,989 reported crashes while in 2015, a total of 3,237 were involved in 3,054 crashes. In 2014, a total of 177 pedestrians were indicated to have been killed (in 176 fatal crashes as indicted in figure 2), with an additional 206 suffering disabling-type injuries (versus 199 collisions that involved one or more disabling-type injuries). In 2015, a total of 196 pedestrians were reported killed (compared to 192 fatal crashes) and 209 pedestrians suffered a disabling injury (compared to 192 disabling-type crashes).

**Exposure risks.** The amount, times, and locations of walking would have the greatest impact on collision frequencies and the severity of injuries involving pedestrians, but we lack data on amounts of walking in NC to better compare trends among years and across specific locations. The types of facilities available – the amount of separation from traffic (places and times to

<sup>1</sup> The number of pedestrians killed and injured reflects only the “first” pedestrian reported on in the crash.

safely walk and cross), the availability of lighting, and other factors – affect the risk of pedestrian collisions and injuries. Other risk factors include motor vehicle traffic volumes, traffic speeds, and driver yielding behaviors. Similarly, the knowledge, abilities, and behaviors of those walking affects their risk. Alcohol or drug use by either the driver or pedestrian also affect crash risks. Distracted walking and driving may also play roles.

**Crash reporting.** Crashes are officially reportable to the NC Division of Motor Vehicles (source of these data) if a fatality, injury, or at least \$1,000 property damage occurred. Note that the data in these reports, and in the query tool on the North Carolina Pedestrian and Bicycle Crash Data Tool website may include a small number of non-injury (or non-observed injury) collisions with low property damage that were not officially “reportable” (minimum property damage of \$1000 or injury), but, which had been reported to the State Division of Motor Vehicles by local agencies. Non-reportable collisions may not be included in other State crash statistics. Because under-reporting of pedestrian crashes is common,<sup>2</sup> any “non-reportable” collisions that involved pedestrians were, however, retained in these data. In addition, injuries are sometimes noted after the crash report is filed, even serious injuries that led to visits to emergency departments or other medical facilities, but crash reports may not be updated with such information.

Finally, as with all crash data, the reported numbers in the crash characteristics that follow undoubtedly reflect some error, including errors or gaps in reporting, as well as errors made during data entry and coding, but every effort has been made to ensure the highest quality possible.<sup>3</sup>

The remainder of this report summarizes the location types, person, time, environmental and roadway characteristics for the 14,498 pedestrian-motor vehicle crashes (not injuries) that were reported Statewide between 2011 and 2015.

## **Where NC Pedestrian Crashes Occur**

### **Geographic Region**

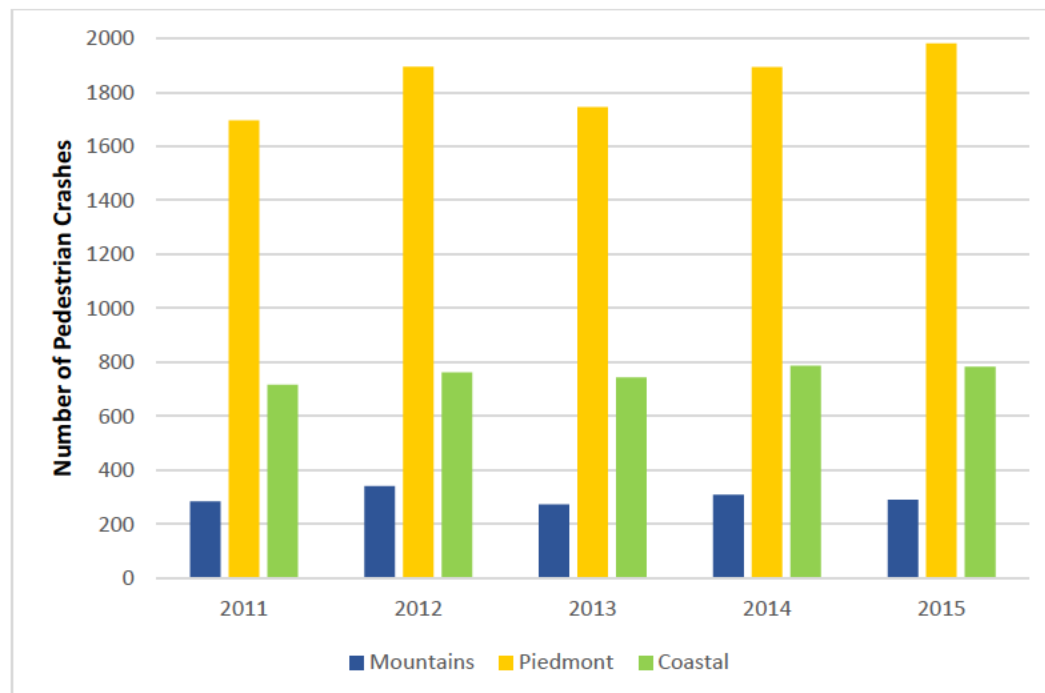
From 2011 to 2015, a majority of reported pedestrian collisions occurred within the counties in the Piedmont region (where most people in the State live), with fewer occurring in the Coastal Plain and Mountain regions of the State. Numerical crash trends by region are shown in Figure 3. Appendix A lists the Counties by Region.

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<sup>2</sup> Injury to Pedestrians and Bicyclists: An analysis based on hospital emergency department data. Report No. FHWA-RD-99-078. US Department of Transportation, Federal Highway Administration.

<sup>3</sup> Note that each crash report was reviewed for the data described in these reports and available on the NCDOT-DBPT website for query. This review offered the opportunity to correct some coding errors.

## NC Pedestrian Crash Facts, 2011-2015

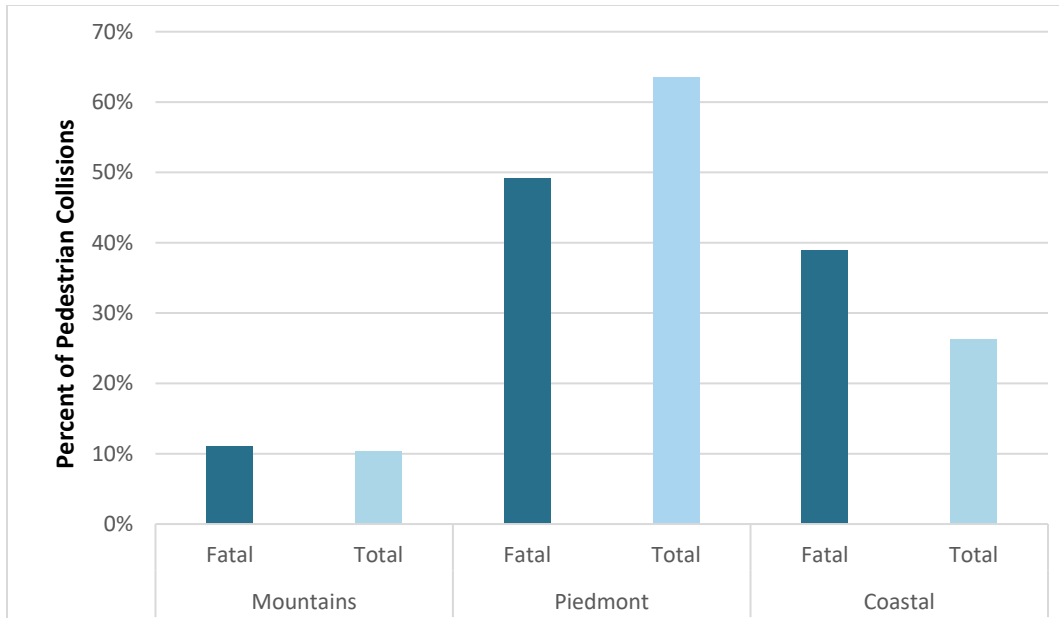


**Figure 3 Five-year pedestrian crash trends by region of NC**

Compared to the 64 percent of total pedestrian crashes, 50 percent of fatal pedestrian crashes occurred in the Piedmont region (Figure 4). A larger share (39%) of fatal crashes compared to total crashes (26%) occurred within the Coastal Plain counties. Part of the explanation is in the extent of urban and rural crashes among the different regions. Rural areas tend to have higher speed roads, few roadways with lighting, and may not have sidewalks, paths, or shoulders to walk on. In fact, **rural areas of the State** accounted for 26 percent of total crashes between 2011 and 2015, but *52 percent of fatal ones* (data not shown). Other factors, as already mentioned, likely also played a role in these trends.



## NC Pedestrian Crash Facts, 2011-2015



**Figure 4 Fatal and Total Crash proportions by Region of the State, 2011-2015**

The numbers equate to approximately 2.94 pedestrian crashes per 10,000 residents Statewide per year and 0.178 fatal pedestrian crashes per 10,000 residents per year. The information described in this report, and similar information developed for local communities, can aid in the establishment of baseline safety metrics, establishment of goals for safety improvement, and the identification of problem types to target with engineering, enforcement, and educational countermeasures to improve pedestrian safety. The companion North Carolina Pedestrian Crash Types report summarizes the types of pedestrian-motor vehicle crashes, or events leading up to the crash, that are, on average, most problematic across the State. That report also contains information about the types of problems and treatments that may be effective.

As illustrated in figure 1, the percentage of all pedestrian collisions occurring in urban areas seems to be increasing over time: 69 percent of NC pedestrian crashes occurred in urban areas in 2006, which rose to 76 percent in 2015.

### **Development Extent**

When looking at development density, as coded by the crash reporting agencies, the picture is even more heavily weighted toward areas that are at least somewhat developed. Combining urban with mixed density percentages, 87 percent of crashes occurred in areas that were at least 30 percent developed, and only 13 percent occurred in areas that were less than 30 percent developed (Table 1).

The areas that are between 30 percent and 70 percent developed may represent areas in transition, where infrastructure is often still more rural in nature and traffic speeds remain high, while traffic volumes and roadway complexity are increasing.

**Table 1 NC pedestrian-motor vehicle crashes by development extent of crash area<sup>4</sup>**

Locality	2011	2012	2013	2014	2015	Total
Rural (<30 percent developed)	375 13.9 <sup>1</sup>	395 13.2	378 13.7	398 13.3	375 12.3	1,921 13.3 <sup>2</sup>
Mixed (30 - 70 percent developed)	358 13.3	427 14.2	368 13.3	428 14.3	424 13.9	2,005 13.8
Urban (>70 percent developed)	1,964 72.8	2,175 72.6	2,015 73.0	2,163 72.4	2,255 73.8	10,572 72.9
Total	2,697 18.6 <sup>3</sup>	2,997 20.7	2,761 19.0	2,989 20.6	3,054 21.1	14,498 100

### Development Type

Reflecting the information on development extent, 51 percent of pedestrian crashes, on average, occurred in areas indicated as commercial districts, 36 percent in residential areas, about 10 percent in areas designated as farms, woods, or pasture, with smaller percentages in institutional (3 percent) and industrial areas (1%) (Table 2).

**Table 2 NC pedestrian-motor vehicle crashes by area development type**

Development Type	2011	2012	2013	2014	2015	Total
Farms, Woods, Pastures	268 9.9	317 10.6	286 10.4	296 9.9	271 8.9	1,438 9.9
Residential	979 36.3	1,149 38.3	956 34.6	1,031 34.5	1,087 35.6	5,202 35.9
Commercial	1,348 50.0	1,430 47.7	1,409 51.0	1,546 51.7	1,585 51.9	7,318 50.5
Institutional	88 3.3	84 2.8	89 3.2	95 3.2	88 2.9	444 3.1
Industrial	14 0.5	17 0.6	21 0.8	21 0.7	23 0.8	96 0.7
Total	2,697 18.6	2,997 21.0	2,761 19.2	2,989 21.1	3,054 21.6	14,498 100

<sup>4</sup> In this and most of the following tables the formatting is as follows:

The top row for each variable level is the count of crashes with that characteristic. The numbers (with decimals) in the bottom rows for each category are percentages.

<sup>1</sup> = Row percent of column total

<sup>2</sup> = Row total percent of total

<sup>3</sup> = Column total percent of total

Total includes total minus any cases with missing or unknown data

### County and City Trends

Using 2013 (middle year) population estimates as a rate denominator, the average yearly pedestrian crash rate averages for 2011 - 2015 were as follows:

- about 2.9 per 10,000 residents for the State as a whole,
- 3.9 per 10,000 across all urban (incorporated) areas, and
- 1.7 per 10,000 residents in unincorporated (rural) areas of the State.<sup>5</sup>

Table 3 shows the top ten counties with the highest numbers of pedestrian-motor vehicle crashes for the recent five-year period. Each of these counties reported more than 200 pedestrian crashes, and the numbers have increased for every county in the list, except Cumberland, compared with the prior summary for 2008-2012. The rates per population also increased for seven counties, remained essentially the same for one, and decreased slightly for two counties compared with 2008-2012 rates (see Table 3). The top ten counties accounted for 58 percent of NC's reported pedestrian-motor vehicle crashes. Most of the counties in the list are highly urbanized. Thus, the high crash counties are, largely, reflections of where more people live in the State. However, the crash rates based on population do vary among the high-crash-frequency counties from a low of 2.4 per 10,000 residents (Forsyth Co.) to a high of 5.2 per 10,000 (Durham Co.). The average is 3.8 per 10,000 residents for these 10 counties (summing all crashes together, and all population together prior to calculating the rate). The county-level differences may reflect differences in extent of urbanization and other factors discussed below regarding cities.

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<sup>5</sup> Population estimates from North Carolina Office of State Budget and Management website, from [https://files.nc.gov/ncosbm/demog/revmuniestbycounty\\_2013.html](https://files.nc.gov/ncosbm/demog/revmuniestbycounty_2013.html)

**Table 3 Ten NC counties with highest numbers of pedestrian crashes from 2011 to 2015 and average yearly population-based crash rates**

County	2011-2015 Crash Count	percent of State Total	Avg. 1- year Freq.	July 2013 Estimate	Avg. yrly crash rate/10,000 residents <sup>6</sup>	Prior Avg yrly rate (2008- 2012)
Mecklenburg	2,474	17.1	494.8	991,508	5.0	4.5
Wake	1,537	10.6	307.4	964,022	3.2	3.0
Guilford	1,158	8.0	231.6	507,144	4.6	4.2
Durham	744	5.1	148.8	286,239	5.2	4.4
Cumberland	597	4.1	119.4	331,633	3.6	3.8
Buncombe	482	3.3	96.4	248,467	3.9	3.7
Forsyth	431	3.0	86.2	360,086	2.4	2.2
New Hanover	421	2.9	84.2	213,707	3.9	4.1
Gaston	347	2.4	69.4	209,442	3.3	3.3
Pitt	273	1.9	54.6	173,783	3.1	2.1
Subtotal for 10 counties	8,464	58.4	1,692.8	4,474,399	3.8	3.7

Table 4 shows the ten cities with the highest numbers of pedestrian-motor vehicle crashes during this five-year period. These ten cities together accounted for 47 percent of the State's 14,498 reported pedestrian crashes for this period. Among North Carolina cities, Charlotte accounted for 16 percent of statewide pedestrian crashes over the past five years, followed by Raleigh (8 percent), Greensboro (6 percent), Durham (5 percent) and Fayetteville (3 percent).

Again, the cities with the highest numbers of pedestrian crashes are generally those with the largest populations. However, there is not an exact correlation as shown by the population-based crash rates in the right-hand columns of Tables 5. Among the ten cities with the highest counts of crashes in the State for 2011 to 2015, Asheville had the highest average yearly crash rate per population (8.5 per 10,000 residents), followed by Greensboro (6.0 per 10,000 residents), and Durham and Wilmington (both 5.9 per 10,000). The average crash rate based on population for all ten cities is 5.4 per 10,000 residents, an increase over the rate for the top ten cities for the period of 2008-2012.

As already mentioned, other factors besides population affect the rate of crashes. These include the extent of walking by residents and visitors, traffic volumes, characteristics of roadways where pedestrians walk, and driver and pedestrian behaviors. For example, there

<sup>6</sup> Population estimates from North Carolina Office of State Budget and Management website, from [https://files.nc.gov/ncosbm/demog/countygrowth\\_2013.html](https://files.nc.gov/ncosbm/demog/countygrowth_2013.html)

may be more walking in university towns or communities with high levels of tourism. Nighttime activity may also play a role.

**Table 4 Ten NC cities with highest numbers of pedestrian crashes from 2011-2015**

Municipality	Five-year Crash Count	Avg. Annual Frequency	percent of NC Total	July 2013 Pop est.	Avg. yearly crash rate / 10,000 residents <sup>7</sup>	Prior Avg yrly rate (2008- 2012)
Charlotte	2,276	455.2	15.7	789,240	5.8	5.1
Raleigh	1,110	222.0	7.7	424,817	5.2	4.8
Greensboro	840	168.0	5.8	278,249	6.0	5.6
Durham	713	142.6	4.9	239,725	5.9	5.0
Fayetteville	448	89.6	3.1	209,748	4.3	4.6
Asheville	374	74.8	2.6	87,852	8.5	8.1
Wilmington	326	65.2	2.2	111,017	5.9	5.4
Winston- Salem	317	63.4	2.2	235,223	2.7	2.4
High Point	232	46.4	1.6	107,630	4.3	4.1
Gastonia	200	40.0	1.4	72,626	5.5	5.8
Subtotal for 10 cities	6,836	1,367.2	47.2	2,556,127	5.4	4.9

The crash fact descriptions that follow are also undoubtedly related to exposure, or when and where people choose to walk, and other factors including the roadway and traffic conditions present; who is walking (age and physical condition), and pedestrian and motorist behaviors. Crash numbers can also change over time simply due to chance, due to changes in crash reporting procedures, and due to weather or other factors such as economics that affect the amounts of walking and driving.

## Pedestrian Characteristics

### Pedestrian Age

It is difficult to draw firm conclusions about the year-to-year fluctuations in crash proportions by age across these five years (Table 5). (Note that the younger age categories span five years, while those beginning with age 31 span 10 years.) Crash involvement among the very young (up to age 5) has remained fairly consistent since 2013 at 68-69 per year. Crashes among young adults (21-25 and 26-30) generally increased over this time period with the numbers in 2016 being 1.3 times that in 2011 for the 26-30 year age group. Crashes among other groups fluctuated more unpredictably year-to-year, but starting with the 51 to 60 year age group and

<sup>7</sup> Population estimates from North Carolina Office of State Budget and Management website, from: [https://files.nc.gov/ncosbm/demog/revmuniestbycounty\\_2013.html](https://files.nc.gov/ncosbm/demog/revmuniestbycounty_2013.html)

older, crash trends increased fairly consistently over the five years. Crash involvement by age reflects both population numbers of the different age groups, and exposure or amount of walking among different age groups, among other risk factors.

**Table 5 Age group of pedestrians involved in crashes**

Pedestrian Age	2011	2012	2013	2014	2015	Total
0-5	87	87	69	68	68	379
	3.3	2.9	2.5	2.3	2.2	2.6
6-10	84	86	103	95	78	446
	3.2	2.9	3.8	3.2	2.6	3.1
11-15	164	193	148	170	161	836
	6.2	6.5	5.4	5.7	5.3	5.8
16-20	338	332	301	310	325	1,606
	12.7	11.2	11.0	10.4	10.7	11.2
21-25	296	366	348	368	352	1,730
	11.1	12.3	12.7	12.4	11.6	12.0
26-30	251	290	271	305	329	1,446
	9.4	9.8	9.9	10.2	10.8	10.0
31-40	423	442	375	455	485	2,180
	15.9	14.9	13.7	15.3	15.9	15.1
41-50	404	481	452	430	434	2,201
	15.2	16.2	16.5	14.4	14.2	15.3
51-60	326	350	357	411	429	1,873
	12.3	11.8	13.0	13.8	14.1	13.0
61-70	158	226	204	222	228	1,038
	5.9	7.6	7.4	7.5	7.5	7.2
71+	128	115	113	142	157	655
	4.8	3.9	4.1	4.8	5.2	4.6
Total	2,659	2,968	2,741	2,976	3,046	14,390
	18.5	20.6	19.0	20.7	21.2	

Combining age categories into larger ranges gives a picture of the overall crash involvement by children, young adults, middle-aged adults, and older adults (Figure 5). Children up to age 16, on average, accounted for about 12 percent of pedestrian crash-involvement over this time period. Teens and young adults between the ages of 16 and 30 accounted for 33 percent; middle-aged adults from 31 to 60 years account for 44 percent, and older adults 61 and up for 12 percent.

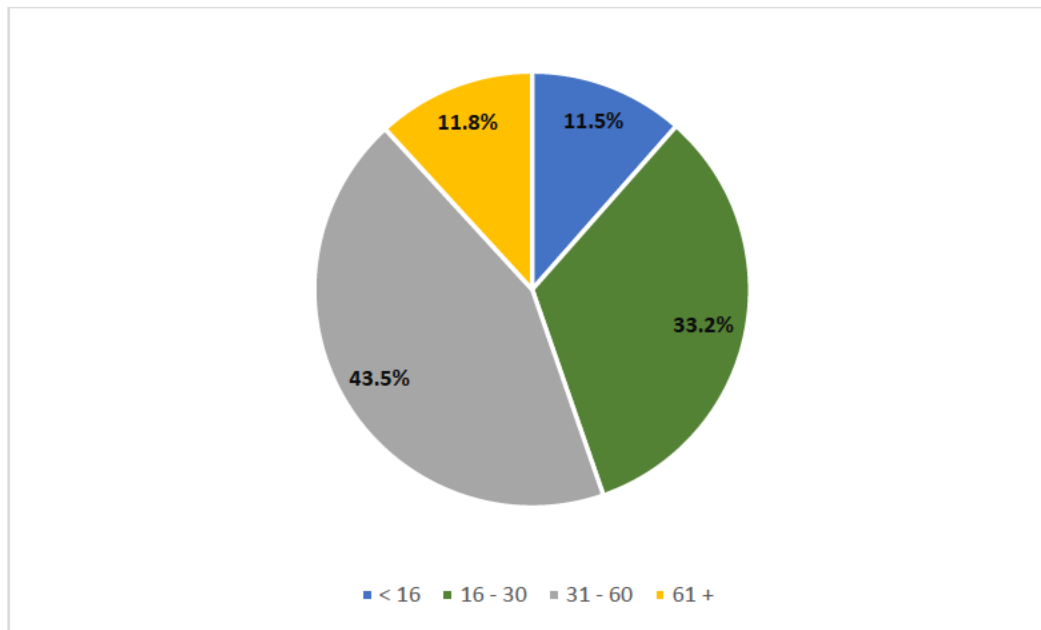


Figure 5 Percentage of NC pedestrian crashes by pedestrian age range, 2011-2015

### Pedestrian Injury

As already mentioned, crashes of all severities increased over this time period.

Table 6 shows the data for all five years for crashes where the injury severity was reported. As shown in Table 6, pedestrian crashes tend to be especially serious, with 6 percent of pedestrian crashes in North Carolina resulting in fatal injuries. This proportion compares with less than 1 percent of all reportable (including motor-vehicle only) crashes that resulted in fatalities for the same period. An additional 7 percent of pedestrians suffered serious (A-type) injuries over the five years.

Using 2013 population estimates, the 2011-2015 crashes translate to an average of 1.78 fatal pedestrian *crashes* per year per 100,000 residents (2013 estimates of 9,852,822). Based on data from the National Highway Traffic Safety Administration comparing states, 1.73 pedestrians were killed per 100,000 residents in North Carolina in 2014 making it the 14<sup>th</sup> most dangerous state for pedestrians.<sup>8</sup>

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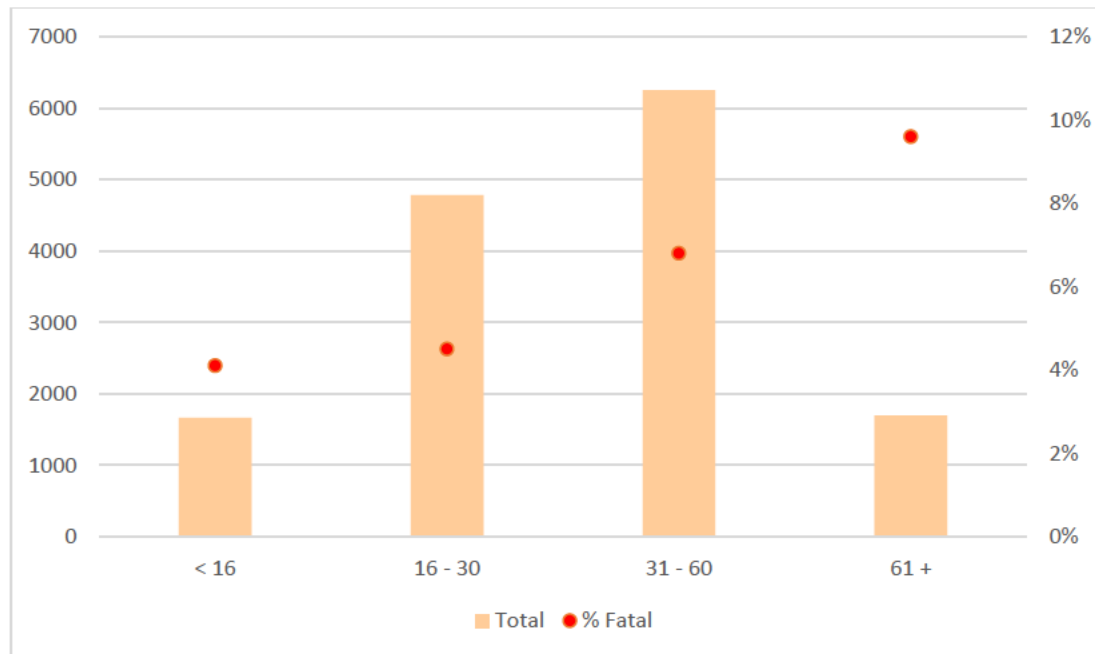
<sup>8</sup> The Most (and Least) Dangerous States for Pedestrians: <http://247wallst.com/special-report/2016/05/27/states-with-the-most-pedestrian-deaths/>



**Table 6 Five-year pedestrian crash injury levels. (Counts are of crashes, with injury level of the first pedestrian in each crash)**

Pedestrian Injury	2011	2012	2013	2014	2015	Total
K: Killed	160	188	163	176	192	879
	6.2	6.5	6.1	6.1	6.5	6.4
A: Disabling Injury	167	215	165	199	192	938
	6.5	7.5	6.2	6.9	6.5	6.7
B: Evident Injury	987	1,070	938	1,044	1,066	5,105
	38.4	37.1	35.2	36.1	35.8	36.5
C: Possible Injury	1,103	1,247	1,219	1,304	1,372	6,245
	42.9	43.2	45.8	45.1	46.1	44.7
O: No Injury	154	165	179	167	154	819
	6.0	5.7	6.7	5.8	5.2	5.9
Total	2,571	2,885	2,664	2,890	2,976	13,986
	18.4	20.6	19.0	20.7	21.3	

Although older pedestrians (61 and up) are involved in lower numbers of pedestrian collisions than other age groups, their injuries tend to more often be fatal when a vehicle strikes them (Figure 6). The rise in proportion of crashes involving children (4%) to older adults (10%) that resulted in fatal injuries may reflect in part the different types of locations where different age groups were when struck, as well as vulnerability or frailty, alcohol use, and other issues.



**Figure 6 Pedestrian Crashes and Fatal Injury by Age Group**



### Pedestrian Gender

On average, males accounted for an average of 60 percent and females, 41 percent of the pedestrians involved in crashes over this five-year period (Table 7). These percentages have remained relatively the same over time. Males are, however, more likely to be involved in fatal collisions with 8 percent of their crashes resulted in fatal injuries compared with 4 percent for females (data not shown).

**Table 7 Pedestrian gender for those involved in crashes**

Pedestrian Sex	2011	2012	2013	2014	2015	Total
Female	1,112	1,185	1,103	1,167	1,237	5,804
	41.8	40.1	40.4	39.5	40.7	40.5
Male	1,548	1,772	1,627	1,785	1,799	8,531
	58.2	59.9	59.6	60.5	59.3	59.5
Total	2,660	2,957	2,730	2,952	3,036	14,335
	18.6	20.6	19.0	20.6	21.2	

### Pedestrian Alcohol Use

The investigating officer indicated alcohol use by an average of about 12 percent of the pedestrians struck by motor vehicles over these five years (Table 8). Suspected use does not necessarily imply that the pedestrian was impaired at the time of the crash, but that evidence of alcohol use or impairment was detected or suspected and may have played a role. When alcohol *is* involved, pedestrian crashes are also more often fatal. Although only 12 percent of crashes reportedly involved pedestrian alcohol use, 287 or 33 percent of the 879 fatal crashes implicated alcohol use by the pedestrian (data not shown).

**Table 8 Pedestrian use of alcohol**

Pedestrian Alcohol	2011	2012	2013	2014	2015	Total
No	2,363	2,636	2,406	2,647	2,710	12,762
	88.0	88.2	87.4	88.7	89.1	88.3
Yes	324	351	346	338	333	1,692
	12.1	11.8	12.6	11.3	10.9	11.7
Total	2,687	2,987	2,752	2,985	3,043	14,454
	18.6	20.7	19.0	20.7	21.1	

## Driver and Vehicle Characteristics

This section describes characteristics of drivers involved in collisions with pedestrians. One of the characteristics is that *20 percent of drivers were involved in hit-and-run crashes* with pedestrians. The other traits for a majority of these hit-and-run drivers, who left the crash scene, and some additional drivers, are therefore unknown, so the numbers of drivers reported on in the following sections is lower than for the number of crashes and pedestrians.

### Driver Age

There were year-to-year fluctuations in the distributions of driver age group involved in pedestrian crashes across the five years of data (Table 9). Younger drivers less than age 20 seem to exhibit a general decreasing trend in involvement in crashes with pedestrians, but trends were less clear among those ages 20-24. The youngest two age groups (up to age 24) combined, accounted, however, for nearly 20 percent of all collisions with pedestrians (this compares to nearly 22 percent over the five-year interval from 2008-2012). Conversely, adults of ages 50 and above seem to be involved in an increasing number of pedestrian crashes over these five years, which may partly reflect increasing populations of these ages.

**Table 9 Age of drivers involved in crashes with pedestrians**

Driver Age	2011	2012	2013	2014	2015	Total
< 20 yrs	182	199	182	153	152	868
	8.2	8.0	8.1	6.3	6.1	7.3
20-24	289	326	263	287	336	1,501
	13.1	13.1	11.7	11.8	13.5	12.6
25-29	266	251	221	264	271	1,273
	12.0	10.1	9.8	10.9	10.9	10.7
30-39	385	440	380	431	452	2,088
	17.4	17.7	16.9	17.7	18.1	17.6
40-49	387	410	396	388	373	1,954
	17.5	16.5	17.6	16.0	15.0	16.4
50-59	299	366	338	398	383	1,784
	13.5	14.7	15.0	16.4	15.4	15.0
60-69	228	271	252	271	282	1,304
	10.3	10.9	11.2	11.1	11.3	11.0
70+	176	229	222	240	243	1,110
	8.0	9.2	9.8	9.9	9.8	9.3
Total	2,212	2,492	2,254	2,432	2,492	11,882
	18.6	21.0	19.0	20.5	21.0	

### Driver Gender

Male drivers accounted for 56 percent of the pedestrian-motor vehicle crashes over the five years, and female drivers about 44 percent. Year-to-year fluctuations in these percentages are generally slight (Table 10).

**Table 10 Gender of drivers involved in crashes with pedestrians**

Driver Sex	2011	2012	2013	2014	2015	Total
Female	1,004	1,111	976	1,092	1,129	5,312
	45.2	44.4	43.0	44.6	44.9	44.4
Male	1,217	1,391	1,293	1,359	1,385	6,645
	54.8	55.6	57.0	55.4	55.1	55.6
Total	2,221	2,502	2,269	2,451	2,514	11,957
	18.6	20.9	19.0	20.5	21.0	

### Driver Injury

As would be expected, drivers are not often seriously injured in crashes with pedestrians, with over 95 percent of drivers reported to receive no injuries, 3 percent possibly receiving injuries, and another 1 percent receiving evident injuries (data not shown). However, there were three reported driver fatalities associated with pedestrian collisions and another 10 reported disabling driver injuries. It is possible that a driver injury was due to the crash also involving multiple vehicles or striking other objects.

### Driver Alcohol Use

The investigating officer detected or suspected alcohol use by the drivers involved in pedestrian crashes in an average of about 4 percent of the crashes for all five years when alcohol use was reported (Table 11). This means that the investigating police officer reported detecting alcohol or suspicion of alcohol use. Again, suspicion of alcohol use does not necessarily imply intoxication or that alcohol was a factor in the crash. However, in fatal pedestrian crashes with driver data provided, driver alcohol use was a factor in 72 crashes or 8 percent (data not shown), again suggesting that alcohol use is over-represented in fatal crashes.

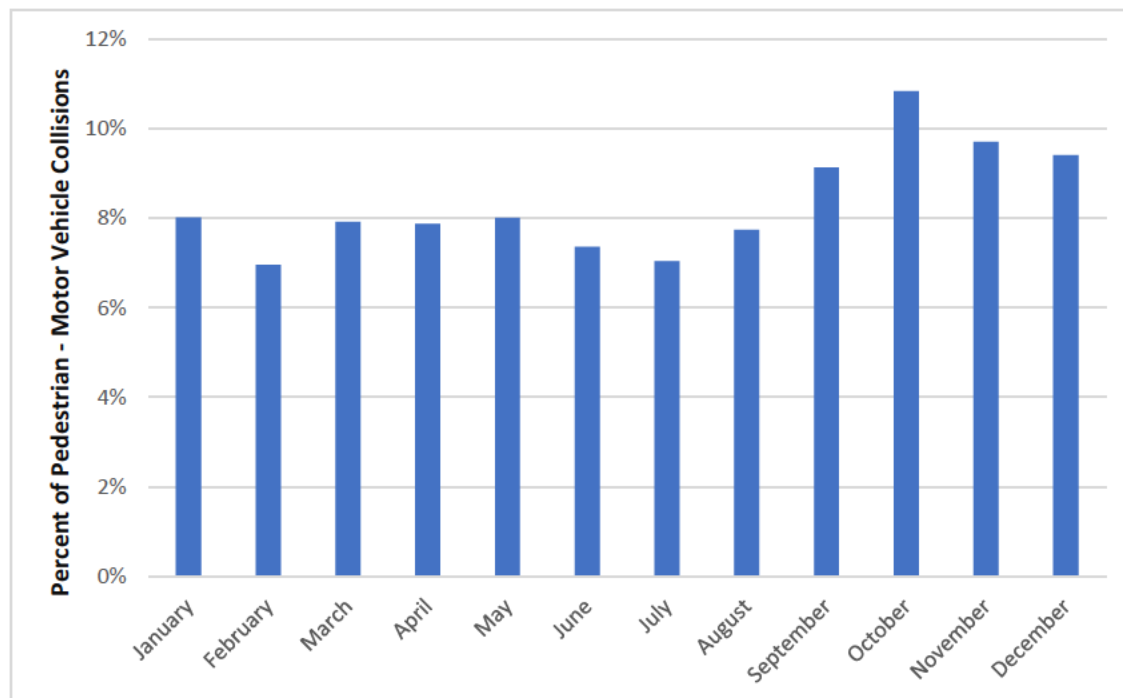
**Table 11 Suspected alcohol use among drivers involved in crashes with pedestrians**

Driver Alcohol	2011	2012	2013	2014	2015	Total
No	2,222 96.4	2,440 95.2	2,280 96.6	2,471 96.5	2,507 96.1	11,920 96.2
Yes	82 3.6	123 4.8	81 3.4	90 3.5	101 3.9	477 3.8
Total	2,304 18.6	2,563 20.7	2,361 19.1	2,561 20.7	2,608 21.0	12,397

## Temporal and Environmental Factors

### Month of Year

Pedestrian crashes occur throughout the year, but are generally lowest in the summer months in North Carolina. Monthly peaks vary from year to year, but pedestrian crashes over this time period typically begin increasing from a low in July through August - September with the highest average numbers occurring in the fall months of October to December, when daylight periods are shorter, and children and college-age students have returned to school (Figure 7).



**Figure 7 NC pedestrian crashes by month of year, 2011-2015**

### Day of the Week and Time of Day

Pedestrian crashes in NC average about 14 to 15 percent, Mondays to Thursdays; Friday is the highest crash day at around 17 percent. Sunday has the fewest. Weekday peak travel times between 2 and 10 pm, along with Saturday between 6 and 10 pm and 10 pm to 2 am account for the largest proportions of crashes. High crash periods locally could be examined along with other circumstances (e.g. failure to yield/ turning crash types, speeding, impairment, etc.), and the locations of crashes to determine best locations and times of day for targeted enforcement and other activities (Figure 8).

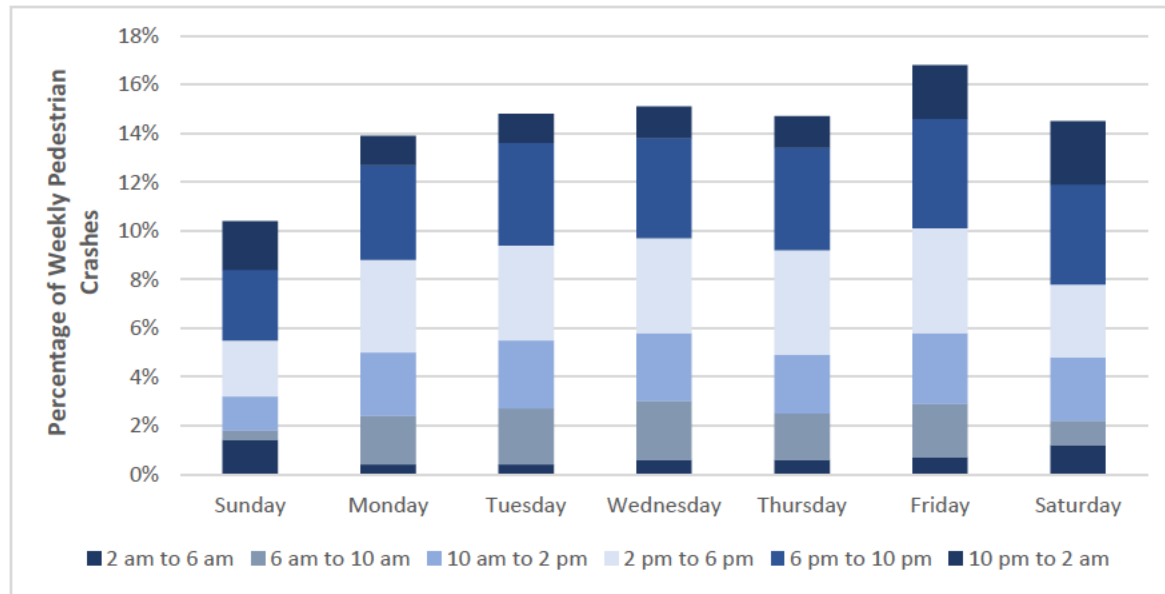


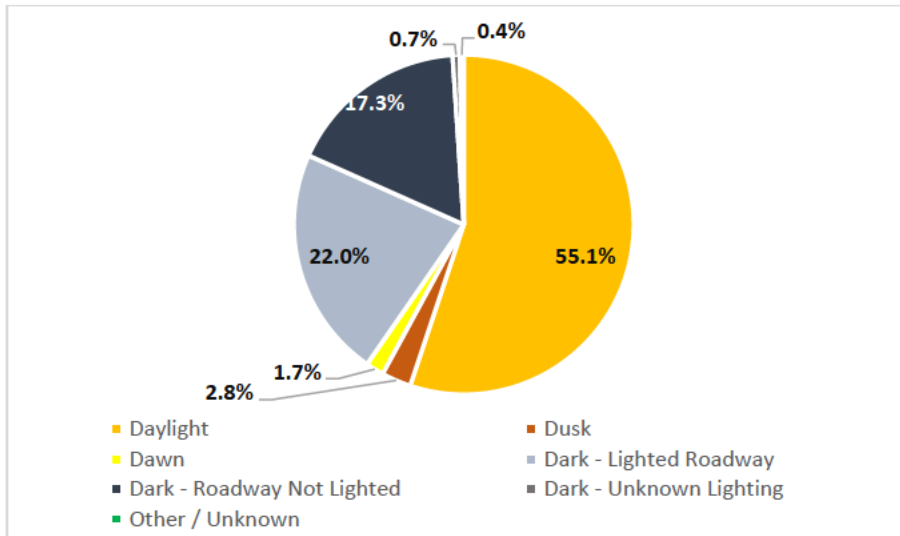
Figure 8 NC pedestrian crashes by day of week and time of day, 2011-2015

### Light Condition

While 55 percent of collisions occurred during daylight hours, 45 percent of pedestrian crashes over the five-year period occurred during non-daylight hours, including dawn and dusk. About 22 percent of crashes occurred at night on lighted roadways (typically urban roads) and 17 percent occurred at night on roadways indicated to have no supplemental lighting (Figure 9).

Those struck at night on unlighted roadways were more than 2.5 times as likely to be killed (17 percent of those struck) compared with those struck at night on lighted roadways (7%; data not shown), with the rate being almost 7 times as likely as during daylight hours (3%). The increased rate of fatalities on unlighted, dark roads likely reflects a number of factors. Unlighted roads are also more likely to be more suburban or rural and higher-speed, compared with lighted roads. In addition, alcohol and some of the other risk factors may also be influences at night. At night, compared with daylight hours, drivers' ability to detect pedestrians in order to slow down is also affected.

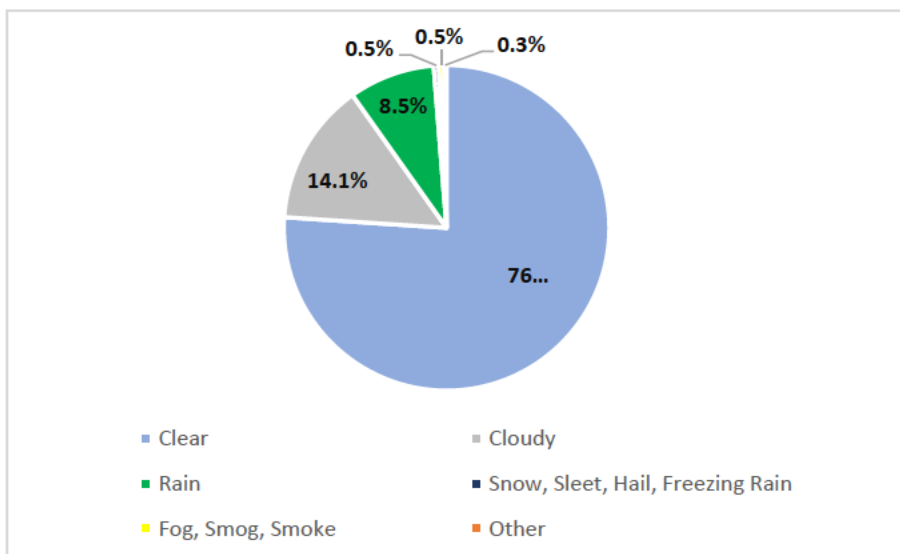
## NC Pedestrian Crash Facts, 2011-2015



**Figure 9 NC pedestrian crashes by light condition, 2011-2015**

### Weather

The majority of pedestrian crashes occurred, on average, under clear (76 percent) or cloudy (14 percent) weather conditions (Figure 10), no doubt reflecting exposure. Year-to-year variation in the number of crashes occurring under rainy, snowy/icy, or foggy/smoky conditions is also likely a reflection of exposure to these conditions (e.g., more pedestrian crashes under snowy conditions in years when the State received more snowfall). Poor weather conditions, especially combined with darkness, affect the ability of drivers to detect pedestrians. Wet or icy roads may also affect stopping distance.



**Figure 10 NC Pedestrian crashes by weather condition, 2011-2015**

## Roadway Characteristics

### Roadway Classification

Nearly half (49 percent) of all pedestrian-motor vehicle crashes occurred on local (mostly city) streets reflecting higher levels of walking and numbers of pedestrians in cities and neighborhoods (Table 12). Over 25 percent of reported pedestrian crashes occurred in parking lots, public driveways, or other public vehicular areas. Many other parking lot crashes probably go unreported. Thus, parking lot crashes are a significant issue warranting better planning and design of parking areas and commercial driveways, and possibly educational measures. Collisions that occurred on private property were reported frequently enough to comprise 3 percent of crashes.

Nearly 10 percent of pedestrian crashes occurred along State Secondary routes. All other roadway classifications accounted for about 13 percent of the total, including 5 percent on NC Routes, 6 percent on US Routes, and about 2 percent on Interstate Routes. Collisions on interstates often involve pedestrians associated with disabled vehicles or who were involved in a prior vehicle-to-vehicle collision, but sometimes involve pedestrians trying to cross an expressway. There appear to be some inaccuracies in these data, with, for example, crashes that occurred within urban areas sometimes coded as on Local Streets, although when mapped, they are found to have occurred on roads designated as US, NC, or State Secondary routes.

**Table 12 Pedestrian crashes by roadway classification**

Road Classification	2011	2012	2013	2014	2015	Total
Interstate	43	42	50	43	54	232
	1.6	1.4	1.8	1.4	1.8	1.6
US Route	146	209	174	182	161	872
	5.4	7.0	6.3	6.1	5.3	6.0
NC Route	120	162	143	172	172	769
	4.4	5.4	5.2	5.8	5.6	5.3
State Secondary Route	290	288	271	294	287	1,430
	10.8	9.6	9.8	9.8	9.4	9.9
Local Street	1,289	1,500	1,374	1,445	1,539	7,147
	47.8	50.1	49.8	48.3	50.4	49.3
Public Vehicular Area	711	720	686	773	760	3,650
	26.4	24.0	24.8	25.9	24.9	25.2
Private Road, Driveway	98	76	63	80	81	398
	3.6	2.5	2.3	2.7	2.7	2.7
Total	2,697	2,997	2,761	2,989	3,054	14,498
	18.6	20.7	19.0	20.6	21.1	



### Road Type/ Configuration

On average, 72 percent of pedestrian collisions occurred on two-way, undivided roadways, 12percent on two-way roads divided by an unprotected median, with 5 percent on two-way roads divided with a positive median barrier (often freeways), and 8 percent on one-way roads or sections (Figure 11).

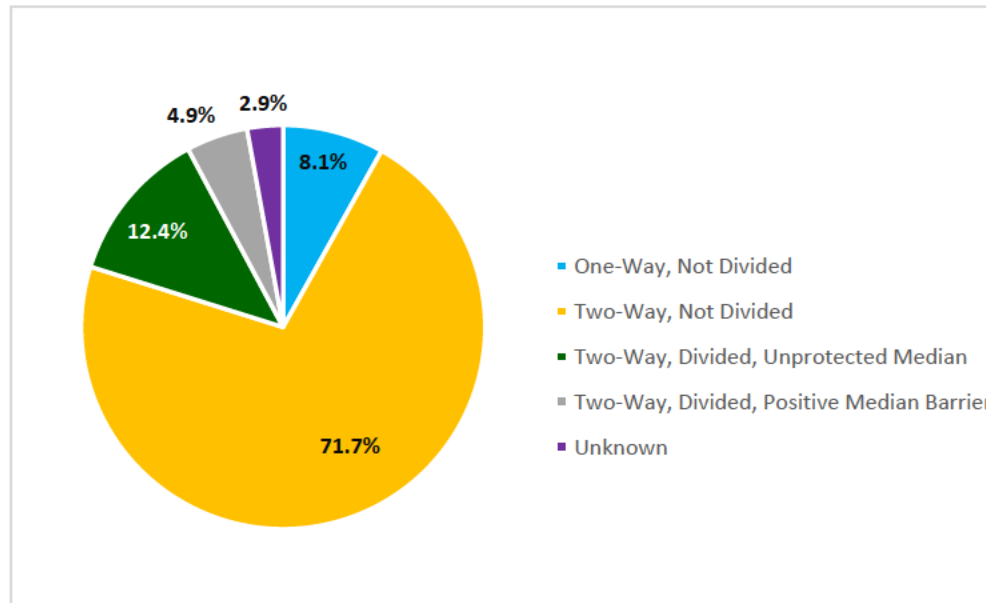


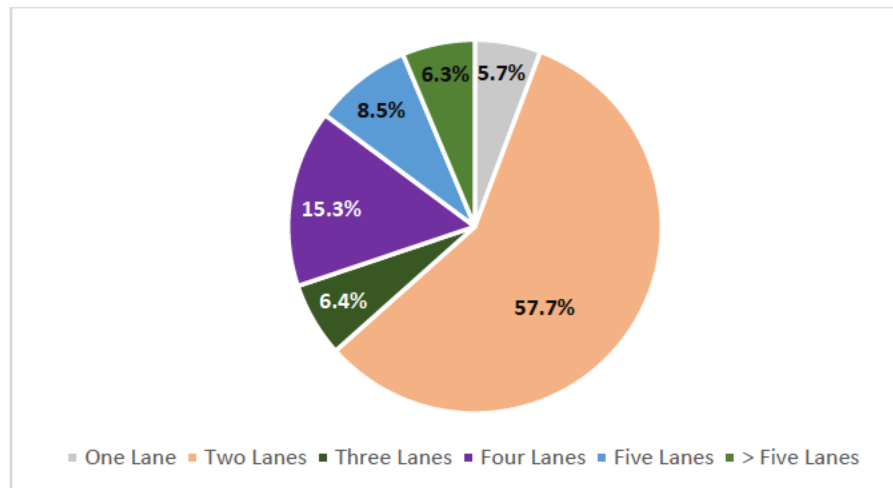
Figure 11 Road configuration and pedestrian crashes, 2011-2015

### Number of Through Lanes

Number of lanes should reflect number of *through* lanes, excluding limited turn lanes and other non-continuing lanes. The figure below excludes pedestrian crashes that occurred in parking lots and other non-roadway locations (Figure 12). The majority of reported on-roadway pedestrian crashes occurred on two-lane roads (58 percent), while 37 percent occurred on multi-lane roadways with three or more travel lanes, especially four-lane roads (15 percent).

The numbers of crashes reflect amounts of walking and driving on roadways with different numbers of lanes as well as other possible differences in road design and risk exposure to crashes. There are also likely to be some inaccuracies in these data, with some apparent variation in how reporting officers interpret of numbers of lanes based on divided/undivided, presence of two-way turn lanes and other roadway characteristics.





**Figure 12 Pedestrian crashes by number of through traffic lanes**

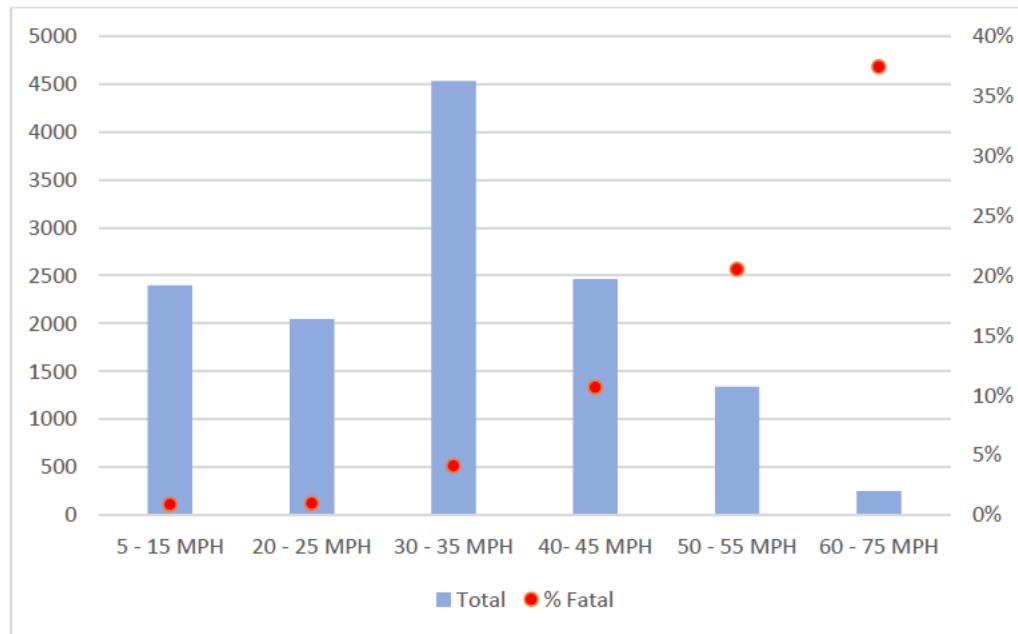
### Speed Limit

When speed limits were known and reported, the largest number (69 percent) of pedestrian crashes occurred on roads of 35 mph or lower. These statistics likely reflect the fact that urban streets and commercial thoroughfares, where more pedestrians tend to walk, generally have limits of 35 mph or lower.

However, pedestrian crashes on higher speed roads are typically more severe. On average 2 percent of those struck on streets and roads with speed limits of 25 mph and lower were killed. However, the proportion of those struck who died from their injuries begin to climb rapidly with higher speed limit roads (Figure 13). About 4 percent of those struck on 30–35 mph roads were killed. The proportions of pedestrians who were killed rose to 11 percent on roads with limits of 40–45 mph; 21 percent on roads 50–55 mph, and 38 percent of those struck on roads with limits of 60–75 mph. In total, 72 percent of pedestrians killed, were struck on roadways with speed limits of 40 mph and greater. (Note that crash data do not provide good information on actual travel speeds of the striking vehicles, but the speed limit of the roadway provides general information about the prevailing travel speeds.) For comparison, roadways with speed limits of 40 mph and above account for 28 percent of pedestrian crashes of all severities in the State.

Road designs, speed limits, and adequate provision for pedestrians to cross and walk along roadways are especially important to reduce the severity of injuries that may result if crashes occur.

## NC Pedestrian Crash Facts, 2011-2015



**Figure 13 Pedestrian crashes and fatal injury by posted speed limit of roadway**

The crash factors discussed in this summary provide information useful for assessing problems and providing safe and accessible pedestrian facilities for local and State roads. Factors especially associated with increasing proportions of fatalities include rural location, speed limit of the roadway, darkness (especially unlighted roads), older age of pedestrian, and suspected alcohol use by either the pedestrian or the driver. Other factors may also be associated with increasing injury severity.

Resources such as PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System (<http://www.pedbikesafe.org/PEDSAFE/>) and others can provide additional assistance with diagnosing and identifying appropriate treatments for pedestrian safety issues.

For more information about pedestrian crashes and potential countermeasures in North Carolina and events leading up to the crashes, see the companion *North Carolina Pedestrian Crash Types* summary report.

## Appendix A – NC Counties by Geographic Region

Table 13 NC Counties by Region of State

Coastal	Piedmont	Mountains
Beaufort	Alamance	Alleghany
Bertie	Alexander	Ashe
Bladen	Anson	Avery
Brunswick	Cabarrus	Buncombe
Camden	Caswell	Burke
Carteret	Catawba	Caldwell
Chowan	Chatham	Cherokee
Columbus	Davidson	Clay
Craven	Davie	Cleveland
Cumberland	Durham	Graham
Currituck	Forsyth	Haywood
Dare	Franklin	Henderson
Duplin	Gaston	Jackson
Edgecombe	Granville	Macon
Gates	Guilford	Madison
Greene	Iredell	McDowell
Halifax	Lee	Mitchell
Harnett	Lincoln	Polk
Hertford	Mecklenburg	Rutherford
Hoke	Montgomery	Surry
Hyde	Moore	Swain
Johnston	Orange	Transylvania
Jones	Person	Watauga
Lenoir	Randolph	Wilkes
Martin	Richmond	Yadkin
Nash	Rockingham	Yancey
New Hanover	Rowan	
Northampton	Scotland	
Onslow	Stanly	
Pasquotank	Stokes	
Pender	Union	
Perquimans	Vance	
Pitt	Wake	
Robeson	Warren	
Sampson		
Tyrrell		
Washington		
Wayne		
Wilson		