# CARE IMPACT Study of Traffic Crashes Involving Pedestrians 2013-2017 Data

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## **Introduction and Summary of Findings**

### Recommendations

The major goal of these recommendations is the reduction in pedestrian fatalities. To some extent the reduction in all pedestrian crashes will reduce fatalities. However, in Alabama there are many significant differences between the aspects of fatal and non-fatal pedestrian crashes. So if there is a trade-off between two factors, one of which will reduce all pedestrian crashes, and the other that will reduce pedestrian fatalities, we would lean toward the one that reduces the fatalities.

At the outset it should be recognized that there are potentially two human causes to a pedestrian crash: the pedestrian and the driver. These recommendations will be divided accordingly. The pedestrian will be considered first, since they have a greater potential for behavioral changes.

### Recommended Pedestrian Countermeasures

The following is a prioritized list of actions that the traffic safety community in Alabama should take that are directed toward pedestrian crashes:

- Initiate a PI&E or other behavioral modification program that will instill within those of all ages who are going to be walking along and across the roadways to see the dangers of impaired walking and distracted walking. This should be expressed, not only in terms of impairment and distraction causing the crash itself, but also in its increasing the severity to its being fatal. Both of these factors, and especially the combination of both of them, prevents the pedestrian from taking the normal preventative and protective response behaviors, which results in a larger number of pedestrian fatalities.
- Training should start at the earliest possible ages, recognizing the over-representation of pedestrian crashes in general in school zones. K-9 training also has effects that could be life-long in duration. This should include intensive behavioral training with regard to actions going to or from school buses.
- Include in these efforts training on protection, preemption before involvement in a crash is imminent, and response when it is no longer preventable. A large majority of pedestrian fatalities are caused by the pedestrian as opposed to the driver. The normal rules for walking and crossing need to be emphasized by the information on the recent fatality increases. For details on the most over-represented negative actions see C015 and C304 within the Pedestrian Fatality Analysis section, both of which show the greatest problem to be Improper Crossing, which is greatly multiplied when the crossing is not done at an intersection.
- Impress upon those who will be pedestrians the fact that the great majority of fatal pedestrian crashes are the fault of the pedestrian, and so it is their responsibility to protect themselves at all times if they are going to avoid injury.

- Protection and preemption information should concentrate on the subject of making yourself visible to the driver, since a major problem in pedestrian fatalities is the driver either not seeing the pedestrian at all, or seeing them too late to take effective preventive actions. Walking against traffic and wearing reflective clothing in the darkness are critical. If at all possible, avoid walking at night, and if that is necessary, be sure to wear reflective clothing. Avoid being out late Friday or Saturday nights, since these are the heaviest DUI times, and these drivers often do not see pedestrians because of impairment. Walking with others could help, but it is not the ultimate solution in that close to 10% of fatal pedestrian crashes involved two or more pedestrians.
- Rural, non-intersection locations where site distance is limited (e.g., no-passing zones) should be given special emphasis in enforcement, engineering and education, since these are the location types where most of the fatalities take place.
- Cities and counties that have more than their expected share of pedestrian fatalities should be targeted for these programs.

The following is a prioritized list of actions that the traffic safety community in Alabama should take that are directed toward drivers:

- While there are over-representations seen throughout the range of driver age, younger drivers (aged 16-20) have about 20% more pedestrian crashes than older drivers, and thus are the logical target group for training if it is to be limited to a narrow age group. Training them early also might have life-long effects. Another target would be male drivers and those who will be driving in rural areas. A final target group would be pickup truck drivers of all ages.
- All countermeasures to reduce impaired driving or distracted driving will reduce pedestrian fatalities. However, we recommend that such training be extended to include emphasis upon the extent to which pedestrians are particularly vulnerable to these driver errors.
- Drivers should be trained to always assume the worse behavior from pedestrians and never take anything for granted. This is especially relevant in light of the high number of pedestrian fatalities caused by impaired walking and distracted walking. It might seem reasonable to expect certain rational behaviors on the part of pedestrians, but typically these are not the pedestrians who are going to be involved.
- Since the location for the most lethal pedestrian crashes are on rural, relatively high speed roadways, drivers should be particularly aware of the vulnerability of pedestrians near these roadway types. It is essential that drivers actually look further ahead than many usually do in identifying their presence. Upon seeing a pedestrian, reduce speed and be ready to take whatever action is necessary to avoid a collision.
- Pedestrian problems occur where there is restricted sight distance for whatever reason. Drivers in these situations are concentrating on the roadway, and thus, not thinking about the possibility of pedestrians appearing, especially in the more remote areas. All of the warning signs for hills and curves, and especially no passing zones should trigger the driver to increase awareness of the potential pedestrian problems.

#### Introduction

The following shows the proportion by year of Alabama pedestrian crashes compared to all other crashes. Typically we would expect there two subsets to rise and fall together, and this is basically what occurred in the 2013-2017 time frame, since there are no significant over-representations four (note absence of asterisks \* in the Odds Ratio column).



The total number of pedestrian crashes over the five year period is 4002, or about 800 per year.

None of the years had significant differences, but the overall total differences in proportionate increase is significant. Non-pedestrian crashes in general have increased from 127,027 to 156,176, which is about 23%. Pedestrian crashes have increase from 735 to 825, which is only about 12%, which is about half the overall percentage difference. This would indicate that pedestrian crashes are not totally dependent on the overall traffic volume for a given year. Alabama's increases in pedestrian crashes and fatalities are also studied in the Time Characteristics section. These changes reflect the National picture, as given in a document entitled, "Pedestrian Traffic Fatalities by State: 2017 Preliminary Data," produced by the Governors' Highway Safety Association (GHSA); <a href="https://www.ghsa.org/resources/spotlight-pedestrians18">https://www.ghsa.org/resources/spotlight-pedestrians18</a>

This document will continue by providing a summary of the detailed findings that are given in subsequent sections. It is important to recognize that the IMPACT displays are not all consistently comparing the same thing. To properly interpret them it is important to determine what the red and blue bars mean as well as what the "Subset" and the "Other" subsets of the data represent. This will be given in the narrative and in the title of the sections.

Statistical significance is indicated by an asterisk on the odds ratio table entries. If a significance was determined at the 0.999 level of significance or greater, an asterisk will appear. However, statistical tests are only performed when there is a sample size of at least 20 in both subsets being compared. Thus, the absence of an asterisk in some cases should not be interpreted as the proportion of the two subsets not being significantly different,

#### **Summary of Findings**

The following summary is a list of conclusions that were summarized from the corresponding named sections that follow. Concentration is given on those findings that are counter to the general expectations or which could otherwise be useful in countermeasure development. It is important for optimization that the IMPACT outputs be examined to determine not only if an overrepresentation exists, but its size and the number of crashes that are affected by it.

- Crash Characteristics
  - C015. Primary Contributing Circumstances (PCC). The PCCs that had at least 100 occurrences and were most over-represented were Improper Crossing, Unseen Object/Person/Vehicle, Failed to Yield the Right-of-Way, Failed to Yield Right-of-Way to Pedestrian in Crosswalk, Pedestrian Under the Influence, and Not Visible. Looking at just fatal pedestrian crashes, Pedestrian Under the Influence has a higher Max Gain position, as did Not Visible and DUI.
  - C129. CU Vehicle Maneuvers. Significant over-representations for pedestrian crashes occur in the Backing, Turning Left and Movement Essentially Straight, with Right Turns also over-represented by not significantly so. Repeating this analysis for just fatal pedestrian crashes found Movement Essentially Straight to be the only category significantly over-represented, which is indicative of the predominantly rural nature of pedestrian fatalities.
  - C023. Manner of Crash. The major use of this attribute is in evaluating types of pedestrian crashes in which there are more than one vehicle involved. As expected, crashes with only one motor vehicle were significantly over-represented.
  - Cross-Tabulation of C023 and Number of Vehicles. This was performed to get better insight into interpreting C023. It was found that many of the codes that might be thought to apply to two vehicles were being applied to single vehicle pedestrian crashes.
  - C051. Number of Vehicles. Two or more motor vehicles are involved in less than 8% of pedestrian crashes.
  - C056. Number of Pedestrians. Multiple pedestrians are involved in only about 4% of pedestrian crashes; however, this percentage doubles when the crash involves one or more fatalities.
  - C203. CU First Harmful Event Location. Over-representations were found in the following (number of pedestrian crashes): In Parking Lane or Zone (209), Intersection with Crosswalk and Pedestrian Signal (86), Other Non-Intersection (51), Off Roadway (93), Shoulder (134, but under-represented), Intersection with Crosswalk no Pedestrian Signal (39), Non-Intersection Crosswalk (22), Sidewalk (15). While these last two have relatively few crashes, they were still highly overrepresented.

- <u>Time Characteristics</u>
  - C003. Year of Crash. Year is of interest because it shows if pedestrian crashes are increasing or decreasing over time. Over the 2013-2017 five years of the study, non-pedestrian crashes in general increased from 127,027 to 156,176, which is about 23%. Pedestrian crashes increased from 735 to 825, which is only about 12%, or about half the overall percentage difference. The pedestrian fatality distribution over the years is considerably different from overall pedestrian crashes. The low was in 2013, which was a very good year compared to those that followed. Years 2014 and 2015 were close to double 2013, and 2016 was much worse. Thus, the pedestrian fatality count increased by about 100% (i.e., it doubled). This alarming fact gave rise to the need for this study.
  - C004. Month. September and October clearly have the highest over-representations for pedestrian crashes, and they were the only two months that were significantly over-represented. June was the only month that had a significant underrepresentation, perhaps because of the heat and rain. July and August are also under-represented, but not significantly. For fatal pedestrian crashes, the most overrepresented months were also September and October.
  - C008. Time of Day. There is a great similarity of this distribution with that of alcohol and other drugs, which might lead us to suspect that they are instrumental in causing pedestrian crashes. Other attributes will confirm this, but it is not the only reason for these times to be high. An exception to the above, the earlier night/late evening (5 PM through 8 PM) hours are some of the highest, and this is probably just the convenient time to be out as opposed to any alcohol/drug involvement. Rush hours are high, but under-represented. Fatal pedestrian crashes are significantly over-represented from 7 PM through 6 AM, with the night-time hours being more pronounced.
  - C029. Lighting Conditions. The results here are consistent and tend to reinforce those for C008 immediately above. However, no doubt the inability to see pedestrians as well in darkness is a major cause of these over-representations.
  - C006. Day of the Week. Saturday is significantly over-represented and Monday is significantly under-represented. The rest are as expected compared to all nonpedestrian crashes. Although not totally, this follows the typical alcohol/drugs day-of-the-week distribution, the main exception being Sunday, which is slightly under-represented for pedestrians.
  - Day of the Week by Time of Day Cross-Tabulation. Night-time hours are clearly over-represented on Friday night, Saturday morning and night and Sunday morning. This is typical of crashes caused by alcohol/drugs, and the fault for such could either be on the impaired walking (IW) pedestrian or the impaired driving (ID) driver. The weekend over-representations become more pronounced for fatal pedestrian crashes, with both Saturday and Sunday have significant over-representations.

#### • <u>Driver Characteristics</u>

- C107. CU Driver Raw Age Frequency Distribution. Youngest drivers (16-30) have about the same average of pedestrian crashes as older drivers, but they are indicated to be under-represented because of their larger numbers in crashes in general. The most over-represented subset if the 45-66 year old group. Drivers older than this seem to continue to have problems with pedestrian crashes at about the same rate as the younger drivers. This indicates that age is not the causal factor that it is in some types of crashes (e.g., speed caused). As an example of how diversified the numbers are, the highest over-representation are at the ages of 27 through 61.
- P107 (P indicates that the information came from the Person as opposed to the Crash subset). Pedestrian Raw Age. This analysis compared pedestrians against the persons involved in non-pedestrian crashes. Over-representations occur at the youngest ages (3-15) and middle-aged (50-70). Two outputs are given: one for all pedestrians involved in crashes, and the other for those pedestrians that caused the crashes. The general conclusion reached was that there is very little inherent in age that makes pedestrians more apt to cause crashes, of conversely, more apt to avoid causing them.
- C109. CU Driver Gender. Driver gender for pedestrian crashes is about the same as for non-pedestrian crashes – there are no significant differences. However, the male over-representation becomes significant for fatal pedestrian crashes, being over-represented by about 20% greater proportion than would be expected. This might be attributed to more rural driving by males, and thus the higher speeds.
- C121. CU Driver Condition. Driver abnormal conditions do not appear to be significant in causing pedestrian crashes. The only item showing a frequency greater than 20 is Under the Influence of Alcohol or Other Drugs, with a frequency of 102 (3.32%). While the distribution for fatal pedestrian crashes is the same in most respects, the Under the Influence rises in significance, accounting for 23 fatalities and being over-represented by an Odds Ratio of 1.445 (about 45% higher than expected).
- C122 CU Driver Officer Opinion Alcohol. This indicates that Driver Under the Influence of Alcohol had an over-representation of 57.8% times the expected proportion. When looking at the same results for fatalities, the ratio of yes to no goes from its value above of 6.13% to 17.65%, an over-representation odds ratio of 4.542 greater proportion than expected. There is no doubt that driver impairment is a major cause of pedestrian fatalities.
- C123 CU Driver Officer Opinion Drugs. Although not as high in frequency (only about a third as many), the over-representation indicator (odds ratio) is about the same for drugs as for alcohol. When looking at the same results for fatalities, the ratio of yes to no goes from its value for all pedestrian crashes of 2.14% to 13.10%, an over-representation odds ratio of 10.357. There is no doubt that driver impairment is a major cause of pedestrian fatalities. Recent reports indicate that drugs have already overtaken alcohol as the source of impairment in

crashes. The reason that they are under-reported here is the extreme difficulty in identifying drug impairment, as well as the relative ease with which alcohol impairment can be proven.

- C104. CU Left the Scene. This attribute is quite important, and it can make the difference between life and death in relatively high severity cases such as pedestrian involved. The Left-Scene rate is almost twice that which occurs in non-pedestrian crashes. This probably tracks ID and night-time hours. However, for crashes that are fatal, the proportion of leaving the scene drops down to under 10%, which is about the same rate that it has in crashes in general.
- C020. Distracted Driving Officer's Opinion. Relatively speaking, DD does not seem to be a major factor in pedestrian crashes. Recognize that this is only referring to the driver, not to the pedestrian, since there is no Walking Distracted entry at all in the crash report. No practical differences were found in the pedestrian fatality analysis.
- <u>Severity Characteristics</u>
  - C025. Crash Severity. As would be expected, all of injury categories are significantly over-represented with the odds ratio increasing exponentially with the severity. Possible Injury has an odds ratio 2.129 times the expected proportion from all non-pedestrian crash types. This increases exponentially to 23.587 for fatal crashes.
  - C058. Number Killed. This attribute indicates that the chances of a pedestrian crash being fatal is about 25 times that of other crashes, and two fatalities result about 8 times the expected proportion of other crashes having two fatalities.
  - C101. Causal Unit Type Fatality Causal Comparison. This attribute becomes important because of the recent research that has indicated that SUVs are more apt to cause fatal pedestrian crashes than are other passenger vehicle types. The analysis for this particular item was different from the other fatal pedestrian analyses in that this comparison is between fatal pedestrian crashes and non-fatal pedestrian crashes. This was performed in order to determine vehicle types that may be causing more than their share of fatalities. Both SUVs and Passenger Cars were found to be under-represented. It is true that Passenger Cars are significantly under-represented and have a much lower odds ratio than SUVs, and this could be interpreted that Passenger Cars are not causing as many fatalities (proportionately speaking) as SUVs. As can be seen, however, SUVs have almost identically their proportion of fatal crashes as their proportion of non-fatal crashes, so it is difficult to prove from these numbers that they are prone to cause more fatalities.
  - C224. Estimated Speed at Impact for Pedestrian Fatal Crashes. Generally pedestrian crashes occur at lower speeds than other crashes due to their being highly concentrated in urban areas. However, the same is not true of fatal pedestrian crashes as given above, which illustrates that speed is a major factor in causing these fatalities.

- C036. Adjusted EMS Arrival Delay. Over 70% of pedestrian crashes have an EMS arrival delay of 10 minutes or less. The delay is longer for fatal pedestrian crashes, with only 57.6% having arrivals less than 10 minutes, and 31.6% falling in the 11 to 30 minute ranges.
- <u>Pedestrian Fatality Analysis</u> The comparisons in this section are not like most of those above (with the exception of C101 Causal Unit Type). As with C101 above, *the comparisons in this section are between pedestrian fatal crashes and pedestrian non-fatal crashes*. The purpose of these analyses was to focus on those factors that turn a non-fatal pedestrian crash into one that is fatal. Generally attributes that are not considered in this section do not show any new significant factors not already established in the other analyses.
  - C015. Primary Contributing Circumstance. Improper Crossing (126) is the most over-represented. Pedestrian under the Influence (46) is over 18 times its expected proportion, creating situations where pedestrians do not take defensive protective action. Not Visible (37) at all, as opposed to unseen is significantly over-represented. DUI (24) of the causal driver is over five times expected. Lying or Sitting in Roadway (16) proved to be fatal 100% of the time. The other items should not be dismissed because they are under-represented.
  - C304 CU Non-Motorist Action at time of Crash #1. These findings tended to reinforce those for C015, immediately above. However, there were a few new items that appear in this attribute. The most over-represented were (number of fatal crashes): In Roadway – Standing, On Knees/Lying (71); Improper Crossing (105); Not Visible – Dark Clothing (32); and Darting (21).
  - C308 CU Non-Motorist Condition. This attribute further confirms the problem of impairment on the part of pedestrians. Impairment may lead them to be careless while walking in or near roadways. It is interesting to compare this with the same driver distribution, C121 CU Driver Condition. The following shows that the over-representation of drivers is not that different for the pedestrian. For drivers, it is over 7 times the expected proportion of fatal crashes when compared to the proportion for non-fatal pedestrian crashes. For pedestrians, it is over 11 times its expected proportion for fatal pedestrian crashes as it is for those that are non-fatal.
  - C309 and C310 CU Non-Motorist Officer Opinion Alcohol and Drugs. The problem of pedestrian impairment is further qualified by these attributes. Pedestrian crashes involving death have a proportion of drug use of 66.521 times the proportion of those pedestrians who survive their crashes. (This may be caused by the requirement to do a blood test on fatal victims that is not otherwise required.) The multiplier for alcohol is not as great at 8.564, but alcohol is recorded to be affecting twice as many pedestrians being killed as drugs.
  - C322 CU Driver/Non-Motorist Victim/Occupant. This attribute demonstrated a striking contrast. If at-fault were just due to chance, then there would be a 50-50% chance for the driver and the pedestrian, and their proportions would thus be the same (i.e., the ratio of the two would be 1.00). But here, for non-fatal pedestrian crashes, the driver is at fault 63.1% of the time. But for fatal pedestrian

crashes just the opposite is true – the pedestrian is at fault 64.9% of the time. This shows that severity is highly dependent on fault. If a pedestrian cause a crash, the probability that s/he will be killed is close to twice what it would be than if they were strictly the victim. The at-fault and impaired pedestrian would reasonably be well correlated, since an officer would be more prone to indicate the pedestrian to be at fault if they were impaired.

- C409 CU Traffic Control. No Passing Zone and Lane Control Device both have significant over-representation of over four and close to six times, respectively. Traffic Signals have a high number but are under-represented, probably because the high volume make these locations very prone to pedestrian crashes in general, and the slower speeds would lead to relatively fewer fatalities.
- C031 Locale. Open country is by far the most lethal locale, having 198 fatal crashes and an odds ratio of 3.415 times its expected proportion. Rural fatal crashes also have an odds ratio of 3.291, almost reflecting the locale result perfectly. C224 Estimated Speed at Impact further reinforces that the increased speed of impact on the rural roadways is a major cause of pedestrian fatalities on these roadway classifications.
- <u>Geographical Characteristics</u>
  - C010. Rural or Urban. Pedestrian crashes are significantly over-represented in the urban areas (odds ratio of 1.078), which pedestrian fatal crashes are over-represented in the rural areas (odds ratio of 1.624). This obviously correlates with speed (see C224).
  - C001. County (all pedestrian crashes). The urban counties, where there are large volumes of both vehicles and pedestrians, have the greatest proportions, although not necessarily the greatest numbers of fatalities. The highest over-represented (all with Max Gains greater than 10), ordered by largest Max Gain first, are Mobile, Jefferson, Montgomery, Madison, Dallas, Calhoun, Russell and Barbour.
  - C001. County (fatal pedestrian crashes). When comparing fatal pedestrian crashes to all other crashes, the over-represented counties change to those that have more rural areas, with the exception of Mobile County. The most over-represented counties, all with Max Gains greater than 5, are: Mobile, Russell, Houston, Dallas and Marion. The most under-represented counties are: Etowah, Montgomery, Cullman, Lee, Madison, Shelby and Jefferson, so Mobile county is certainly a notable exception.
  - C002. City Over-Represented All Pedestrian Crashes. The following cities had Max Gains greater than 20 (worst first): Birmingham, Mobile, Montgomery, Huntsville, Rural Mobile, Anniston and Selma.
  - C002. City Over-Represented in Fatal Pedestrian Crashes. The following cities had Max Gains greater than 4 (worst first): Rural Mobile, Dothan, Rural Russell, Rural Baldwin, Rural Macon, Rural Autauga, Rural Tuscaloosa, and Selma.
  - C031. Locale. Of greatest concern is the great over-representation of pedestrian crashes in school zones. Fortunately, this locale is much further down on the list when it comes to fatal pedestrian crashes (see below). For all pedestrian crashes

the significantly over-represented are: Residential, and School. For fatal pedestrian crashes, the only significantly over-represented locale was Open Country. School has five (one per year), and was under-represented by an odds ratio 0.637 of its expected proportion when compared to all other crashes.

- C011. Highway Classification. The typical pattern holds for the majority of pedestrian crashes to be on the urban roads, while the majority of fatalities are on the higher speed roadways. Significant over-representations for all pedestrian crashes were on Private Property (would including parking lots), and Municipal roadways. For fatal pedestrian crashes the significant over-representations were on Federal, and State.
- C110. CU Driver Residence Distance. No distance from home is recorded for the pedestrian this attribute is strictly for the driver. For all pedestrian crashes Less Than 25 Miles was over-represented with an odds ratio of 1.058 times its expected proportion compared to all non-pedestrian crashes. The opposite is true for fatal pedestrian crashes with the odds ratio being 1.071 for Greater Than 25 Miles. This reflects the rural nature of fatal pedestrian crashes.
- <u>Vehicle Characteristics</u>
  - C101. CU Vehicle Type. This was considered for both all pedestrian crashes and fatal pedestrian crashes in the major section on Crash Severity.
  - C201. CU Body (Passenger Cars Only). This is presented for comparison with the C101 analysis that was performed. The only item found to have statistically significant difference was the under-representation of Two-Door vehicle bodies for all pedestrian crashes. Four Door with Rear Entry had the highest Max Gain for fatal pedestrian crashes, but it was still not found to be a significant difference.
  - C208. Model Year. The years 2003-2012, collectively, were over-represented. There was no obvious difference in the distribution for fatal pedestrian crashes.
  - C024. School Bus Related. School bus involvement in pedestrian crashes are less than 1% of the pedestrian crashes. However, they are over-represented in both of the "Involved" categories, and "Directly Involved" accounted for the two fatalities within this attribute.
  - C061. Train Involved. Trains were only involved in one pedestrian crash over the five years of the study. This particular crash did prove to be fatal.
- <u>Roadway Environment/Pavement Characteristics</u>
  - C412 CU Traffic Lanes. For fatal pedestrian crashes there was the expected shift to the higher speed roadways, with the two lane roads becoming significantly under-represented (0.870 odds ratio), and the four-lane roads becoming significantly over-represented (1.168).
  - C408. CU Vision Obscured By. Vision obstructions play a part in some pedestrian crash causes, with about 8.55% of the crashes involving some vision obstructions (it is about 4.54% for non-pedestrian crashes). Parked Vehicles are an obvious over-representation in that many vulnerable pedestrians probably emerge

from parked vehicles. The next three – Driver Blinded by Sun, Lights Glare (Roadside), and Driver Blinded by Headlights – are indicative of the difficulty that it is to see pedestrians in night-time or other situations in which they are not wearing contrasting clothing. The distribution for fatal pedestrian crashes showed no significant differences from the more general analysis.

- C026 Intersection Related. Pedestrian crashes are clearly over-represented away from intersections, and this becomes even more pronounced for fatal pedestrian crashes. For pedestrian crashes in general, the odds ratio is 1.068 times the proportion of crashes in general not being at intersections. For fatal crashes this ratio increases to 1.159 times the proportion of all other crashes not at intersections. This is an indication that drivers have more of a tendency to be looking for pedestrians at intersections.
- C022. Type of Roadway Junction. Are some intersection types worse than others? The four way intersection category was not found to be significantly over-represented; nevertheless, because of the large number of pedestrian crashes that occur in this type of intersections, it should definitely get priority as far as countermeasures are concerned. The fatal pedestrian analysis did not vary much from the more general analysis; however Bridge/Overpass/Underpass was found to have a much larger over-represented with 12 fatalities over the five year period of the study.
- C407 CU Roadway Curvature and Grade. The general pedestrian analysis would seem to show that roadway curvature and grade has little to do with causing pedestrian crashes. However, the contrast with the fatal pedestrian indicates that the interactions with other roadway differences (e.g., Roadway Classifications, Rural-Urban, and other differences in location types), should be considered in conjunction with curvature and grade. The differences seen might be due to the necessary differences between urban and rural roadways.
- C409. CU Traffic Control. This is an interesting distribution to assist in determining where pedestrian countermeasures might be more effective. The only major difference in the fatal pedestrian distribution is the elevation of No Passing Zone to the third position down with 52 fatal crashes and a significant over-representation factor of 1.420 (42% higher than what would be expected from crashes in general).
- C030. Weather. Rain works in favor of preventing pedestrian crashes. While visibility may be reduced, the fewer pedestrians greatly overcomes this factor. The under-representation factor is a significant 0.676 for all pedestrian crashes, and an amazingly close 0.653 for fatal pedestrian crashes. C403 Roadway Condition heavily reflects these findings.
- C415. CU Workzone Related. This result will be of interest to those who are implementing work zone countermeasures. Of the 77 pedestrian crashes in work zones, 22 (28.6%) were fatal, which is much higher than the overall fatality rate (see severity section) of 12.02%.

If there are any questions, please contact Dr. David Brown at brown@cs.ua.edu.

# **Crash Characteristics**

i       Eile       Dashboard       Eilters       Analysis       Impact       Locations       Tools       Window       Help       -         V       2013-2017       Alabama Integrated Crash Data       V       Pedestrian Involved       V	_							
2013-2017 Alabama Integrated Crash Data <ul> <li>Pedestrian Involved</li> <li>Pedestrian Involved</li> <li>Significance:</li> <li>Over Representation</li> <li>Threshold:</li> <li>2015: Primary Contributing Circumstance</li> <li>Subset Frequency</li> <li>Percent Frequency</li> <li>Percent Ratio</li> <li>Contex:</li> <li>C</li></ul>	🔋 <u>F</u> ile <u>Dashboard</u> <u>Filters</u> <u>A</u> nalysis <u>I</u> mpact <u>L</u> ocations <u>T</u> ools <u>W</u> indow <u>H</u> elp							
Order:       Max Gain       Descending       Suppress Zero-Valued Rows       Significance:       Over Representation       Threshold:       2.0         C015:       Primary Contributing Circumstance:       Subset       Subset       Other       Other       Odds       Max       A         Value       Value       Frequency       Percent       Frequency       Percent       Ratio       Gain       A         E       Improper Crossing       760       23.47       132       0.02       1023.225*       759.257       A         Unseen Object/Person/Vehicle       731       22.58       46654       8.11       2.785*       468.483       A	😵 2013-2017 Alabama Integrated Crash Data 🗸 Pedestrian Involved 🗸 <table-cell> 😨 1/ 1/2013 v 12/31/2017 v</table-cell>							
C015: Primary Contributing Circumstance     Subset     Subset     Other Percent     Other Percent     Odds Ratio     Max Gain     Colts: Primary Contributing Circumstance       E Improper Crossing     760     23.47     132     0.02     1023.225*     759.257       Unseen Object/Person/Vehicle     731     22.58     46654     8.11     2.785*     468.483	Order: Max Gain y Descending y J Suppress Zero-Valued Rows Significance: Over Representation y Threshold: 20							
E Improper Crossing     760     23.47     132     0.02     1023.225*     759.257       Unseen Object/Person/Vehicle     731     22.58     46654     8.11     2.785*     468.483								
E Improper Crossing         760         23.47         132         0.02         1023.225*         759.257           Unseen Object/Person/Vehicle         731         22.58         46654         8.11         2.785*         468.483	Stance							
Unseen Object/Person/Vehicle 731 22.58 46654 8.11 2.785* 468.483								
Failed to Yield the Right-of-Way         276         8.52         2884         0.50         17.008*         259.772								
E Failed to Yield Right-of-Way to Pedestrian 223 6.89 36 0.01 1100.864* 222.797								
Pedestrian Under the Influence         169         5.22         12         0.00         2502.862         168.932								
E Not Visible 157 4.85 104 0.02 268.286* 156.415								
E Wrong Side of Road 44 1.36 360 0.06 21.721* 41.974								
E Lying or Sitting in Roadway         35         1.08         12         0.00         518.344         34.932								
E Aggressive Operation 90 2.78 10358 1.80 1.544* 31.717								
E Other Failed to Yield 67 2.07 6927 1.20 1.719* 28.023								
P Pedestrian Violation 18 0.56 4 0.00 799.731 17.977								
Failure to Obey Signs/Signals/Officer         20         0.62         849         0.15         4.187*         15.223								
E Swerved to Avoid Non-Motorist 15 0.46 222 0.04 12.008 13.751								
Vision Obstructed 32 0.99 3614 0.63 1.574* 11.664								
Improper Parking/Stopped in Road 19 0.59 1781 0.31 1.896 8.979 V Sort by Sum of Max Gain								
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2013-2017 Alahama Integrated Crash Data								
C015: Primary Contributing Circumstance								
30								
20								
<sup>11</sup> 10								
E Other Failed to Yield Improper Backing E Ran Traffic Signal	E Other Failed to Yield Improper Backing E Ran Traffic Signal							
C015: Primary Contributing Circumstance								

### **C015 Primary Contributing Circumstance – Most Overrepresented**

All values with less than 10 occurrences were pruned from the displays above and below. The most over-represented were: Improper Crossing, Unseen Object/Person/Vehicle, Failed to Yield the Right-of-Way, Failed to Yield Right-of-Way to Pedestrian in Crosswalk, Pedestrian Under the Influence, Not Visible, Wrong Side of Road, Lying or Sitting in Roadway, Aggressive Operation, Other Failed to Yield, Pedestrian Violation, and Failure to Obey Signs/Signals/Officer.

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😵 2013-2017 Alabama Integrated Crash Data 🗸 Pedestrian Fatal Crashes 🗸 🖓 😰 1/ 1/2013 v 12/31/2017 v 🎼 🗈										
Order	Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0 🚖									
C015	Primary Contributing Circumstance	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻 🔨	C015: Primar	Contributing Circu	mstance
•	E Improper Crossing	126	30.00	766	0.12	260.726*	125.517			
	Pedestrian Under the Influence	46	10.95	135	0.02	540.090*	45.915			
	E Not Visible	37	8.81	224	0.03	261.816*	36.859			
	Failed to Yield the Right-of-Way	37	8.81	3123	0.47	18.779*	35.030			
	Unseen Object/Person/Vehicle	53	12.62	47332	7.11	1.775*	23.138			
	E Lying or Sitting in Roadway	16	3.81	31	0.00	818.089	15.980			
	DUI	24	5.71	22156	3.33	1.717*	10.022			
	E Wrong Side of Road	10	2.38	394	0.06	40.230	9.751			
	Improper Parking/Stopped in Road	5	1.19	1795	0.27	4.415	3.868			
	P Pedestrian Violation	3	0.71	19	0.00	250.271	2.988			
	E Failed to Yield Right-of-Way to P	2	0.48	257	0.04	12.335	1.838			
	Failure to Obey Signs/Signals/Offi	2	0.48	867	0.13	3.656	1.453			
	E Distracted by Insect/Reptile	1	0.24	497	0.07	3.189	0.686			
	E Other Failed to Yield	5	1.19	6989	1.05	1.134	0.591	Sort by Sum	of Max Gain	
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				2013-2017 Alaba	ma Integrated Cras	sh Data				
				C015: Primary C	ontributing Circum	stance				
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	P Pedestrian Violation E Failed to Yield Right-of-Way Defective Equipment at Uncontrolled Intersection									
	C015: Primary Contributing Circumstance									

### **C015 Primary Contributing Circumstance – Fatal Crashes; Most Overrepresented**

Major differences between the fatal pedestrian distribution and the overall distribution:

- Pedestrian Under the Influence has a higher Max Gain position in the fatal crashes, although the comparison number in both cases is for non-pedestrian crashes, so should not be considered valid. Additional analysis will be performed for the Pedestrian Under the Influence subset.
- Not Visible also moves up in its Max Gain position.
- DUI becomes over-represented, which it was not in the overall pedestrian analysis.

C129 CU	Vehicle	Maneuvers
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🖳 <u>F</u> ile	Dashboard <u>Filters</u>	<u>A</u> nalysis <u>I</u> mp	oact <u>L</u> ocatio	ns <u>T</u> ools	Window H	lelp				_ 8 ×	
<b>2013</b>	3-2017 Alabama Integrated C	ùrash Data	~	Pede	strian Involved			- v 💡 🔞	1/ 1/2013	12/31/2017	
Order: Max	r Gain y Desc	rending	V Supp	ress Zero-Value	ad Rowe	Sign	aificance: Over	Representation	M. Thrashold	20 🛋	
		Jonang		1033 2010 1010	00 110/03	loigi			• meshold.		
C129:CU	Vehicle Maneuvers	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C129: CU venic	cie Maneuvers		
Back	king	259	12.67	33176	4.90	2.582*	158.693				
Tum	ning Left	310	15.16	78413	11.59	1.308*	72.920				
Mov	vement Essentially Straight	1191	58.24	371937	54.99	1.059*	66.454				
Tum	ning Right	123	6.01	34515	5.10	1.179	18.644				
llega	ally Parked	15	0.73	893	0.13	5.556	12.300				
Lega	ally Parked	2	0.10	473	0.07	1.398	0.570				
P Av	void Object in Road	1	0.05	181	0.03	1.827	0.453				
ELe	eaving Main Road	7	0.34	2481	0.37	0.933	-0.501				
Stop	pped in Traffic	5	0.24	2693	0.40	0.614	-3.142				
Mak	king U-Tum	7	0.34	3572	0.53	0.648	-3.800				
EO	vertaking/Passing	17	0.83	7390	1.09	0.761	-5.344				
E Er	ntering Main Road	21	1.03	19055	2.82	0.365*	-36.612				
E Ne	egotiating a Curve	36	1.76	33226	4.91	0.358*	-64.458				
ECh	hanging Lanes	16	0.78	37601	5.56	0.141	-97.686				
Slow	wing/Stopping	35	1.71	46139	6.82	0.251*	-104.501	Sort by Sum of	Max Gain		
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	2013-2017 Alabama Integrated Crash Data										
	C129: CU Vehicle Maneuvers										
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	0		Illegally P	arked		Making L	J-Turn	S	lowing/Stoppir	ng	
				C12	9: CU Vehicle N	Maneuvers			2. 11	-	

Significant over-representations for pedestrian crashes occur in the Backing, Turning Left and Movement Essentially Straight, with Right turns also over-represented by not significantly so. Repeating this analysis for just fatal pedestrian crashes found Movement Essentially Straight to be the only category significantly over-represented, which is indicative of the predominantly rural nature of pedestrian fatalities.

C023	Manner	of Crash
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<b>*</b>	2013-2017 Alabama Integrated	Crash Data		~	Pedestrian Invo	lved		✓ ♥ 1/ 1/2013 ∨ 12/3			
Order:	Max Gain 🗸 De	escending	✓ □ S	uppress Zero-'	Valued Rows	Signif	ficance: Over	Representation V Threshold: 2.0 숮			
C023:	E Manner of Crash	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C018: Location First Harmful Event Rel t A C019: E Most Harmful Event			
	Other	1289	32.21	15383	2.13	15.088*	1203.569	C020: E Distracted Driving Opinion			
	Single Vehicle Crash (all ty	1585	39.61	143521	19.92	1.989*	787.943	C021: Distance to Fixed Object			
	Non-Collision	98	2.45	4796	0.67	3.679*	71.365	C022: E Type of Roadway Junction/Featu			
	Unknown	91	2.27	4196	0.58	3.905*	67.697	C024: School Bus Related			
	Head-On (front to front only)	130	3.25	14178	1.97	1.651*	51.261	C025: Crash Severity			
	Record from Paper System	86	2.15	14856	2.06	1.042	3.496	C026: Intersection Related			
	Causal Veh Backing: Rear	11	0.27	4013	0.56	0.494	-11.287	C027: At Intersection			
	Sideswipe - Opposite Dire	45	1.12	12143	1.69	0.667*	-22.437	C028: Mileposted Route C029: Lighting Conditions			
	Angle Oncoming (frontal)	59	1.47	15971	2.22	0.665*	-29.696	C030: Weather			
	Causal Veh Backing: Rear	25	0.62	13081	1.82	0.344*	-47.647	C031: Locale			
	Angle (front to side) Oppos	26	0.65	20007	2.78	0.234*	-85.111	C032: E Police Present at Time of Crast			
	Angle (front to side) Same	17	0.42	18403	2.55	0.166	-85.203	C033: Police Notification Delay			
	Sideswipe - Same Direction	187	4.67	58614	8.13	0.574*	-138.518	C035: EMS Arrival Delay			
	Side Impact (angled)	116	2.90	58865	8.17	0.355*	-210.912	C036: Adjusted EMS Arrival Delay			
	Side Impact (90 degrees)	115	2.87	64061	8.89	0.323*	-240.769	C037: Non-Vehicular Property Damage			
	Rear End (front to rear)	122	3.05	258527	35.88	0.085*	-1313.753	Sort by Sum of Max Gain			
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				2013-2017 Ala	bama Integrate	d Crash Data					
	C023: E Manner of Crash										
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	0	Har	ad-On (front tr	front only)	Caucal	(eb Backing)	Rear to Side	Side Impact (90 degrees)			
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We would expected a larger proportion than 65.0% to be single vehicle crashes. A cross-tabulation between the variable and the number of vehicles involved in the crashes is given on the next page. This indicates that 3676/4002=91.9% involved only a single vehicle, which seems far more reasonable. This still leaves 326 pedestrian crashes that involved more than one vehicle, and the distribution above might be useful in determining how these crashes occurred. The distribution for fatal pedestrian crashes was essentially the same.

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2013-2017	Nabama Integrated C	irash Data	~	Pedestrian Involved		Ý	💡 🋐 1
Suppress Zero Val	lues: Rows and Col	umns 🗸 Select	Cells: 🔳 🗸 🔣	9	Column: Numb	er of Vehicles ; Row: I	E Manner of Cr
	1 Vehicle	2 Vehicles	3 Vehicles	4 Vehicles	5 Vehicles	TOTAL	
Non-Collision	94 2.56%	4 1.59%	0	0	0	98 2.45%	
Single Vehicle Crash (all types)	1580 42.98%	3 1.20%	2 3.39%	0	0	1585 39.61%	
Head-On (front to front only)	119 3.24%	10 3.98%	1 1.69%	0.00%	0	130 3.25%	
Angle Oncoming (frontal)	49 1.33%	9 3.59%	1 1.69%	0.00%	0	59 1.47%	
Angle (front to side) Same Direct	10 0.27%	6 2.39%	1 1.69%	0	0	17 0.42%	
Angle (front to side) Opposite Dir	15 0.41%	11 4.38%	0	0	0	26 0.65%	
Rear End (front to rear)	26 0.71%	63 25.10%	25 42.37%	6 46.15%	2 66.67%	122 3.05%	
Side Impact (angled)	93 2.53%	17 6.77%	5 8.47%	1 7.69%	0	116 2.90%	
Side Impact (90 degrees)	100 2.72%	14 5.58%	0	1 7.69%	0	115 2.87%	
Sideswipe - Same Direction	150 4.08%	32 12.75%	4 6.78%	1 7.69%	0	187 4.67%	
Sideswipe - Opposite Directio	37 1.01%	8 3.19%	0	0 0.00%	0	45 1.12%	
Causal Veh Backing: Rear to	12 0.33%	12 4.78%	0 0.00%	1 7.69%	0 0.00%	25 0.62%	
Causal Veh Backing: Rear to	7 0.19%	3 1.20%	1 1.69%	0 0.00%	0	11 0.27%	
Other	1214 33.03%	54 21.51%	17 28.81%	3 23.08%	1 33.33%	1289 32.21%	
Unknown	89 2.42%	2 0.80%	0	0 0.00%	0 0.00%	91 2.27%	
Record from Paper System	81 2.20%	3 1.20%	2 3.39%	0	0 0.00%	86 2.15%	
TOTAL	3676 91.85%	251 6.27%	59 1.47%	13 0.32%	3 0.07%	4002 100.00%	

### Cross-tabulation of C023 (manner of crash) by C051 (number of vehicles)

This display was generated to get a feel for the Manner of Crash that would appear to require multiple vehicles. This is confirmed in some cases, e.g., Rear End (front to rear), but even here 15 of the single vehicle crashes were marked as such. We conclude that reporting officers in many cases regard the pedestrian as a quasi-vehicle.

### **C051** Number of Vehicles

Presented here to complement the findings given above. As expected, pedestrians are involved in over four times the proportion of single vehicle crashes as non-pedestrian crashes.



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<b>6</b> 2	2013-2017 Alabama Integrated (	Crash Data	~	Pede	strian Involved			✓ ♥ 1/ 1/2013 ∨ 12/31/2017				
Orde	r: Natural Order V Des	cending	V Suppr	ess Zero-Value	ed Rows	Sign	ificance: Over F	Representation V Threshold: 2.0				
C056	Number of Pedestrians	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C055: Number of Non-Motorists Record A C056: Number of Pedestrians				
	1 Pedestrian Involved	3842	96.00	0	0.00	0.000	3842.000	C057: Number of Pedacyclists				
	2 Pedestrians Involved	133	3.32	0	0.00	0.000	133.000	C058: Number Injured (Non-Fatal)				
	3 Pedestrians Involved	21	0.52	0	0.00	0.000	21.000	C060: Number Killed				
	4 Pedestrians Involved	1	0.02	0	0.00	0.000	1.000	C061: Number of Railroad Trains				
	5 Pedestrians Involved	1	0.02	0	0.00	0.000	1.000	C062: Has Railroad Crossing Number				
	7 Pedestrians Involved	2	0.05	0	0.00	0.000	2.000	C080: CMV Involved				
	11 Pedestrians Involved	1	0.02	0	0.00	0.000	1.000	C101: Causal Unit (CU) Type				
	12 Pedestrians Involved	1	0.02	0	0.00	0.000	1.000	Sort by Sum of Max Gain				
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	C056: Number of Pedestrians											
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	0 1	19 Pedestrians Inv	volved 3	9 Pedestrians Invo	Ived 59 F	Pedestrians Involv	ed 79 Ped	estrians Involved 99 or More Redestrians Involved				
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### **C056** Number of Pedestrians – All Pedestrian Crashes

The fatal pedestrian crashes below are the number of crashes when there was a fatality recorded; it is not the number of fatalities.

### **C056** Number of Pedestrians – Fatal Pedestrian Crashes

CA	ARE 10.1.0.19 - [IMPACT	Results - 20	13-2017 Ala	abama Integ	grated Crash	Data - Pec	lestrian Fatal	Crashes vs. No 🗕 🗖 🗙				
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6	🦿 2013-2017 Alabama Integrated Crash Data V Pedestrian Fatal Crashes V 🍸 😨 1/ 1/2013 V 12/31/2017 V 🎼 🏵 🌑											
Order	Order: Natural Order v Descending v V Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0 🜩											
C056	C056: Number of Pedestrians Subset Subset Other Percent Other Percent Odds Ratio Max Gain C053: Number of Persons Recorded C054: Number of Motorists Recorded											
•	1 Pedestrian Involved	444	92.31	3398	0.47	196.714*	441.743	C055: Number of Non-Motorists Record				
	2 Pedestrians Involved	30	6.24	103	0.01	438.489*	29.932	C056: Number of Pedestrians				
	3 Pedestrians Involved 4 0.83 17 0.00 354.231 3.389 C057: Number of Pedacyclists											
	7 Pedestrians Involved 2 0.42 0 0.00 0.00 2.000 C059: Number Injured (Non-Fatal)											
	11 Pedestrians Involved 1 0.21 0 0.00 0.000 1.000 Sort by Sum of Max Gain											
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C203 CU	First	Harmful	Location
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CA	🛿 CARE 10.1.0.19 - [IMPACT Results - 2013-2017 Alabama Integrated Crash Data - Pedestria — 🗖 💌											
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<b>6</b> 2	2013-2017 Alabama	Integrated Crash E	ata	~	Pe	destrian Inv	olved			✓ ♥ 1/ 1/2013	v 12/	
Order	: Max Gain	✓ Descending	• •	Suppres	ss Zero-Va	lued Rows	s	ignificance:	Over Repr	resentation v Threshold: 2.0	÷	
C203	CU First Harmful	Event Location		Subset requency	Subset Percent	Other requency	Other Percent	Odds Ratio	Max Gain 👻	C203: CU First Harmful Event Loo	cation	
	E In Parking Lane of	or Zone		209	5.92	14621	2.12	2.798*	134.305			
	E Intersection with	Crosswalk and Ped	estrian Signal	86	2.44	1306	0.19	12.890*	79.328			
	E Other Non-Interse	ection		51	1.45	97	0.01	102.916*	50.504			
	Off Roadway			93	2.64	9142	1.32	1.991*	46.296			
	E Intersection with	Crosswalk no Pede	strian Signal	39	1.11	1068	0.15	7.148*	33.544			
	E Non-Intersection	Crosswalk		22	0.62	80	0.01	53.829*	21.591			
	E Sidewalk			15	0.43	165	0.02	17.795	14.157			
	E Off Roadway - Lo	cation Unknown		47	1.33	6659	0.96	1.382	12.981			
	P Private Road or F	Property		19	0.54	2085	0.30	1.784	8.348			
	E Driveway Access	Crosswalk		5	0.14	78	0.01	12.548	4.602			
	E Outside of Right-	of-Way		36	1.02	6276	0.91	1.123	3.937			
	E Not Applicable Be	ecause Unit is Railr	oad Train	2	0.06	40	0.01	9.787	1.796			
	E At Intersection no	Crosswalk		55	1.56	10708	1.55	1.005	0.295			
	E Shoulder			134	3.80	26434	3.83	0.992	-1.045			
	Median			8	0.23	7747	1.12	0.202	-31.578			
	On Roadway			2610	73.96	546289	79.08	0.935*	-180.869			
	E Roadside			98	2.78	57695	8.35	0.332*	-196.751	Sort by Sum of Max Gain		
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	2013-2017 Alabama Integrated Crash Data C203: CU First Harmful Event Location											
	100 Luedneuci 50 0		EIntersectio	T Crosswa	alk	EDrives	vay Access (	Crosswalk		Hedian		
			no Pede	sulan əlgnâl	C203: CU	First Harm	ful Event L	ocation				

In order of Max Gain, the following had over-representations greater than ten times (frequency):

- In Parking Lane or Zone (209) heavy vehicle and pedestrian traffic.
- Intersection with Crosswalk and Pedestrian Signal (86) more than twice the number as when there is not a signal; however, signals are usually installed in particularly heavy interactions of pedestrians and motor vehicles, so the raw frequencies cannot be used to gauge effectiveness. This can only be done by comparing the rates, which must take into account both the ADT (or entry vehicles to an intersection) and the number of pedestrians exposed.
- Other Non-Intersection (51) this would include J-walking.
- Off Roadway (93) not including shoulder (134), which was under under-represented.
- Intersection with Crosswalk no Pedestrian Signal (39) see above.
- Non-Intersection Crosswalk (22) relatively few, but still highly over-represented.
- Sidewalk (15) relatively few, but still highly over-represented.

The major difference found for fatal pedestrian crashes was the over-representation of those where the First Harmful Event Location was On Roadway; this included 382 fatal crashes over the five year period, and it was over-represented by about 5%. On Roadway would tend to infer pedestrian cause, and this will be investigated further in terms of walking under the influence.

### **Time Characteristics**

### C003 Year – All Pedestrian Crashess

Elle       Beachdoard       Ellers       Analysis       Impact       Locations       Tools       Vindow       Help       -	CARE 10.1.0.19 - [IMPACT	Results - 201	3-2017 Ala	bama Integi	rated Crash	Data - Pede	estrian Involve	ed vs. Not Ped 🗕 🗖	x
2013/2017 Alabama Integrated Crash Data <ul> <li>Pedestran Involved</li> <li>Page</li> <li>Page</li> <li>Percent</li> <li>Subset</li> <li>Other</li> <li>Percent</li> <li>Other</li> <li>Percent</li> <li>Other</li> <li>Percent</li> <li>Other</li> <li>Other</li> <li>Percent</li> <li>Other</li> <li>Other</li> <li>Other</li> <li>Other</li> <li>Other</li> <li>Percent</li> <li>Other</li> <li>Percent</li> <li>Other</li> <li>Other</li> <li>Percent</li> <li>Other</li> <li>Other</li> <li>Other</li></ul>	<b>File</b> <u>D</u> ashboard <u>Filters</u> <u>A</u> naly	is <u>I</u> mpact <u>L</u> oc	tations <u>T</u> ools	<u>W</u> indow <u>H</u> el	р				- 8 ×
Order         Usered ing         Superse Zero-Valued Rows         Significance         Over Representation         Threshold:         2.0         Construction           C0005         Subset         Peccent         Other         Other         Odda Ratio         Max Gain           2014         735         18.37         12.2328         17.63         1.042         22.544         CO04: Countly         CO02: Chy         CO04: Month         CO02: Chy         CO04: Month         CO05: Say of Month         CO05: Say of Month         CO05: Say of Month         CO05: Say of Month         CO07: Week of the Year         CO07:	2013-2017 Alabama Integrated Crash I	lata	∨ Ped	estrian Involved		Ý	🌱 🦉 1/ 1	/2013 v 12/31/2017 v 👔 N 🕨	•
Subset         Subset         Other Percent         Other         Other         Other         Courts         Ocio: City City         Ocio: City City <thocio: city<="" th=""> <th< td=""><td>Order: Natural Order V Descendin</td><td>, 🗸 🗸 s</td><td>ouppress Zero-Valu</td><td>ed Rows</td><td></td><td></td><td>Significance: Over</td><td>Representation Y Threshold:</td><td>2.0 🜲</td></th<></thocio:>	Order: Natural Order V Descendin	, 🗸 🗸 s	ouppress Zero-Valu	ed Rows			Significance: Over	Representation Y Threshold:	2.0 🜲
2013       735       18.37       127027       17.63       1.042       29.54         2014       762       19.04       132898       18.44       1.032       23.393         2016       801       20.01       149069       20.69       0.668       -26.668         2017       825       20.61       156176       21.67       0.951       42.33         2017       825       20.61       156176       21.67       0.951       42.33         Image: State Sta	C003: Year	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C001: County C002: City	^
2014       762       19.04       132898       18.44       1.032       23.93         2015       801       20.01       149069       20.63       0.968       -26.86         2016       873       21.96       155445       21.57       1.018       15.722         2017       825       20.61       156176       21.67       0.951       42.33         Colspan="4">Display Filter Name	2013	735	18.37	127027	17.63	1.042	29.544	C003: Year	
2015       801       20.01       149069       20.69       0.968       -26.88       CO06: Day of the Week         2016       873       21.96       155445       21.57       1.018       15.72         2017       825       20.61       156176       21.67       0.961       -42.33       CO06: Day of the Week         2017       825       20.61       156176       21.67       0.961       -42.33       Sort by Sum of Max Gain         Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan="4">Colspan="4"Colspan	2014	762	19.04	132898	18.44	1.032	23.939	C004: Month	
2016         879         21.96         155445         21.57         1.018         15.722           2017         825         20.61         156176         21.67         0.951         -42.337         Sort by Sum of Max Gain           Image: Color week of the Year           Image: Color week of the Year         Image: Color week of the Year         Image: Color week of the Year           Image: Color week of the Year         Image: Color week of the Year         Image: Color week of the Year           Image: Color week of the Year         Image: Color week of the Year         Image: Color week of the Year           Image: Color week of the Year         Image: Color week of the Year         Image: Color week of the Year           Image: Color week of the Year         Image: Color week of the Year         Image: Color week of the Year           Image: Color week of the Year         Image: Color week of the Year         Image: Color week of the Year           Image: Color week of the Year         Image: Color week of the Year         Image: Color week of the Year           Image: Color week of the Year         Image: Color week of the Year         Image: Color week of the Year           Image: Color week of the Year         Image: Color week of the Year         Image: Color week of the Year <td>2015</td> <td>801</td> <td>20.01</td> <td>149069</td> <td>20.69</td> <td>0.968</td> <td>-26.868</td> <td>C005: Day of Month C006: Day of the Week</td> <td></td>	2015	801	20.01	149069	20.69	0.968	-26.868	C005: Day of Month C006: Day of the Week	
2017 825 20.61 156176 21.67 0.951 42.337 Sort by Sum of Max Gain Display Filter Name	2016	879	21.96	155445	21.57	1.018	15.722	C007: Week of the Year	~
COU3: Year	2017	825	20.61	156176	21.67	0.951	-42.337	Sort by Sum of Max Gain	
2013-2017 Alabama Integrated Crash Data C003: Year	📋 🕼 🚳 🖋							Display Filter Name	
2013 2014 2015 2016 2017	20 Leanner 10 0	2013	2014		2015	2016	20		

This display was discussed in the Introduction; repeated here for completeness.



#### **C003 Year – Fatal Pedestrian Crashess**

The pedestrian fatality distribution over the years is considerably different from overall pedestrian crashes. The low was in 2013, which was a very good year compared to those that followed. Years 2014 and 2015 were close to double 2013, and 2016 was much worse. It does not look like there was much of a regression to the mean in 2017. Hopefully this will be seen with a dramatic reduction in 2018.

CA	RE 10.1.0.1	9 - [IMF	PACT Resu	ilts - 2013	3-2017 Al	abama In	tegrated	Crash Dat	a - Pedest	ria —	×
E E	le <u>D</u> ashboard	<u>F</u> ilters	<u>A</u> nalysis <u>I</u> n	npact <u>L</u> oca	tions <u>T</u> ools	: <u>W</u> indow	<u>H</u> elp				- 8 ×
<b>6</b> °	2013-2017 Alabam	a Integrated	Crash Data		✓ Pe	edestrian Involv	ed		¥ 🖓	7 😨 1/	1/2013 y 12/
Order	Natural Order	✔ De	scending	V Su	ppress Zero-Va	alued Rows	Significa	nce: Over Rep	presentation	✓ Threshold	d: 2.0 🜲
C004	Month		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C003: Year C004: Month		^
•	January		322	8.05	57215	7.94	1.013	4.251	C005: Day of	Month	
	February		276	6.90	54481	7.56	0.912	-26.565	C006: Day of	f the Week	
	March		331	8.27	60732	8.43	0.981	-6.281	C007: Week	of Dav	
	April		330	8.25	61194	8.49	0.971	-9.846	C009: Data S	Bource	
	May		349	8.72	61692	8.56	1.019	6.388	C010: Rural	or Urban	
	June		269	6.72	57137	7.93	0.848*	-48.315	C011: Highw	ay Classificat	tions
	July		294	7.35	56759	7.88	0.933	-21.216	C012: Contro C013: E High	Diled Access	
	August		311	7.77	61173	8.49	0.915	-28.730	C015: Prima	ry Contributin	g Circumst:
	September		391	9.77	58293	8.09	1.208*	67.265	C016: Prima	ry Contributin	g Unit Num
	October		429	10.72	64616	8.97	1.195*	70.149	C017: First H	larmful Event	
	November		345	8.62	61935	8.59	1.003	1.038	C018: Locati	on First Harm	iful Event R
	December		355	8.87	65388	9.07	0.978	-8.138	Sort by Sum	of Max Gain	
00	) 🗞 🖉										🗌 Displa
				20	)13-2017 Alaba	ima Integrated (	Crash Data				
					С	004: Month					
	15										
	-										
	> 10					-					
	lenc										
	-requ										
II '	5										
	0										
			February	April		June	August	Oc	tober	December	
						C004: Month					

September and October clearly have the highest over-representations, and are the only two months significantly over-represented. The reason for this could be:

- Back-to-school times,
- Break in the heat,
- Typically relatively dry months.

June is the only month that is significantly under-represented, perhaps because of the heat and rain. Note that July and August are also under-represented, but not significantly. For fatal pedestrian crashes, the most over-represented months were also September and October.

#### C008 Time of Day

CA	RE 10.1.0.19 - [IM	PACT Res	ults - 201	3-2017	Alabama	Integrated	l Crash [	Data - Pedestria 🗕 🗖	×
🕴 Ei	ile <u>D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis	Impact Lo	cations <u>T</u> o	ols <u>W</u> indo	w <u>H</u> elp		-	. 8 ×
<b>6</b> 2	2013-2017 Alabama Integrated	d Crash Data		~	Pedestrian Inv	olved		✓ ♥ 1/ 1/201	3 v 12/
Order	Natural Order 🗸 De	escending		Suppress Zero	-Valued Rows	Signific	cance: Over	r Representation V Threshold 2.	
LC008	Time of Day	Cubant	Cabart	Other	Other	0.44-	Mari	C003: Year	
	Voice	Frequency	Percent	Frequency	Percent	Ratio	Gain	C004: Month	
	1:00 PM to 1:59 PM	158	3.95	46473	6.45	0.612*	-100.092	C005: Day of Month	
	2:00 PM to 2:59 PM	202	5.05	51227	7.11	0.710*	-82.494	C006: Day of the Week	
	3:00 PM to 3:59 PM	273	6.82	65172	9.04	0.754*	-88.939	C008: Time of Day	
	4:00 PM to 4:59 PM	233	5.82	60811	8.44	0.690*	-104.719	C009: Data Source	
	5:00 PM to 5:59 PM	321	8.02	65920	9.15	0.877*	-45.093	C010: Rural or Urban	
	6:00 PM to 6:59 PM	329	8.22	41980	5.83	1.411*	95.860	C011: Highway Classifications	
	7:00 PM to 7:59 PM	292	7.30	28528	3.96	1.843*	133.567	C012: Controlled Access	
	8:00 PM to 8:59 PM	333	8.32	24047	3.34	2.494*	199.453	C015: Primary Contributing Circu	umst:
	9:00 PM to 9:59 PM	236	5.90	20206	2.80	2.103*	123.784	C016: Primary Contributing Unit	Num
	10:00 PM to 10:59 PM	179	4.47	15308	2.12	2.106*	93.986	C017: First Harmful Event	
	11:00 PM to 11:59 PM	139	3.47	11576	1.61	2.162*	74.712	C018: Location First Harmful Event	ent R
	Unknown	5	0.12	1057	0.15	0.852	-0.870	Sort by Sum of Max Gain	
0	) 🗞 🖉								🗌 Displa
				2013-2017 Ala	bama Integrate	ed Crash Data			
				C	008: Time of D	ву			
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	10						_		
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	5 5				-1				-
									-
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		-	_						
	0	4:00 AM to 4	:59 AM 9	:00 AM to 9:	59 AM 2:	00 PM to 2:59	PM 7:0	00 PM to 7:59 PM Unknown	
					C008: Time	e of Day			

This display contains considerable information to provide insight into the pedestrian crash problem:

- First note the similarity of this distribution with that of alcohol and other drugs, which leads us to suspect that they are quite instrumental in causing pedestrian crashes. This is especially true late night.
- As an exception to the above, the earlier night/late evening (5 PM through 8 PM) hours are some of the highest, and we propose that this is just the convenient time to be out as opposed to any alcohol/drug involvement.
- Rush hours are high, but under-represented.
- Fatal pedestrian crashes are significantly over-represented from 7 PM through 6 AM.

### **C029 Lighting Conditions**

CA	RE 10	0.1.0.19	- [IMPACT F	Results -	2013-20	)17 Alab	ama Inte	grated C	rash Dat	a - Pedes	stria — 🗖	×
<u>E</u> i	le <u>D</u> a	shboard	<u>F</u> ilters <u>A</u> nalysis	: <u>I</u> mpact	<u>L</u> ocations	<u>T</u> ools	<u>W</u> indow <u>H</u>	<u>l</u> elp				- 8 ×
<b>6</b> °	2013-20	17 Alabama li	ntegrated Crash Da	ta	~	Pedes	trian Involved			Ý	💡 🌠 1/ 1	/2013 v 12/
Order	Max Ga	in	✓ Descending	~	✓ Suppress Zero-Valued Rows			Significant	Significance: Over Representation			2.0 🖨
C029:	Lightin	g Conditions			Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C029: Lighting	Conditions
	Dark - F	Roadway Not	Lighted		745	19.21	71685	10.16	1.891*	351.013		
	E Dark	- Spot Illumina	ation Both Sides of	Roadway	454	11.70	42143	5.97	1.960*	222.378		
	E Dark	- Spot Illumina	ation One Side of R	oadway	316	8.15	23315	3.30	2.466*	187.859		
	E Dark	- Continuous	Lighting Both Sides	of Road	182	4.69	22882	3.24	1.447*	56.238		
	Dusk				138	3.56	20143	2.85	1.247*	27.292		
	E Dark	- Continuous	Lighting One Side o	of Roadway	41	1.06	3630	0.51	2.055*	21.049		
	Dark - F	Roadway Ligh	ited		24	0.62	2763	0.39	1.580	8.814		
	Daylight	t			1979	51.02	519213	73.57	0.693*	-874.643	Sort by Sum of	Max Gain
00	1	<i>s</i>									2	Displa
					2013-20	)17 Alahama I	ntegrated Cra	eh Data				
					2013 20	C029: Lightin	na Conditions	311 2010				
							.g conditione					
		100										
												_
	ency	50										
	requ	50										
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		0										
			Dark - Roadway Not Lighted	E Dark - Spo Illumination Both Sides of Roadway	t E Dark - Sp Illumination One Side of Roadway	ot E Dark n Continuo Lighting y Both Sid of Roadw	- Dusk us J es ray	t E Da Contin Light One S of Roa	rk - Dark - F uous Ligi ing Side dway	Roadway Da hted	aylight	
						C029: L	ighting Conditi	ons				

This demonstrates the enemy that darkness is to pedestrians, and that countermeasures for their crashes need to be focused on the nighttime hours. About half of pedestrian crashes occur in darkness, as opposed to about 25% of all crashes. As indicated above, the darkness problem is even more pronounced for fatal pedestrian crashes.

#### C006 Day of the Week

ŧ.	🛿 CARE 10.1.0.19 - [IMPACT Results - 2013-2017 Alabama Integrated Crash Data - Pedestria 🗕 🗖 🗾 🗡												
B	<u>F</u> ile	<u>D</u> ashboard	<u>F</u> ilters <u>A</u>	nalysis <u>I</u> mpao	ct <u>L</u> ocations	<u>T</u> ools <u>W</u> i	ndow <u>H</u> elp			-	₽×		
¢?	2013	-2017 Alabama	Integrated Cra	ash Data	~	Pedestria	n Involved			1/ 1/2013	∨ 12/		
Or	der: Natu	ural Order	✓ Desce	nding V	Suppres	s Zero-Valued R	lows	Significance: Ov	er Representation	✓ Threshold: 2.0	÷		
C	106: Day	of the Week		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C001: County C002: City	^		
	Sund	day		400	10.00	69908	9.70	1.030	11.760	C003: Year			
	Mon	day		533	13.32	105657	14.66	0.908*	-53.776	C004: Month			
	Tues	sday		590	14.74	108102	15.00	0.983	-10.354	C005: Day of Month			
	Wed	Inesday		588	14.69	106090	14.72	0.998	-1.180	C007: Week of the Year			
	Thur	sday		618	15.44	110787	15.37	7 1.004	2.734	C008: Time of Day			
	Frida	iy		674	16.84	128894	17.89	0.942	-41.824	C009: Data Source	J		
	Satu	ırday		599	14.97	91177	12.65	i 1.183*	92.640	Sort by Sum of Max Gain	n		
0		r 🖉								, 	Displa		
					2013-20	)17 Alabama Inte	grated Crash [	Data					
						C006: Day of t	he Week						
		20	-										
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	ancy	-											
	edne	10											
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		0	Sund	av Mond	av Tues	day Wedn	esday Th	ursdav F	riday Sa	turday			
			Gund	ay 10000	ay 1003	C006: D-w	of the Week	aroday 1		taraay			
<u>II</u>						COUD. Day	or the week						

Saturday is significantly over-represented and Monday is significantly under-represented. The rest are as expected compared to all non-pedestrian crashes. Although not totally, this follows the typical alcohol/drugs day-of-the-week distribution, the main exception being Sunday, which is slightly under-represented for pedestrians.

The time of day by day of the week distribution is given on the next page. The night-time hours are clearly over-represented on Friday night, Saturday morning and night and Sunday morning. This is typical of crashes caused by alcohol/drugs, and the fault for such could either be on the impaired walking (IW) pedestrian or the impaired driving (ID) driver.

The weekend over-representations become more pronounced for fatal pedestrian crashes, with both Saturday and Sunday have significant over-representations.

CARE 10.1	.0.19 - [Cros	stab Results	- 2013-2017	Alabama Int	egrated Cras	h Data - Filte	r = Pede	_ 🗆 🗙
🚦 <u>F</u> ile <u>D</u> ashb	ooard <u>F</u> ilters	<u>A</u> nalysis <u>C</u> rosstał	<u>L</u> ocations <u>T</u>	ools <u>W</u> indow	<u>H</u> elp			_ 8 ×
2013-2017	Alabama Integrated C	Crash Data	~	Pedestrian Involved		~	P 1/ 1	1/2013 y 12/31/20
Suppress Zero Va	lues: None	✓ Select	Cells: 🔳 🗸 🛞	9		Column: Day	/ of the Week ; Row	: Time of Day 👔
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	TOTAL
12:00 Midnight to	12	6	8	12	11	7	23	79
1:00 AM to 1:59	3.00%	1.13%	1.36%	2.04%	1./8%	1.04%	3.84%	1.9/%
AM AM	4.75%	1.31%	0.17%	0.85%	0.81%	1.19%	4.01%	1.72%
2:00 AM to 2:59	23	2	3	2	4	5	26	65
AM 2:00 AM to 2:50	5.75%	0.38%	0.51%	0.34%	0.65%	0.74%	4.34%	1.62%
3:00 AM to 3:59 AM	3 25%	4	4	1.02%	162%	0.89%	2 17%	56 1.40%
4:00 AM to 4:59	12	7	5	3	8	3	14	52
AM	3.00%	1.31%	0.85%	0.51%	1.29%	0.45%	2.34%	1.30%
5:00 AM to 5:59	9	13	12	5	15	6	10	70
6:00 AM to 6:59	2.25%	2.44 /	2.03%	0.85%	2.43%	0.89%	1.67 %	1./5%
AM	2.25%	2.25%	2.71%	3.74%	3.07%	2.37%	1.50%	2.57%
7:00 AM to 7:59	2	22	25	31	31	26	8	145
AM	0.50%	4.13%	4.24%	5.27%	5.02%	3.86%	1.34%	3.62%
8:00 AM to 8:59 AM	0.25%	18	31 5.25%	18	2 75%	19	9	2 82%
9:00 AM to 9:59	9	14	18	19	20	32	12	124
AM	2.25%	2.63%	3.05%	3.23%	3.24%	4.75%	2.00%	3.10%
10:00 AM to 10:59	11	22	14	26	26	21	14	134
AM 11.00 AM to 11.50	2./5%	4.13%	2.3/%	4.42%	4.21%	3.12%	2.34%	3.35%
AM AM 10 11.55	4.25%	3.56%	4.58%	2.89%	3.56%	3.56%	2.34%	3.50%
12:00 Noon to	9	21	23	28	21	25	25	152
12:59 PM	2.25%	3.94%	3.90%	4.76%	3.40%	3.71%	4.17%	3.80%
1:00 PM to 1:59 PM	15	35	22	24	20	28	14	158
2:00 PM to 2:59	20	32	27	32	32	36	2.34%	202
PM	5.00%	6.00%	4.58%	5.44%	5.18%	5.34%	3.84%	5.05%
3:00 PM to 3:59	17	48	59	40	38	51	20	273
FIM	4.25%	9.01%	10.00%	6.80%	6.15%	7.57%	3.34%	6.82%
4:00 PM to 4:59 PM	5.50%	5.25%	6.27%	6.12%	7.12%	5.49%	4.84%	5.82%
5:00 PM to 5:59	26	51	50	42	64	47	41	321
PM	6.50%	9.57%	8.47%	7.14%	10.36%	6.97%	6.84%	8.02%
6:00 PM to 6:59 PM	35	41	52 0 01%	52	53	50	46	329
7:00 PM to 7:59	34	37	35	44	48	44	50	292
PM	8.50%	6.94%	5.93%	7.48%	7.77%	6.53%	8.35%	7.30%
8:00 PM to 8:59	38	34	61	57	44	52	47	333
PM	9.50%	6.38%	10.34%	9.69%	7.12%	7.72%	7.85%	8.32%
9:00 PM to 9:59 PM	23 5.75%	26 4.88%	24 4 07%	25 4 25%	37 5.99%	49	52	236
10:00 PM to 10:59	11	18	21	23	18	37	51	179
PM	2.75%	3.38%	3.56%	3.91%	2.91%	5.49%	8.51%	4.47%
11:00 PM to 11:59 PM	13	14	15	18	11	44	24	139
1 101	3.25%	2.63%	2.54%	3.06%	1./8%	6.53%	4.01%	3.4/%
Unknown	0.00%	0.38%	0.00%	0.17%	0.00%	0.15%	0.17%	0.12%
ΤΟΤΑΙ	400	533	590	588	618	674	599	4002
TOTAL	10.00%	13.32%	14.74%	14.69%	15.44%	16.84%	14.97%	100.00%

# C006 Day of the Week by C008 Time of Day

# **Driver Characteristics**

C107 CU Driver Raw	Age Frequency	Distribution
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CA	RE 10.1.0.19 - [IMF	PACT Resu	ults - 201	3-2017 Al	labama In	tegrated	Crash Dat	a - Pedestria	n In 🗕 🗖	×
🖡 Ei	ile <u>D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis <u>I</u> r	mpact <u>L</u> oca	ations <u>T</u> ools	s <u>W</u> indow	<u>H</u> elp				_ 8 ×
<b>6</b> 2	2013-2017 Alabama Integrated	Crash Data		✓ P	edestrian Involv	ed		v 9	1/ 1/2013 🗸	12/31/20
Order	Max Gain 🗸 De	scending	✓ ✓ Si	uppress Zero-V	alued Rows	s	ignificance: Ov	ver Representation	✓ Threshold:	2.0 🜲
C107	CU Driver Raw Age	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max <sup>r</sup> Gain	C107: CU Dri	ver Raw Age	
	45	27	1.62	8636	1.34	1.204	4.574			
	46	29	1.74	8331	1.30	1.340	7.366			
	47	29	1.74	8126	1.26	1.374	7.898			
	48	22	1.32	7758	1.21	1.092	1.854			
	49	22	1.32	7918	1.23	1.070	1.438			
	50	31	1.86	7951	1.24	1.501	10.353			
	51	23	1.38	8080	1.26	1.096	2.018			
	52	27	1.62	8077	1.26	1.287	6.025			
	53	19	1.14	8071	1.26	0.907	-1.959			
	54	21	1.26	7863	1.22	1.028	0.581			
	55	22	1.32	7586	1.18	1.117	2.300			
	56	28	1.68	7563	1.18	1.426	8.360			
	57	20	1.20	7321	1.14	1.052	0.989			
	58	22	1.32	7044	1.10	1.203	3.708			
	59	29	1.74	6832	1.06	1.635*	11.258			
	60	26	1.56	6555	1.02	1.527	8.978			
	61	34	2.04	6314	0.98	2.074*	17.604			
	62	28	1.68	5887	0.92	1.832*	12.712			
	63	15	0.90	5672	0.88	1.018	0.271			
	64	18	1.08	5326	0.83	1.301	4.169			
	65	13	0.78	5226	0.81	0.958	-0.571			
	66	18	1.08	5124	0.80	1.353	4.694	Sort by Sum	of Max Gain	
00	) 🗞 🖉									Display Filte
				2013-2017 AI	abama Integrat	ed Crash Data				
				C107	: CU Driver Ra	w Age				
	4									
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			34		54	4		74		
JI					C107: CU Driv	ver Raw Ade				

This distribution is of those known to be causal drivers. It does not include the following (estimated frequencies from C107):

- Crashes in which the pedestrian was at fault (1516=47.6%),
- Unknown ages of drivers (446),
- Unknown causal unit (308).

Youngest drivers (16-30) have about the same average of pedestrian crashes as older drivers, but are under-represented because of their larger numbers in crashes in general. The most over-represented subset if the 45-66 year old group. Drivers older than this seem to continue to have problems with pedestrian crashes at about the same rate as the younger drivers. This indicates that age is not the causal factor that it is in some types of crashes (e.g., speed caused). As an example of how diversified the numbers are, the highest over-representation are at the ages of 27 and 61.

CA	RE 10.1.0.19 - [IMF	PACT Resu	lts - 2013	-2017 Al	abama In	tegrated f	Person Dat	a - Pedestrian C 🗕 🗖 🗙
E E	ile <u>D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis <u>I</u> n	npact <u>T</u> ools	: <u>W</u> indow	<u>H</u> elp			_ @ X
<b>6</b> 2	2013-2017 Alabama Integrated	Person Data		Pe	edestrian C101			✓ ♥ 〒 1/ 1/2013 ∨ 12/31/20
Order	: Max Gain 🗸 De	scending	V 🗌 Sut	opress Zero-Va	alued Rows	Sig	nificance: Over	Representation V Threshold: 2.0
P107:	Person Raw Age (incomple	ete before 2011) Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max ^ Gain	P023: E Manner of Crash P024: School Bus Related
	45	56	1.36	21553	1.35	1.002	0.110	P025: Crash of Severity
	46	68	1.65	20894	1.31	1.255	13.819	P042: Highway Patrol Troops
	47	54	1.31	20243	1.27	1.029	1.507	P043: Highway Patrol Posts
	48	61	1.48	19920	1.25	1.181	9.345	P046: ALDOT Region
	49	76	1.84	20303	1.28	1.444*	23.351	P047: ADECAAHSO Region
	50	66	1.60	20319	1.28	1.253	13.310	P048: Regional Planning Organization
	51	66	1.60	20391	1.28	1.248	13.123	P075: Person Relationship to Casual U
	52	46	1.11	20504	1.29	0.865	-7.170	P TO 1: Unit Type P102: Unit Non-Motorist Indicator
	53	60	1.45	20356	1.28	1.137	7.214	P103: Unit Commercial Motor Vehicle In
	54	78	1.89	19860	1.25	1.515*	26.500	P105: Person Age Range
	55	61	1.48	19494	1.22	1.207	10.449	P107: Person Raw Age (incomplete befo
	56	56	1.36	18974	1.19	1.138	6.798	P109: Person Gender
	57	66	1.60	18456	1.16	1.379*	18.141	P209. Vehicle Body of Person in Vehicle
	58	61	1.48	17803	1.12	1.321	14.834	P213: Vehicle Usage of Person in Vehicl
	59	51	1.24	17273	1.08	1.139	6.209	P321: Person Seating Position
	60	60	1.45	16857	1.06	1.373*	16.287	P322: Person Victim/Occ Type
	61	53	1.28	15938	1.00	1.282	11.671	P323: Person Safety Equipment
	62	49	1.19	14724	0.92	1.283	10.819	P324. Person Flection Status
	63	45	1.09	14200	0.89	1.222	8.177	P328: Person Injury Type
	64	44	1.07	13334	0.84	1.273	9.423	D200: Dore on Eiret Aid Dy
		11		1	1	1	•	
								Display Filte
				2013-2017 Ala	abama Integrate	ed Person Data		
			P	107: Person Ra	aw Age (incomp	lete before 201	1)	
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	and the local design of th	at III III					in the second	
	0							
		19		39		59		79 99 or Older
				P107: Persor	n Raw Age (inco	omplete before 2	2011)	

### P107 Pedestrian Raw Age

CA	ARE 10.1.0.19	) - [IMP/	ACT Result	s - 2013-2	2017 Alab	ama Integ	rated Pers	son Data - P	edestrian (	Caus — 🗖 🗙
₿ E	ile <u>D</u> ashboard	<u>F</u> ilters	<u>A</u> nalysis <u>I</u> mp	act <u>T</u> ools	Window H	lelp				_ & ×
<b>6</b> 2	2013-2017 Alabama	Integrated F	erson Data	~	Pedes	trian Caused			v 💡 🏆	1/ 1/2013 v 12/31/2017 v
Order	r: Max Gain	✓ Desc	cending	V Suppre	ess Zero-Value	d Rows	9	Significance: Over	Representation	✓ Threshold: 2.0 ÷
P107	: Person Raw Age	(incomplete	e before 2011)	Subset	Other	Other	Odds		P107: Perso	n RawAge (incomplete before
	Valac		Frequency	Percent	Frequency	Percent	Ratio	Max Gain		
	38		54	1.58	22859	1.43	1.101	4.953		
	39		60	1.76	22153	1.39	1.262	12.467		
	40		53	1.55	21979	1.38	1.124	5.841		
	41		53	1.55	21775	1.37	1.134	6.278		
	42		48	1.40	21777	1.37	1.027	1.274		
	43		38	1.11	22190	1.39	0.798	-9.612		
	44		51	1.49	21658	1.36	1.097	4.529		
	45		48	1.40	21561	1.35	1.038	1.738		
	46		60	1.76	20902	1.31	1.338	15.152		
	47		40	1.17	20257	1.27	0.920	-3.464		
	48		50	1.46	19931	1.25	1.169	7.235		
	49		57	1.67	20322	1.28	1.307	13.396		
	50		60	1.76	20325	1.28	1.376*	16.390		
	51		53	1.55	20404	1.28	1.211	9.220		
	52		49	1.43	20501	1.29	1.114	5.012		
	53		41	1.20	20375	1.28	0.938	-2.718		
	54		49	1.43	19889	1.25	1.148	6.325		
	55		47	1.38	19508	1.22	1.123	5.143		
	56		41	1.20	18989	1.19	1.006	0.256		
	57		59	1.73	18463	1.16	1.489*	19.385		
	58		53	1.55	17811	1.12	1.387*	14.784 🗸	Sort by Sum	n of Max Gain
	D 🕸 🖉 📃									Display Filter Name
					2013-2017 Ala	bama Integrated	Person Data			
				P	107: Person Ra	w Age (incomple	te before 2011)			
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	0-111								1000 Dimo	mbaaraa .
			19		39		59		79	99 or Older
					P107: Person	Raw Age (incon	nplete before 20	)11)		

### P107 Causal Pedestrian Raw Ages

The above is quite comparable to the previous age distribution despite the fact that this is for only causal pedestrians. The general conclusion that can be reached is that there is nothing inherent in age that makes pedestrians more apt to cause crashes, or conversely, more apt to avoid causing them.

### C109 CU Driver Gender

•	CARE 10	.1.0.19 - [IMPA	ACT Results	s - 2013-2	017 Alaba	ma Integra	ated Crash	n Data - Pe	destrian Inv	/olv — 🗖	X		
•	<u>F</u> ile <u>D</u> as	hboard <u>F</u> ilters <u>A</u>	<u>A</u> nalysis <u>I</u> mpa	ct <u>L</u> ocation	s <u>T</u> ools <u>W</u>	<u>(</u> indow <u>H</u> elp					- 8 ×		
¢?	2013-2017 Alabama Integrated Crash Data Pedestrian Involved Y Y 1/ 1/2013 < 12/31/2017												
Ore	Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0												
C1	09: CU Driv	er Gender	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C109: CU Driv	ver Gender			
	Male		956	54.91	363421	55.79	0.984	-15.223	I				
	Female		785	45.09	288042	44.21	1.020	15.223	Sort by Sum	of Max Gain	1		
0	🗊   🌚 y	8								Displ	ay Filter Nam		
				:	2013-2017 Alaba	ama Integrated C	rash Data						
					C109: (	CU Driver Gende	er						
		60											
	len cy	40											
	requ	20											
	-	0											
				Male	•		Female						
					C109: CU	Driver Gender							

Driver gender is about the same for non-pedestrian crashes – there are no significant differences. However, the male over-representation becomes significant for fatal pedestrian crashes, given below.



### C121 CU Driver Condition

CA	ARE 10.	1.0.19 - [IMF	PACT Resu	lts - 2013	-2017 Ala	bama Inte	egrated Cr	ash Data	- Pedestriar	n In — 🗖 📕	×
E E	ile <u>D</u> ash	board <u>F</u> ilters	<u>A</u> nalysis <u>I</u> m	npact <u>L</u> ocati	ons <u>T</u> ools	<u>W</u> indow	<u>H</u> elp			- é	9 X
<b>6</b> 2	2013-2017	Alabama Integrated	Crash Data	~	Ped	lestrian Involved			- v 9	₩ 1/ 1/2013 ∨ 12/3	31/20 <sup>.</sup>
Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshol										✓ Threshold: 2.0	÷
C121	: CU Drive	r Condition	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C121: CU Driv	ver Condition	
•	CU is Not	a Vehicle	1516	49.35	676	0.11	457.980*	1512.690			
	E Emotion	al (Depressed/An	18	0.59	2068	0.33	1.778	7.874			
	E Physica	l Impairment	10	0.33	1770	0.28	1.154	1.333			
	Illness		5	0.16	2900	0.46	0.352	-9.201			
	E Under th	ne Influence of Al	102	3.32	25236	4.02	0.825	-21.574			
	E Asleep/	Fainted/Fatigued	17	0.55	11502	1.83	0.302	-39.322			
	Apparently	y Nomal	1404	45.70	583065	92.94	0.492*	-1451.114	Sort by Sum of	of Max Gain	1
00	) 🛯 🖗 🏓	•								Display	y Filte
					2013-2017 Alab	ama Integrated	Crash Data				
					C121: 0	CU Driver Cond	ition				
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	duen	50									
	Fre										
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			N SI D	UD VA	8		şt ≱‡	pFair	o ppice		
			0	2	E U		5	Aska			
				(Dei				-			
					C12	1: CU Driver Co	ondition				

Driver abnormal conditions do not appear to be significant in causing pedestrian crashes. While the distribution for fatal pedestrian crashes is the same in most respects, Under the Influence or Alcohol or Other Drugs rises in significance, accounting for 23 fatalities and being over-represented by an Odds Ratio of 1.445 (about 45% higher than expected).

### C122 CU Driver Officer Opinion Alcohol

CARE 10.1.0.19 - [IMPACT Resul	ts - 2013-2017 Ala	bama Integrate	d Crash Data -	Pedestrian Inv 🗕 🗖 🗙							
🚦 Eile Dashboard Eilters Analysis Im	pact <u>L</u> ocations <u>T</u> ools	<u>W</u> indow <u>H</u> elp		_ & ×							
2013-2017 Alabama Integrated Crash Data v Pedestrian Involved v 🍸 😨 1/ 1/2013 v 12/31/2013											
Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0 文											
C122: CU Driver Officer Opinion Alcohol Subset Frequency	Subset Other Percent Frequency	Other Odd Percent Rati	ls Max Gain	C122: CU Driver Officer Opinion Alcohol							
Yes - Driver Was Under Infl 95	6.13 24229	3.88 1	1.578* 34.790								
No - Driver Was Not Under I 1456	93.87 599876	96.11 0	.977* -34.713	Sort by Sum of Max Gain							
				Display Filter							
	2013-2017 Alat	bama Integrated Crash D	ata								
	C122: CU Driv	ver Officer Opinion Alcoh	ol								
100											
8											
<u>ڦِ</u> 50 –											
Le											
0 - Ves - Dr	iver Was Under Influence of Alco	hol No-Driver Was Not	Under Influence of								
163-01	C122: CU Driver	Alco Officer Opinion Alcohol	ohol								

We suspected significant alcohol involvement with the time of day and day of the week results. This indicates that they had an over-representation of 57.8% times the expected proportion. When looking at the same results for fatalities, the ratio of yes to no goes from its value above of 6.13% to 17.65%, an over-representation odds ratio of 4.542. There is no doubt that driver impairment is a major cause of pedestrian fatalities.
## C123 CU Driver Officer Opinion Drugs

C/	ARE 10.1.0.19 - [IMP	ACT Resul	ts - 2013·	-2017 Alal	bama Inte	grated Cr	ash Data -	Pedestrian Ir	nv — 🗖	x
	ile <u>D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis <u>I</u> mp	oact <u>L</u> ocati	ons <u>T</u> ools	<u>W</u> indow <u>H</u>	<u>l</u> elp				- 8 ×
<b>6</b>	2013-2017 Alabama Integrated	Crash Data	~	Pede	estrian Involved			× 💡 🔞	1/ 1/2013 v	12/31/2017
Orde	r: Max Gain 🗸 Des	cending	V V Supp	oress Zero-Valu	ed Rows	Sign	ificance: Over	Representation	✓ Threshold: 2	2.0 🚖
C123	CU Driver Officer Opinion Dr	ugs Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C123: CU Driver	Officer Opinion D	rugs
	Yes - Driver Was Under Infl	32	2.14	7766	1.26	1.696*	13.130			
	No - Driver Was Not Under I	1461	97.86	606684	98.74	0.991*	-13.130	Sort by Sum of N	/lax Gain	
	) 🛯 🖉								🗌 Dis	play Filter
				2013-2017 Alab	ama Integrated	Crash Data				
				C123: CU Dri	ver Officer Opin	ion Drugs				
	100									
	50									
	Ereq									
	0									
		Yes -	Driver Was Un Drugs	der Influence of	No - Driver	Was Not Under Drugs	r Influence of			
				C123: CU Driver	Officer Opinion	Drugs				

Although not as high in frequency (only about a third as many), the over-representation indicator (odds ratio) is about the same for drugs as for alcohol. When looking at the same results for fatalities, the ratio of yes to no goes from its value above of 2.14% to 13.10%, an over-representation odds ratio of 10.357. There is no doubt that driver impairment is a major cause of pedestrian fatalities.

### C104 CU Left the Scene



This attribute is quite important in relatively high severity cases such as pedestrian involved. The Left-Scene rate is almost twice that which occurs in non-pedestrian crashes. This probably tracks ID and night-time hours. When there is a fatality involved, the proportion of leaving the scene drops down to under 10%, which is about the same rate that it has in crashes in general.

## **C020 E Distracted Driving Opinion**

	CARE 10.1.0.19 - [IMPACT Results - 2013-2017 Alabama Integrated Crash Data - Pedestrian Inv 🗕 🗖 🗾 🗡										
🖡 <u>F</u> ile	<u>D</u> ashboard <u>F</u> ilter	rs <u>A</u> nalysis <u>I</u> mpao	ct <u>L</u> ocatior	ns <u>T</u> ools	<u>W</u> indow	<u>H</u> elp				-	ъ×
<b>6</b> 2	013-2017 Alabama Integra	ated Crash Data	~	Ped	estrian Involve	d		Ý	9	1/ 1/2013 v 12/	31/2017
Order:	Max Gain 🗸 🗸	Descending v	<ul> <li>Suppress</li> </ul>	ess Zero-Valu	ed Rows		Significance:	Over Represer	ntation 🗸	Threshold: 2.0	÷
C020: E	Distracted Driving Opi	nion	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C020: E Dis	stracted Driving Op	oinion
► (	Distracted by Passenger		15	0.66	5909	1.35	0.486	-15.885			
(	Distracted by Use of Electr	ronic Communication	42	1.84	8270	1.89	0.972	-1.226			
(	Distracted by Use of Other	r Electronic Device	11	0.48	3551	0.81	0.593	-7.560			
F	Fatigued/Asleep		15	0.66	13712	3.14	0.209	-56.670			
	Distracted by Insect/Reptil	le	4	0.18	615	0.14	1.244	0.786			
0	Other Distraction Inside the	e Vehicle	61	2.67	21595	4.95	0.540*	-51.873			
0	Other Distraction Outside t	he Vehicle	100	4.38	19185	4.39	0.997	-0.276			
1	Not Applicable (Not Distrac	cted)	2034	89.13	360649	82.60	1.079*	148.960	Sort by Su	m of Max Gain	
0	Se 🖉									🗌 Displa	y Filter
			2	013-2017 Alat	oama Integrate	ed Crash Data	3				
				C020: E Dis	stracted Drivir	ig Opinion					
	100										
	<u>s</u>										
	- Fre										
	0	7 20	ں ج ا	0.0	l	20					
		senge stronic cation	Devio Use o	Devio	Aslee	Reptile	action fehicle	Taction Utriside	acted		
		/ Past istrac	- is a	ж —	//penf	istrac sect/l	Dist	the Dist	Distr		
		Con B	i	6	Fati	0 2	Other	Other	Not (Not		
				C020: E	Distracted D	iving Opinion	1				

Relatively speaking, DD does not seem to be a major factor in pedestrian crashes. Recognize that this is only referring to the driver, not to the pedestrian. No practical differences were found in the pedestrian fatality analysis.

# **Severity Characteristics**

## C025 Crash Severity

CARE 10.1.0.19 - [IMPACT Results - 2013-2017 Alabama Integrated Crash Data - Pedestrian Inv 🗕 🗖 💌										
<u>File Dashboard Filters Analysis Impact Locations Tools Window Help</u>	_ & ×									
😵 2013-2017 Alabama Integrated Crash Data 🗸 Pedestrian Involved 🗸 🂡 😨	1/ 1/2013 y 12/31/2013									
Order:         Max Gain         V         Descending         V         Suppress Zero-Valued Rows         Significance:         Over Representation         V	Threshold: 2.0									
C025: Crash Severity Subset Subset Other Other Other Odds Max C021: Distance to I C022: E Type of Ro	Fixed Object									
Fatal Injury 481 12.02 3672 0.51 23.587* 460.607 C023: E Manner of	Crash									
Incapacitating Injury 1050 26.24 29598 4.11 6.388* 885.625 C024: School Bus	Related									
Non-Incapacitating Injury 1277 31.91 52879 7.34 4.348* 983.332 C026: Intersection	Related									
Possible Injury 778 19.44 65790 9.13 2.129* 412.629 C027: At Intersection	on									
Property Damage Only         156         3.90         549140         76.20         0.051*         -2893.698         C028: Mileposted F	Route 🗸									
Unknown 260 6.50 19536 2.71 2.396* 151.505 Sort by Sum of Max	x Gain									
	Display Filter									
2013-2017 Alabama Integrated Crash Data										
C025: Crash Severity										
100										
Fatal Injury Incapacitating Non-Incapacitating Possible Injury Property Unknown Injury Injury Damage Only										
C025: Crash Severity										

As would be expected, all of injury categories are significantly over-represented with the Odds ratio increasing exponentially with the severity.

## C058 Number Killed

₿ C	ARE 10.1.0.1	9 - [IMI	PACT Resu	ilts - 2013	3-2017 A	labama Ir	ntegrated	Crash Dat	ta - Pedestrian 🗕 🗖 🗙			
B	<u>F</u> ile <u>D</u> ashboard	<u>F</u> ilters	<u>A</u> nalysis <u>I</u> r	npact <u>L</u> oca	tions <u>T</u> ool	s <u>W</u> indow	<u>H</u> elp		_ & ×			
¢°	2013-2017 Alaban	na Integrated	l Crash Data		✓ P	edestrian Involv	ved		✓ Y </td			
Orde	er: Max Gain	∨ De	escending	Y V Su	ppress Zero-V	alued Rows	Signi	ficance: Over	Representation V Threshold: 2.0			
C06	0: Number Killed		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C056: Number of Pedestrians C057: Number of Pedacyclists			
	No Fatalities		3517	87.88	716926	99.49	0.883*	-464.513	C058: Number Injured (Non-Fatal)			
	1 Fatality		472	11.79	3372	0.47	25.205*	453.273	C059: Number Injured (Includes Fatalitie			
	2 Fatalities		12	0.30	254	0.04	8.507	10.589	C060: Number of Railroad Trains			
	3 Fatalities		1	0.02	47	0.01	3.831	0.739	Sort by Sum of Max Gain			
0												
				:	2013-2017 Alal	bama Integrate	d Crash Data					
					C06	0: Number Kill	ed					
	100											
	n 50 -		_									
			_									
	0		No Fatali	ties	1 Fatality	2	? Fatalities	3Fa	atalities			
					CO	60: Number Kill	ed					
h.												

As indicated above, the chances of a pedestrian crash being fatal is about 25 times that of other crashes, and two fatalities result about 8 times the expected proportion.

## C101 Causal Unit (CU) Type

C/	ARE 10.1.0.19 - [IMPACT Results - 2013-2017 Alabama Integrated Crash Data - Pedestrian Inv 🗕 🗖 🗾 🔀													
E E	<u>F</u> ile <u>D</u> a	shboard <u>F</u> ilte	ers <u>A</u> naly	sis <u>I</u> mpact	<u>L</u> ocations	<u>T</u> ools <u>W</u>	<u>(</u> indow <u>H</u> e	р					-	₽ ×
<b>6</b> 2	2013-20	17 Alabama Integ	rated Crash [	)ata	~	Pedestri	an Involved			- ¥ §	1	1/ 1/2013	/ 12/3	31/2017
Orde	r: Max Ga	in v	Descendin	g v	Suppress	s Zero-Valued	Rows	Signifi	cance: Over I	Representatio	on v	Threshold:	2.0	÷
C101	1: Causa	Unit (CU) Type		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C101: Ca	ausal Unit (	(CU) Type		
•	Passen	ger Car		1154	55.56	360785	53.56	1.037	41.623					
	E Van o	r Mini-Van		12	0.58	2572	0.38	1.513	4.070					
	E Single	-Unit Truck (2-Ax	de/6-Tire)	20	0.96	5815	0.86	1.116	2.071					
	E Cargo	Van (10000 lbs o	or Less)	14	0.67	4277	0.63	1.062	0.813					
	E Mini-v	an		48	2.31	15953	2.37	0.976	-1.186					
	Motorcy	cle		10	0.48	5579	0.83	0.581	-7.201					
	Pick-Up	(Four-Tire Light ]	Truck)	385	18.54	127284	18.89	0.981	-7.444					
	E Tracto	or/Semi-Trailer		31	1.49	12945	1.92	0.777	-8.912					
	E Sport Utility Vehicle (SUV) 403 19.40 138438 20.55 0.944 -23.834													
0	) )	<i>s</i>								<u></u>			Displa	y Filter
					201:	3-2017 Alabam C101: Caus	a Integrated Ci al Unit (CU) Ty	rash Data rpe						
	Frequency	60 40 20	ſ								1			
		0	Passenger Car –	E Van or Mini-Van	E Single-Unit Truck 2-Ade/8-Tire)	E Cargo Van (10000	E Mini-van	Md orcycle —	Hck-Up (Four-Tire- Ught Truck)	E Tractor/Semi-Trailer —	E Sport Utility Vehicle (SUV)-			
						C101: C	ausal Unit (CU	) Type						

This attribute becomes important because of the recent research that has indicated that SUVs are more apt to cause fatal pedestrian crashes than are other passenger vehicle types. The display above shows that SUVs are in no way over-represented in causing pedestrian crashes. More analysis will be performed below to determine if pedestrian fatality crashes are more apt to be caused by SUVs than other vehicles. The next section contains the same display as above, but for pedestrian fatality crashes.



#### C101 Causal Unit (CU) Type – Fatality Causal Comparison

The above display is different from the other fatal pedestrian analyses in that this comparison is between fatal pedestrian crashes and non-fatal pedestrian crashes. This was performed in order to determine vehicle types that may be causing more than their share of fatalities. It has been postulated that because of their structure, SUVs cause more fatal pedestrian crashes (see: <a href="http://www.safehomealabama.gov/SafetyTopics/Pedestrians.aspx">http://www.safehomealabama.gov/SafetyTopics/Pedestrians.aspx</a>). Both SUVs and Passenger Cars are under-represented, falling to the bottom of the table above. It is true that Passenger Cars are significantly under-represented and have a much lower odds ratio than SUVs, and this could be interpreted that they are not causing as many fatalities (proportionately speaking) as SUVs. As can be seen, however, SUVs have almost identically their proportion of fatal crashes as their proportion of non-fatal crashes.

CA	RE 10.1.0.19 - [IMPA	CT Results ·	- 2013-20	17 Alabam	a Integrate	ed Crash D	ata - Pede	strian Fatal (	Cra 🗕 🗖 🗙
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<b>6</b> °	2013-2017 Alabama Integrated Cra	ish Data	~	Pedestrian	Fatal Crashes		~	💡 🍸 1/ 1	1/2013 🗸 12/31/2017 🗸 🥘
Order:	Max Gain 🗸 Descer	nding 🗸 🗸	Suppress	Zero-Valued Ro	ws	Sig	nificance: Over	Representation	✓ Threshold: 2.0 ♣
C224:	CU Estimated Speed at Impact	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C224: CU Esti	mated Speed at Impact
•	1 to 5 MPH	7	8.24	69860	17.77	0.463	-8.109		
	11 to 15 MPH	3	3.53	30301	7.71	0.458	-3.553		
	16 to 20 MPH	1	1.18	23098	5.88	0.200	-3.995		
	21 to 25 MPH	2	2.35	20591	5.24	0.449	-2.453		
	31 to 35 MPH	7	8.24	25654	6.53	1.262	1.452		
	36 to 40 MPH	3	3.53	23671	6.02	0.586	-2.119		
	41 to 45 MPH	7	8.24	35591	9.06	0.909	-0.697		
	46 to 50 MPH	7	8.24	17770	4.52	1.821	3.157		
	51 to 55 MPH	16	18.82	28611	7.28	2.586	9.812		
	56 to 60 MPH	5	5.88	12695	3.23	1.821	2.254		
	61 to 65 MPH	10	11.76	14371	3.66	3.217	6.892		
	66 to 70 MPH	10	11.76	15941	4.06	2.901	6.552		
	71 to 75 MPH	4	4.71	3143	0.80	5.885	3.320		
	81 to 85 MPH	3	3.53	661	0.17	20.986	2.857	Sort by Sum o	f Max Gain
00	i 🕼 🖉								Display Filter Name
				2013-2017 Alaba	ma Integrated Cra	ash Data			
				C224: CU Esti	imated Speed at I	mpact			
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	0								
			31 to 35	MPH		56 to	60 MPH		
				C224: CU	Estimated Speed	at Impact			

### C224 CU Estimated Speed at Impact for Pedestrian Fatal Crashes

Generally pedestrian crashes occur at lower speeds than other crashes due to their being highly concentrated in urban areas. However, the same is not true of fatal pedestrian crashes as given above, which illustrates that speed is a major factor in causing these fatalities.

## C036 Adjusted EMS Arrival Delay

CA	ARE 10.1.0.19 - [IMF	PACT Resu	ults - 201	3-2017 A	labama Ir	ntegrated	Crash Da	ta - Pedestr	ian 🗕 🗖	×
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<b>*</b>	2013-2017 Alabama Integrated	Crash Data		✓ F	edestrian Involv	ved		v 9	? 🌃 1/ 1/20	13 v 12/31
Order	: Max Gain 🗸 De	scending	🗸 🗸 Si	uppress Zero-V	alued Rows	Signi	ficance: Over	Representation	✓ Threshold:	2.0 🜩
C036	: Adjusted EMS Arrival Delay	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C036: Adjuste	d EMS Arrival Dela	У
•	0 to 5 minutes	1221	36.98	45617	26.77	1.381*	337.052			
	6 to 10 minutes	1187	35.95	54211	31.81	1.130*	136.521			
	11 to 15 minutes	481	14.57	30582	17.95	0.812*	-111.606			
	16 to 20 minutes	193	5.84	16677	9.79	0.597*	-130.160			
	21 to 30 minutes	144	4.36	14605	8.57	0.509*	-139.010			
	31 to 45 minutes	51	1.54	5737	3.37	0.459*	-60.169			
	46 to 60 minutes	7	0.21	1590	0.93	0.227	-23.810			
	61 to 90 minutes	10	0.30	894	0.52	0.577	-7.324			
	91 to 120 minutes	3	0.09	176	0.10	0.880	-0.410			
	121 to 180 minutes	1	0.03	151	0.09	0.342	-1.926			
	Over 180 minutes	4	0.12	163	0.10	1.266	0.841	Sort by Sum	of Max Gain	
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				2013-2017 Ala	bama Integrated	d Crash Data				
				C036: Adiu	usted EMS Arriv	al Delav				
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	0-1	6 to 10 minutes	16 to 2	0 minutes	31 to 45 min	utes 61 t	to 90 minutes	121 to 180 mir	lutes	
				C036:	Adjusted EMS	Arrival Delay				

Over 70% of pedestrian crashes have an EMS arrival delay of 10 minutes or less. The delay is longer for fatal pedestrian crashes, with only 57.6% having arrivals less than 10 minutes, and 31.6% falling in the 11 to 30 minute ranges.

## Pedestrian Fatal vs. Non-Fatal Analysis

The study above of vehicle types (C101) is repeated here for all other attributes, and those which were the most significant are given here, in order of those that were found to have the highest significance, as measure by their total Max Gain. For this section only the comparisons are between Pedestrian Fatal Crashes and Pedestrian Non-Fatal Crashes, with the purpose of surfacing what in a pedestrian crash leads to it being fatal.

CA	ARE 10.1.0.19 - [IMPAC	T Results	- 2013	-2017 A	labama	Integrat	ed Crasl	h Data - Pede	est 🗕 🗖 🗙
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<b>6</b> 2	2013-2017 Alabama Integrated Crash	Data	~	P	edestrian Fat	al Crashes		~	• 💡 🔞 1/ 1/2013 🗸
Order	: Max Gain v Descend	ing 🔻	🖌 🖌 Sup	press Zero-V	alued Rows	Significa	ance: Over	Representation	✓ Threshold: 2.0
C015	Primary Contributing Circumstance	e Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 👻	C015: Primary C	Contributing Circumstance
•	E Improper Crossing	126	36.10	72	10.45	3.455*	89.530		
	Pedestrian Under the Influence	46	13.18	5	0.73	18.163	43.467		
	E Not Visible	37	10.60	20	2.90	3.652*	26.869		
	DUI	24	6.88	9	1.31	5.265	19.441		
	E Lying or Sitting in Roadway	16	4.58	0	0.00	0.000	16.000		
	Failed to Yield the Right-of-Way	37	10.60	71	10.30	1.029	1.036		
	E Wrong Side of Road	10	2.87	30	4.35	0.658	-5.196		
	Unseen Object/Person/Vehicle	53	15.19	200	29.03	0.523*	-48.306	Sort by Sum of	Max Gain
	) 😪 🖉								D
	ð 10		2013- C015	2017 Alabam i: Primary Co	a Integrated ntributing Cir	Crash Data cumstance			
	L.	E Im proper Crossing Podestrian Under the	Influence	E Not Visible	E Lying or Sitting in	Roodway Failed to Yield the Right	-ot-Way	c word see or read	
			(	015: Primary	Contributing	Circumstan	ce		

### C015 Primary Contributing Circumstance (Fatal vs. Non-Fatal)

All of these PCCs are relevant. Improper Crossing (126) is the most over-represented. Pedestrian under the Influence (46) is over 18 times its expected proportion, creating situations where pedestrians do not take defensive protective action. Not Visible (37) at all, as opposed to unseen is significantly over-represented. DUI (24) of the causal driver is over five times expected. Lying or Sitting in Roadway (16) proved to be fatal 100% of the time. The other items should not be dismissed because they are under-represented.

### C304 CU Non-Motorist Action at time of Crash #1

This display largely reflects the findings above, but it contains several categories not in the contributing circumstance codes. Generally, it shows the actions as opposed to what might have caused them (e.g., ID).



### C308 CU Non-Motorist Condition



This attribute confirms the problem of impairment on the part of pedestrians, which leads them to ignore the care they would usually take while walking. It is interesting to compare this with the same driver distribution, C121 CU Driver Condition. The following shows that the results are not that different for the Pedestrian, there being over 7 times the expected proportion of fatal crashes when compared to the proportion for non-fatal crashes.

C12	1: CU Driver Condition	Subset requency	Subset Percent	Other requency	Other Percent	Odds Ratio	Max Gain 👻	C121: CU Driver Condition		
	E Under the Influence of Alcohol/Drugs	23	21.70	14	3.08	7.036	19.731			
	Illness	3	2.83	0	0.00	0.000	3.000			
	E Asleep/Fainted/Fatigued	3	2.83	2	0.44	6.425	2.533			
	E Emotional (Depressed/Angry/Disturbed)	2	1.89	2	0.44	4.283	1.533			
	E Physical Impairment	1	0.94	0	0.00	0.000	1.000			
	Apparently Normal	74	69.81	436	96.04	0.727*	-27.797	Sort by Sum of Max Gain		
2013-2017 Alagama Integrated Crash Data										

### C310 CU Non-Motorist Officer Opinion Drugs

•	CARE 10.1	1.0.19 - [IMPA	CT Results -	2013-2017	Alabama I	ntegrated	Crash Data	a - Pedestria	ın Fatal Crashes 🗕 🗖	×	
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¢?	2013-2017	Alabama Integrated Cra	sh Data	~	Pedestrian Fata	Il Crashes		✓ ♥ 1/ 1/2013 ∨ 12/31/2017 ∨ ① ●			
Orc	ler: Max Gain	✓ Descer	nding v	Suppress Ze	ro-Valued Rows		s	lignificance: Over	Representation V Threshold: 2	2.0 🜩	
C3	10: CU Non-I	Motorist Officer Opinio	n Drugs <sub>ubset</sub> Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C310: CU Non-Motorist Officer Opi	inion Dru	
	Yes - Non-	-Motorist Was Under I	31	25.83	2	0.39	66.521	30.534			
	No - Non-I	Motorist Was Not Und	89	74.17	513	99.61	0.745*	-30.534	Sort by Sum of Max Gain		
0	🗊   🍲 🖉								Display Filter Nam	e	
				c	2013-2017 Alaban 310: CU Non-Moto	na Integrated Cra prist Officer Opini	sh Data ion Drugs				
	equency	100 50									
	Ŀ	0	Yes - N	lon-Motorist Was Ur Drugs C310	nder Influence of CU Non-Motoris	No - Non-Motoris t Officer Opinion	t Was Not Under Drugs Drugs	Influence of			

The problem of pedestrian impairment is further qualified by these displays. Above indicates that the pedestrian suffering death is 66.521 times the proportion of those pedestrians who survive their crashes. The multiplier for alcohol is not as great at 8.564, but this is still a major indicator of the role that alcohol is playing in that it is recorded to be affecting twice as many pedestrians being killed as drugs.



#### C309 CU Non-Motorist Officer Opinion Alcohol

### C322 CU Driver/Non-Motorist Victim/Occupant Type

In other words, who caused the crash; this is a very important aspect of countermeasure development, since it gives a good indication of where the resources should be concentrated.

CA	ARE 10.1.0.19 - [IMPACT Results - 2013-2017 Alabama Integrated Crash Data - Pedestrian Fatal Crashes 🗕 🗖 💌										
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<b>\$</b> ?	2013-2017 Alabama Integrated Cra	sh Data	Ý	Pedestrian Fata	al Crashes		× 9	1/ 1/2013 ∨ 12/31/2017 ∨ ①			
Order	Max Gain 🗸 Descer	iding v	✓ Suppress Ze	ro-Valued Rows		s	ignificance: Over	Representation v Threshold: 2.0			
C322:	CU Driver/Non-Motorist Victim/	Occ Type <sub>pset</sub> Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔍	C310: CU Non-Motorist Officer Opinion [ C049: Has Coordinate			
•	Non-Motorist	285	59.25	330	26.70	2.219*	156.578	C309: CU Non-Motorist Officer Opinion A			
	E CU Driver Not Recorded	15	3.12	18	1.46	2.141	7.995	C322: CU Driver/Non-Motorist Victim/Oc			
	CU is Unknown	22	4.57	81	6.55	0.698	-9.522	C304. E CO Non-Motorist Action at Time C325: CU Driver/Non-Motorist Age			
	Driver	154	32.02	564	45.63	0.702*	-65.485	C227: CU Vehicle Towed			
	E CU Non-Motorist Not Recorded	5	1.04	243	19.66	0.053	-89.566	Sort by Sum of Max Gain			
00	) (av 🖉							<ul> <li>Display Filter Name</li> </ul>			
	60 40 20 0	2013-2017 Alaba	E CU Driver Not F	sh Data - Filter = f 322: CU Driver/No	Pedestrian Fatal ( n-Motorist Victim)	Crashes vs. Pede /Occ Type	Estrian Non-Fatal C	Von-Motorist Recorded			
			С	322: CU Driver/No	on-Motorist Victim	/Осс Туре					

The display above shows a striking contrast. To get the perspective, recognize that if at-fault were just due to chance, then there would be a 50-50% chance for the driver and the pedestrian and their proportions would thus be the same (the ratio of the two would be 1.00). But here, for non-fatal pedestrian crashes, the driver is at fault 63.1% of the time (a ratio of 1.71 rather than 1.00). But for fatal pedestrian crashes just the opposite is true. The pedestrian is at fault 64.9% of the time (a ratio of 1.85 rather than 1.00). This shows that severity is highly dependent on fault. If a pedestrian cause a crash, the probability that s/he will be killed is close to twice what it would be if they were strictly the victim.

## C409 CU Traffic Control

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B	File Dashboard Filters	Analysis	Impact L	ocations	Tools Wind	dow Help		_ 8	×	
<b>6</b> 2	2013-2017 Alabama Integrate	ed Crash Data		~	Pedestrian	Fatal Crashes		✓ ♥ 1/ 1/2013	$\sim$	
Orde	er: Max Gain 🗸 🗸	Descending	~ •	Suppress Ze	ero-Valued Rov	vs Signifi	cance: Over	Representation v Threshold: 2.0 🖨		
C40	9: CU Traffic Control	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C409: CU Traffic Control		
	No Passing Zone	52	40.63	52	9.81	4.141*	39.442			
	Lane Control Device	35	27.34	25	4.72	5.797*	28.962			
	Flag Person	2	1.56	0	0.00	0.000	2.000			
	E Workzone Signs	2	1.56	0	0.00	0.000	2.000			
	Railroad Gates	2	1.56	0	0.00	0.000	2.000			
	Police Officer	2	1.56	1	0.19	8.281	1.758			
	Flashing Traffic Control S	2	1.56	4	0.75	2.070	1.034			
	E School Zone Sign/De	1	0.78	4	0.75	1.035	0.034			
	Pedestrian Control	2	1.56	9	1.70	0.920	-0.174			
	Traffic Signals	23	17.97	212	40.00	0.449*	-28.200			
	Stop Sign	5	3.91	206	38.87	0.101	-44.751	Sort by Sum of Max Gain		
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			:	2013-2017 Ala	abama Integrat	ed Crash Data	1			
				C409	): CU Traffic C	ontrol				
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	"									
	0	Lane Control Dev	ice EWor	rkzone Signs	Police Off	icer I	E School Zone Sign/Device	Traffic Signals		
				(	C409: CU Traff	fic Control				

No Passing Zone and Lane Control Device both have significant over-representation of over 4 and close to six times, respectively. Traffic Signals have a high number but are under-represented, probably because the high volume make these locations very prone to pedestrian crashes.

CA	RE 10.1.0.19 - [IN	IPACT Re	sults - 20	)13-2017	Alabam	a Integra	ted Crasł	n Data - Pedest 🗕 🗖 🗙			
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<b>6</b> 2	2013-2017 Alabama Integrat	ed Crash Data		~	Pedestrian I	Fatal Crashes		✓ ♥ 1/ 1/2013 ∨			
Order: Max Gain v Descending v V Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0											
C031	Locale	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C325: CU Driver/Non-Motorist Age A C227: CU Vehicle Towed			
	Open Country	198	41.16	149	12.06	3.415*	140.015	C409: CU Traffic Control			
	Manufacturing or Industrial	7	1.46	10	0.81	1.799	3.108	C130: E CU Non-Motorist Maneuvers			
	Other	6	1.25	8	0.65	1.927	2.887	C031: Locale			
	Shopping or Business	174	36.17	462	37.38	0.968	-5.791	C226: CU Vehicle Damage			
	School	5	1.04	90	7.28	0.143	-30.024	C026: Intersection Related			
	Residential	91	18.92	517	41.83	0.452*	-110.195	Sort by Sum of Max Gain			
	) 🗞 🖉							<b>√</b> D			
	2013-2	2017 Alabama I	ntegrated Cras	sh Data - Filter	= Pedestrian C031: Locale	Fatal Crashes	vs. Pedestria	n Non-Fatal Crashes			
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		Open Country	Manufacturin or Industrial	ig Oth	C031: Loca	Shopping or Business le	School	Residential			

Open country is by far the most lethal locale, having 198 fatal crashes and an odds ratio of 3.415 times its expected proportion. Rural fatal crashes also have and odds ratio of 3.291, almost reflecting the locale result perfectly. C224 Estimated Speed at Impact further reinforces that the increased speed of impact on the rural roadways is a major cause of pedestrian fatalities on these roadway classifications.

### **Attributes Found Consistent with the General Comparisons**

Displays were not be shown in this section for those attributes show no major differences in their findings than the fatal to non-fatal pedestrian comparisons. For example, Time of Day and Lighting Conditions are compounded for fatalities due to the PCCs given above; not being visible as well as ID on the part of drivers and impaired walking on the part of pedestrian, both of which are more apt to occur in hours of darkness.

# **Geographical Characteristics**

## C010 Rural or Urban



Pedestrian crashes are over-represented in the urban areas (see above), which pedestrian fatal crashes are over-represented in the rural areas (see below).

## **C010 Rural or Urban Fatal Pedestrian Crashes**



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<b>6</b> °	2013-2017 Alabama I	ntegrated	l Crash Data		~	Pedestrian Invo	olved		✓ ♥ 1/ 1/2013	∨ 12/31
Order	Max Gain	∨ De	scending	~ <b>~</b>	Suppress Zero	-Valued Rows	Sig	gnificance: Over	r Representation V Threshold: 2.	.0 🜲
C001:	County		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max 🚽 ^	C001: County C002: City	^
	Mobile		598	14.94	74409	10.33	1.447*	184.763	C003: Year	
	Jefferson		889	22.21	139381	19.34	1.148*	114.935	C004: Month	
	Montgomery		340	8.50	47219	6.55	1.297*	77.765	C006: Day of the Week	
	Madison		350	8.75	55427	7.69	1.137*	42.181	C007: Week of the Year	
	Dallas		53	1.32	4963	0.69	1.923*	25.438	C008: Time of Day	
	Calhoun		116	2.90	17779	2.47	1.175	17.263	C009: Data Source	
	Russell		85	2.12	12302	1.71	1.244	16.680	C011: Highway Classifications	
	Barbour		28	0.70	2683	0.37	1.879*	13.100	C012: Controlled Access	~
	Marion		19	0.47	2539	0.35	1.347	4.899 ~	Sort by Sum of Max Gain	
00	) 🗞 🖉									Display
					2013-2017 A	labama Integrat	ted Crash Data	3		
						C001: County	,			
	20									_
	30									_
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	10									
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	0	and and a mailer								
				Tallap	oosa		Bib	b	Dekalb	
						C001: 0	County			

# C001 County – Over-Represented

As expected, the urban counties are over-represented in pedestrian crashes.

	ARE 10.1.0.19 -	IMPACT Results	- 2013-2(	)17 Alabar	ma Integra	ted Crash	Data - Pedes	strian Fatal Cra 🗕 🗖 🗙
	2013-2017 Alabama Inte	grated Crash Data	t <u>L</u> ocations	Pedestria	in Fatal Crashes		Ý	
Order	:Max Gain v	Descending v	Suppres	s Zero-Valued F	lows		Significance: Over I	Representation V Threshold: 2.0
C001	County	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻 ^	C001: County
•	Mobile	67	13.93	74940	10.35	1.346*	17.222	C003: Year
	Russell	17	3.53	12370	1.71	2.069	8.783	C004: Month
	Houston	19	3.95	17896	2.47	1.598	7.113	C005: Day of Month
	Dallas	9	1.87	5007	0.69	2.706	5.674	C007. Week of the Year
	Marion	7	1.46	2551	0.35	4.131	5.306	C008: Time of Day
	Baldwin	21	4.37	25288	3.49	1.250	4.203	C009: Data Source
	Macon	6	1.25	3395	0.47	2.661	3.745	C010: Rural or Urban
	Chilton	7	1.46	4901	0.68	2.150	3.745	C011: Highway Classifications
	Blount	6	1.25	4294	0.59	2.104	3.148	C013: E Highway Side
	Greene	4	0.83	1470	0.20	4.097	3.024 🗸	Sort by Sum of Max Gain
00	) 🗞 🖉							Display Filter Name
				2013-2017 Ala	bama Integrated	Crash Data		
				(	C001: County			
	20							
	20							
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		Littatiling	1 Loop Dr.					
	0		Henry			Franklin		Elmore
					C001: Cou	nty		

### **C001** County Fatal Pedestrian Crashes – Over-Represented

This comparison is between fatal pedestrian crashes (in red) and all other crashes (in blue). It should be noted that no statistical test is performed for items with less than 20 crashes in either side of the comparison. The most under-represented counties are: Etowah, Montgomery, Cullman, Lee, Madison, Shelby and Jefferson, so Mobile county is certainly a notable exception.

CA	RE 10.1.0.19 - [II	MPACT Resu	lts - 2013	-2017 Ala	abama Int	egrated	Crash Data -	Pedestrian Inv 🗕 🗖 🗙				
💀 Ei	le <u>D</u> ashboard <u>F</u> ilter	s <u>A</u> nalysis <u>I</u> n	npact <u>L</u> ocat	ions <u>T</u> ools	<u>W</u> indow	<u>H</u> elp		_ @ ×				
<b>6</b> 2	2013-2017 Alabama Integra	ated Crash Data		Pe	destrian Involve	d		✓ ♀ 1/ 1/2013 ∨ 12/31/2017				
Order	Max Gain 🗸	Descending	V 🗌 Sup	press Zero-Val	ued Rows	[	Significance: Over	Representation V Threshold: 2.0 ᆃ				
C002:	City	Subset	Subset	Other	Other	Odds Patio	Max – ^	C001: County				
<b>•</b>	Birmingham	633	15.82	73631	10.22	1.547	• 223.941	C002: City C003: Year				
	Mobile	416	10.39	55206	7.66	1.356	109.302	C004: Month				
	Montgomery	323	8.07	43108	5.98	1.349	83.512	C005: Day of Month				
	Huntsville	281	7.02	40535	5.63	1.248	55.807	C006: Day of the Week				
	Rural Mobile	109	2.72	10116	1.40	1.940	52.800	C008: Time of Dav				
	Anniston	66	1.65	6248	0.87	1.901	31,289	C009: Data Source				
	Selma	42	1.05	2908	0.40	2.600	25.845	C010: Rural or Urban				
	Prichard	40	1.00	4037	0.56	1.784	17.572	C011: Highway Classifications				
	Tuscaloosa	150	3.75	24857	3.45	1.086	5 11.906	C012: Controlled Access C013: E Highway Side				
	Eufaula	21	0.52	1799	0.25	2.101	11.006	C015: Primary Contributing Circumstance				
	Phenix City	63	1.57	9678	1.34	1.172	9.234	C016: Primary Contributing Unit Numbe				
	Ozark	18	0.45	1636	0.23	1.980	8.911	C017: First Harmful Event				
	Gadsden	57	1.42	8690	1.21	1.181	8.722	C018: Location First Harmful Event Rel t				
	Orange Beach	16	0.40	1499	0.21	1.921	7.672	C020: E Distracted Driving Opinion				
	Rural Russell	22	0.55	2783	0.39	1.423	6.539	C021: Distance to Fixed Object				
	Midfield	12	0.30	992	0.14	2.177	7 6.489	C022: E Type of Roadway Junction/Featu				
	Hamilton	10	0.25	729	0.10	2.469	5.950	C023: E Manner of Crash				
	Gulf Shores	22	0.55	2914	0.40	1.359	5.811	C025: Crash Severity				
	Fairhope	19	0.47	2398	0.33	1.426	5 5.678	C026: Intersection Related				
	Aubum	58	1.45	9431	1.31	1.107	7 5.606	C027: At Intersection				
	Northport	37	0.92	5682	0.79	1.172	2 5.434	C028: Mileposted Route				
	Tarrant City	11	0.27	1198	0.17	1.653	3 4.344	C029. Lighting Conditions C030: Weather				
	Saraland	19	0.47	2658	0.37	1.287	7 4.233	C031: Locale V				
	Union Springs	7	0.17	512	0.07	2.461	4.156 ¥	Sort by Sum of Max Gain				
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	2013-2017 Alabama Integrated Crash Data											

# C002 City Over-Represented All Pedestrian Crashes

CARE 10.1.0.19 - [IMPAC	T Results - 20	013-2017 A	labama Inte	grated Cras	h Data - Pe	destrian Fatal	Crashes vs. No 🗕 🗖 🗙					
Eile Dashboard Filters Ana	ilysis <u>I</u> mpact <u>I</u>	ocations <u>T</u> ool	s <u>W</u> indow <u>H</u>	<u>l</u> elp			_ & ×					
2013-2017 Alabama Integrated Cras	n Data	∀ P	edestrian Fatal Cras	shes		Y Y 1						
Order: Max Gain 🗸 Descen	ding 🗸 🗌	Suppress Zero-V	alued Rows			Significance: Over	r Representation V Threshold: 2.0 🖨					
C002: City	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻 ^	C001: County					
Rural Mobile	28	5.82	10197	1.41	4.132*	21.224	C003: Year					
Dothan	16	3.33	14700	2.03	1.638	6.232	C004: Month					
Rural Russell	8	1.66	2797	0.39	4.304	6.141	C005: Day of Month C006: Day of the Week					
Rural Baldwin	10	2.08	6497	0.90	2.316	5.683	C007: Week of the Year					
Rural Macon	6	1.25	2321	0.32	3.890	4.458	C008: Time of Day					
Rural Autauga	6	1.25	2364	0.33	3.820	4.429	C009: Data Source					
Rural Tuscaloosa	10	2.08	8519	1.18	1.767	4.339	C010: Rural or Urban					
Selma	6	1.25	2944	0.41	3.067	4.044	C012: Controlled Access					
Rural Marion	4	0.83	931	0.13	6.466	3.381	C013: E Highway Side					
Rural Limestone	6	1.25	4413	0.61	2.046	3.068	C015: Primary Contributing Circumstanc					
Orange Beach	4	0.83	1511	0.21	3.984	2.996	C016: Primary Contributing Unit Numbe					
Rural Morgan	5	1.04	3484	0.48	2.160	2.685	C017: First Harmful Event					
Phenix City	9	1.87	9732	1.34	1.392	2.533	C019: E Most Harmful Event					
Guntersville	4	0.83	2412	0.33	2.496	2.397	C020: E Distracted Driving Opinion					
Rural Blount	4	0.83	2683	0.37	2.244	2.217	C021: Distance to Fixed Object					
Rural Greene	3	0.62	1221	0.17	3.698	2.189	C022: E Type of Roadway Junction/Featu					
Clanton	3	0.62	1707	0.24	2.645	1.866	C023: E Manner of Crash					
Sardis City	2	0.42	242	0.03	12.438	1.839	C024: School Bus Related					
New Hope	2	0.42	248	0.03	12.137	1.835	C026: Intersection Related					
Eufaula	3	0.62	1817	0.25	2.485	1.793	C027: At Intersection					
Rural Calhoun	5	1.04	4865	0.67	1.547	1.767	C028: Mileposted Route					
Rural Colbert	3	0.62	1924	0.27	2.347	1.722	C029: Lighting Conditions					
Rural Bullock	2	0.42	446	0.06	6.749	1.704	C031: Locale					
Rural Dallas	Rural Dallas 3 0.62 1978 0.27 2.283 1.686 ∨ Sort by Sum of Max Gain											
📋 🕼 🐟 🖉	□ Display Filter Name											
2013-2017 Alabama Integrated Crash Data												
			C	:002: City								

# C002 City Over-Represented in Pedestrian Fatalities

## **C031** Locale all Pedestrian Crashes

B	CA	RE 10.1.0.19 - [IMP	ACT Resul	ts - 2013-3	2017 Alak	oama Inte	grated Cra	ash Data -	Pedestrian Inv 🗕 🗖	×		
B	Ei	le <u>D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis <u>I</u> mp	pact <u>L</u> ocatio	ns <u>T</u> ools	<u>W</u> indow <u>H</u>	lelp		_ t	8 ×		
ø		2013-2017 Alabama Integrated C	Crash Data	~	Pede	strian Involved			✓ ♥ 1/ 1/2013 ∨ 12/31	1/2017		
C	Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0 🚖											
C	031:		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C027: At Intersection C028: Mileposted Route	^		
		Residential	1231	30.82	150997	20.98	1.469*	393.251	C029: Lighting Conditions			
		School	165	4.13	11649	1.62	2.553*	100.370	C030: Weather			
		Other	71	1.78	6635	0.92	1.929*	34.188	C031: Locale C032: E Police Present at Time of Crr			
		Playground	5	0.13	251	0.03	3.590	3.607	C033: Police Notification Delay	5		
		Manufacturing or Industrial	47	1.18	13046	1.81	0.649*	-25.381	C034: Police Arrival Delay			
		Shopping or Business	1799	45.04	336599	46.76	0.963	-68.490	C035: EMS Arrival Delay	<b>.</b>		
		Open Country	676	16.93	200707	27.88	0.607*	-437.546	Sort by Sum of Max Gain			
	] (]	i 🚳 🖉							Display	Filter		

Of greatest concern is the great over-representation of pedestrian crashes in school zones. Fortunately, this locale is much further down on the list when it comes to fatal pedestrian crashes (see below).

### **C031 Locale Fatal Pedestrian Crashes**

CA	ARE 10.1.0.19 - [IMPACT	Results - 20	13-2017 Ala	abama Integ	rated Crash	Data - Ped	estrian Fatal	Crashes vs. No 🗕 🗖 🗙				
₿ E	ile <u>D</u> ashboard <u>F</u> ilters <u>A</u> nalys	is <u>I</u> mpact <u>L</u> o	ocations <u>T</u> ools	<u>W</u> indow <u>H</u> e	lp			_ & ×				
¢°	😵 2013-2017 Alabama Integrated Crash Data 🗸 Pedestrian Fatal Crashes 🗸 🖓 🔞 1/ 1/2013 v 12/31/2017 v 🌓 📦											
Order	Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0 🖨											
C031	Locale	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C028: Mileposted Route				
•	Open Country	198	41.16	201185	27.81	1.480*	64.228	C030: Weather				
	Other	6	1.25	6700	0.93	1.347	1.545	C031: Locale				
	Playground	0	0.00	256	0.04	0.000	0.000	C032: E Police Present at Time of Crast				
	Manufacturing or Industrial	7	1.46	13086	1.81	0.804	-1.701	C034: Police Arrival Delay				
	School	5	1.04	11809	1.63	0.637	-2.852	C035: EMS Arrival Delay				
	Residential	91	18.92	152137	21.03	0.900	-10.159	C036: Adjusted EMS Arrival Delay				
	Shopping or Business         174         36.17         338224         46.75         0.774*         -50.891         C037: Non-Vehicular Property Damage ¥											
	🗋 🕼 🗇 🖉											

## **C011 Highway Classifications all Pedestrian Crashes**

C.	ARE 10.1.0.19 - [I	IMPACT Resul	ts - 2013-	2017 Alab	ama Inte	grated Cra	sh Data -	Pedestrian Inv 🗕 🗖 🗙
	<u>F</u> ile <u>D</u> ashboard <u>F</u> ilte	ers <u>A</u> nalysis <u>I</u> m	pact <u>L</u> ocatio	ns <u>T</u> ools	<u>W</u> indow <u>H</u>	elp		_ & ×
<b>6</b> 2	2013-2017 Alabama Integ	rated Crash Data	~	Pede	strian Involved			✓ ♥ 1/ 1/2013 ∨ 12/31/2017
Orde	er: Max Gain 🗸 🗸	Descending	V Supp	ess Zero-Value	ed Rows	Signit	ficance: Over	Representation V Threshold: 2.0 🜩
C01	1: Highway Classifications	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C007: Week of the Year A C008: Time of Day
	Private Property	556	13.89	20601	2.86	4.860*	441.590	C009: Data Source
	Municipal	1990	49.73	291213	40.41	1.230*	372.722	C010: Rural or Urban
	P Other*	0	0.00	6	0.00	0.000	0.000	C012: Controlled Access
	County	442	11.04	104025	14.44	0.765*	-135.712	C013: E Highway Side
	Federal	362	9.05	103016	14.30	0.633*	-210.109	C015: Primary Contributing Circumstanc
	State	494	12.34	126988	17.62	0.700*	-211.239	C016: Primary Contributing Unit Numbe
	Interstate	158	3.95	74766	10.38	0.381*	-257.220	Sort by Sum of Max Gain
	D 😪 🔎							Display Filter
			:	2013-2017 Alab	ama Integrated	Crash Data		
				C011: Hig	hway Classifica	ations		
	60							
	Cuentre 40 Leadness 20							
		Private Property	Municipal	P Other*	County	Federal	State	Interstate
<b>P</b> 1				C011	Highway Classi	tications		

The typical pattern holds for the majority of pedestrian crashes to be on the urban roads, while the majority of fatalities are on the higher speed roadways.

## **C011 Highway Classifications Fatal Pedestrian Crashes**

CA	RE 10.1.0.19 - [IMPACT	Results - 20	13-2017 Ala	abama Integ	grated Crash	Data - Ped	estrian Fatal	Crashes vs. No 🗕 🗖 🗙				
🖡 Ei	ile <u>D</u> ashboard <u>F</u> ilters <u>A</u> naly	sis <u>I</u> mpact <u>L</u> e	ocations <u>T</u> ools	<u>W</u> indow <u>H</u> e	۱p			_ & ×				
<b>6</b>	2013-2017 Alabama Integrated Crash	Data	✓ Pe	destrian Fatal Crash	es	· · · · · · · · · · · · · · · · · · ·	1/	1/2013 v 12/31/2017 v 🚺 🕨 💮 🥥				
Order	Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0 文											
C011:	Highway Classifications	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 📼	C007: Week of the Year C008: Time of Day				
	Federal	101	21.00	103277	14.26	1.472*	32.399	C009: Data Source				
	State	113	23.49	127369	17.59	1.336*	28.396	C010: Rural or Urban				
	Interstate	65	13.51	74859	10.34	1.307	15.276	C0112: Controlled Access				
	P Other*	0	0.00	6	0.00	0.000	0.000	C013: E Highway Side				
	Private Property	12	2.49	21145	2.92	0.854	-2.045	C015: Primary Contributing Circumstanc				
	County	64 13.31		104403	14.42	0.923	-5.349	C016: Primary Contributing Unit Numbe				
	Municipal	126	26.20	293077	40.47	0.647*	-68.673	C017' First Harmful Event				
0	) (av 🖉							Display Filter Name				
				2013-2017 Alabama	a Integrated Crash	Data						
				C011: Highw	ay Classifications							
	60 40 20 0				P Othard Pri		Causha					
	rec			C011 High	way Classification	s s	Soundy	Hamopal				



### C110 CU Driver Residence Distance (All and Fatal Crashes)

The display above is for all pedestrian crashes; the one below for fatal pedestrian crashes. As can be seen, they give the opposite picture due to the rural nature of pedestrian fatalities. Please realize that this is the distance from home of the causal driver, NOT the pedestrian.



## **Vehicle Characteristics**

# C101 Causal Unit (CU) Type (All and Fatal)

This was considered for both all pedestrian crashes and fatal pedestrian crashes in the major section on crash severity.



## C210 CU Body (Passenger Cars Only) All Pedestrian Crashes

The difference in this display and the one below might tend to implicate SUVs in fatal crashes, but no statistically significant differences were found for the fatal crashes (below).

### C210 CU Body (Passenger Cars Only) Fatal Pedestrian Crashes

8 (	CAF	RE 10.1	1.0.19	- [IMI	PACT	Results -	2013-2	017 Ala	abama Inte	grated Crash	Data - Peo	lestrian Fatal	Crashes AN	d – 🗖	×
B	<u>F</u> ile	<u>D</u> ashl	board	<u>F</u> ilters	<u>A</u> nalysi	is <u>I</u> mpact	<u>L</u> ocation	s <u>T</u> ools	<u>W</u> indow <u>H</u>	elp					- 8 ×
<b>6</b> 2	2	013-2017	Alabama	Integrated	d Crash Da	ata	Ý	Pe	destrian Fatal Cras	hes		▼ ♥ 1/	1/2013 v 12/31	/2017 🗸 🔋	• • •
Or	Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0 🔄														
C2	10: 0	U Body	(Passen	ger Cars	Only)	Subset Frequency	P	Subset ercent	Other Frequency	Other Percent	Odds Ratio	Max Gain 🔻	C210: CU Bod	y (Passenger Ca	irs Only)
		E Four Doo	or with R	ear Entry			31	28.70	117985	21.16	1.357	8.148			
	ŀ	Two Door					17	15.74	85731	15.37	1.024	0.395			
		E Two Doo	or with R	ear Entry/	Hatch		1	0.93	12748	2.29	0.405	-1.469			
		Four Door					59	54.63	341142	61.18	0.893	-7.074	Sort by Sum of	f Max Gain	
0	۲	S 🖉											🗌 Display F	Filter Name	
								:	2013-2017 Alabar	na Integrated Crash	Data				
									C210: CU Body	(Passenger Cars Or	nly)				
	80 60 40 0 0 0 0 0 0 0 0 0 0 0 0 0														
						E Four Door with	Rear Entry		Two Door	E Two Door Entry/Hat	with Rear Shback	Four Door			
									C210: CU Body (	Passenger Cars On	lv)				

## C208 CU Model Year

CARE 10.1.0.19 - [II	MPACT Resul	ts - 2013	-2017 Ala	abama Int	egrated (	Crash Dat	a - Pedestrian	n Inv — 🗖	×
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2013-2017 Alabama Integra	ated Crash Data	Ý	' Pe	destrian Involve	d		✓	72 1/ 1/2013 ∨	12/31/2017
Order: Max Gain 🗸	Descending	✓ ✓ Sup	Suppress Zero-Valued Rows Significa				Over Representation	✓ Threshold:	2.0 🜲
C208: CU Model Year	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	▲ C208: CU M	odel Year	
2002	83	4.77	34851	5.32	0.897	-9.490			
2003	105	6.04	38386	5.86	1.031	3.129			
2004	115	6.61	40465	6.18	1.071	7.612			
2005	107	6.15	43416	6.63	0.929	-8.220			
2006	100	5.75	44038	6.72	0.856	-16.871			
2007	136	7.82	45059	6.88	1.137	16.420			
2008	106	6.10	36802	5.62	1.085	8.333			
2009	67	3.85	23413	3.57	1.078	4.865	_		
2010	60	3.45	26234	4.00	0.862	-9.621			
2011	77	4.43	28007	4.27	1.036	2.673			
2012	109	6.27	30709	4.69	1.337*	27.503			
2013	76	4.37	29893	4.56	0.958	-3.332	V Sort by Sum	of Max Gain	
1 1 1 1								🗌 Dis	splay Filter
			2013-2017 Al	abama Integrate	ed Crash Data				
			C2	08: CU Model Y	ear				
10									
10									
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						<b>6.11</b>			
ы С									
c du					41				
				n					
0									
		1990		20	000		2010		
				C208: CU M	odel Year				

The years 2003-2012 were over-represented. There was no obvious difference in the distribution for fatal pedestrian crashes.

## C024 School Bus Related

CA	ARE 10.1.0.19 - [IMPACT F	Results - 2	013-201	7 Alabar	na Integra	ated Cras	sh Data -	Pedestrian li	nv — 🗖	×		
🖡 Ei	ile <u>D</u> ashboard <u>F</u> ilters <u>A</u> nalysis	<u>I</u> mpact	<u>L</u> ocations	<u>T</u> ools <u>W</u> ii	ndow <u>H</u> elp					- 🗗 🗙		
<b>6</b> °	2013-2017 Alabama Integrated Crash Data v Pedestrian Involved v 🖓 😨 1/ 1/2013 v 12/31/2017											
Order	Order: Max Gain V Descending V Suppress Zero-Valued Rows Significance: Over Representation V Threshold: 2.0											
C024:	School Bus Related	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C024: School B	us Related			
	E Yes - School Bus Indirectly Involved	10	0.25	503	0.07	3.580	7.206					
	E Yes - School Bus Directly Involved	14	0.35	2287	0.32	1.102	1.298					
	No - School Bus Not Involved	3978	99.40	717769	99.61	0.998	-8.504	Sort by Sum of	Max Gain			
00	) 🕸 🖉									isplay Filter		
			2013-2	2017 Alabama	Integrated Cra	sh Data						
				C024: Scho	ol Bus Related							
	100									-		
	auch											
	50											
	<u>د</u>											
	0   E	Yes - School Bus Ir	ndirectly E	E Yes - School Bu	I Is Directly Involve	d No-Sch	nool Bus Not Involv	ved				
		Involved		C024: Schoo	l Bus Related							

School bus involvement in pedestrian crashes are less than 1% of the pedestrian crashes. However, they are over-represented in both of the "Involved" categories, and "Directly Involved" accounted for the two fatalities within this attribute.

## C061 Train Involved

C/	ARE 10.1.0.19 - [IMP	ACT Results	- 2013-	2017 Alab	ama Inte	grated Cra	ash Data -	Pedestrian Inv 🗕 🗖 🗙				
	<u>File D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis <u>I</u> mpac	ct <u>L</u> ocatio	ns <u>T</u> ools	<u>W</u> indow <u>H</u>	elp		_ & ×				
<b>*</b>	2013-2017 Alabama Integrated	Crash Data	~	Pede	strian Involved			✓ ♥ 1/ 1/2013 ∨ 12/31/2017				
Orde	r: Natural Order V Des	cending 🗸 🗸	Suppr	ress Zero-Value	ed Rows	Sign	ificance: Over I	Representation V Threshold: 2.0 🜩				
C06	1: Number of Railroad Trains	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C059: Number Injured (Includes Fatalitie A C060: Number Killed				
	No Trains Involved	4001	99.98	720292	99.96	1.000	0.794	C061: Number of Railroad Trains				
	1 Train Involved	1	0.02	323	0.04	0.557	-0.794	C062: Has Railroad Crossing Number				
	2 or More Trains Involved	0	0.00	0	0.00	0.000	0.000	Sort by Sum of Max Gain				
	Display Filter											
			:	2013-2017 Alab	ama Integrated	Crash Data						
				C061: Num	ber of Railroad	Trains						
	100											
	No la											
	Ľ											
	0											
	V-F	No Trains	Involved	1 Tr	ain Involved	2 or Mo	ore Trains Invo	lved				
				C061: Numb	per of Railroad	rains						

Trains were only involved in one pedestrian crash over the five years of the study. This particular crash did prove to be fatal.

# **Roadway Environment and Pavement Characteristics**

## C412 CU Traffic Lanes

CA	RE 10.1.0.19 - [IM	PACT Resul	ts - 2013-	2017 Alak	oama Integ	grated Cra	ish Data -	Pedestrian Inv	. — 🗖	×
🖳 Ei	ile <u>D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis <u>I</u> m	pact <u>L</u> ocatio	ons <u>T</u> ools	<u>W</u> indow <u>H</u>	elp				- 8 ×
<b>6</b> °	2013-2017 Alabama Integrate	d Crash Data	*	Pede	strian Involved			🗸 👻 🍸 1	i/ 1/2013 v 1	12/31/2017
Order	: Max Gain 🗸 D	escending	V V Supp	ress Zero-Value	ed Rows	Signi	ficance: Over F	Representation 🗸	Threshold:	2.0 🜲
C412:	CU Trafficway Lanes	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C412: CU Trafficway	Lanes	
	One Lane	86	2.35	14426	2.07	1.134	10.160			
	Two Lanes	1666	45.48	321332	46.12	0.986	-23.294			
	Three Lanes	153	4.18	33420	4.80	0.871	-22.694			
	Four Lanes	819	22.36	209661	30.09	0.743*	-283.221			
	Five Lanes	139	3.79	24326	3.49	1.087	11.114			
	Six Lanes or More	184	5.02	69339	9.95	0.505*	-180.526			
	Not Applicable (Parking Lot)	616	16.82	24260	3.48	4.830*	488.461	Sort by Sum of Max	Gain	
00	) 🕸 🖉								Dis	play Filter
			:	2013-2017 Alab	ama Integrated (	Crash Data				
				C412: C	U Trafficway La	nes				
	<b>CO</b>									
	00			_						
	> 40									
	neno neno									
	рани 20-									
	0									
		One Lane	Two Lanes	Three Lanes	Four Lanes	Five Lanes	Six Lanes or More	Not Applicable (Parking Lot)		
				C412	CU Trafficway	Lanes				

For fatal pedestrian crashes there was the expected shift to the higher speed roadways, with the two lane roads becoming significantly under-represented (0.870 odds ratio), and the four-lane roads becoming significantly over-represented (1.168).

C408 CU	<b>Vision</b>	Obscured	By
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C/	ARE 10.1.0.19 - [IMP	ACT Resu	lts - 2013	-2017 Ala	abama Int	egrated	Crash Data	a - Pedestrian Inv 🗕 🗖 🗙
B E	ile <u>D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis <u>I</u> m	pact <u>L</u> ocat	ions <u>T</u> ools	<u>W</u> indow	<u>H</u> elp		_ & ×
<b>6</b> 2	2013-2017 Alabama Integrated	Crash Data	· · · · ·	Pe	destrian Fatal Ci	ashes		✓ ♥ 1/ 1/2013 ∨ 12/31/201
Order	: Max Gain 🗸 Des	scending	V V Sup	press Zero-Va	lued Rows	[	Significance: O	ver Representation V Threshold: 2.0
C408	CU Vision Obscured By	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 👻	C408: CU Vision Obscured By
•	Parked Vehicles	38	17.92	2370	8.83	2.029	• 19.275	
	Driver Blinded by Sun	47	22.17	3907	14.56	1.523	• 16.131	
	E Lights/Glare (Roadside)	11	5.19	388	1.45	3.588	3 7.934	
	Driver Blinded by Headlights	10	4.72	336	1.25	3.767	7 7.345	
	Buildings	4	1.89	172	0.64	2.943	3 2.641	
	E Person/Object in or on V	5	2.36	515	1.92	1.229	0.931	
	P Rain on Windshield	1	0.47	74	0.28	1.710	0.415	
	E Frosted Windows/Winds	4	1.89	507	1.89	0.999	9 -0.006	
	Hillcrest	19	8.96	2478	9.24	0.970	0 -0.579	
	E Other Object in Roadway	2	0.94	380	1.42	0.666	6 -1.002	
	Curve in Road	8	3.77	1274	4.75	0.795	5 -2.066	
	E Weather Conditions	21	9.91	3125	11.65	0.851	1 -3.691	
	Trees/Crops	6	2.83	1560	5.81	0.487	7 -6.326	
	Moving Vehicles	36	16.98	9286	34.61	0.491	• -37.369	✓ Sort by Sum of Max Gain
	a 🛯 🖉							Display Filter
				2013-2017 Al	abama Integrate	ed Crash Data	а	
				C408: 0	CU Vision Obso	ured By		
	40							
	、 - I							
	5' 							
						_		
	0							
			Bi	uildings		E Oth	er Object in Ro	adway
				C4	08: CU Vision (	Obscured By		

Vision obstructions play a part in some pedestrian crash causes, with about 8.55% of the crashes involving some vision obstructions (it is about 4.54% for non-pedestrian crashes). The display above is restricted to only those crashes in which meaningful obstructions were indicated (the no-obstruction crashes were suppressed along with Other, Unknown and Not Applicable. Parked Vehicles would be an obvious over-representation in that many vulnerable pedestrians probably emerge from parked vehicles. The next three are indicative of the difficulty to see pedestrians in night-time or other situations in which they are not wearing contrasting clothing. The distribution for fatal pedestrian crashes showed no significant differences than the more general analysis given above.

### C026 Intersection Related (Non-Fatal and Fatal)



Pedestrian crashes are clearly over-represented away from intersections, and this becomes even more pronounced for fatal pedestrian crashes (see below).



C.	ARE 10.1.0.19 - [IMP/	ACT Result	s - 2013-	2017 Alak	pama Inte	grated Cra	ash Data -	Pedestrian	Inv — 🗖	×
8	<u>File D</u> ashboard <u>F</u> ilters	<u>A</u> nalysis <u>I</u> mp	act <u>L</u> ocatio	ons <u>T</u> ools	<u>W</u> indow <u>H</u>	elp			-	. 8 ×
¢°	2013-2017 Alabama Integrated C	Crash Data	~	Pede	strian Fatal Cras	hes		- v 9	3 1/ 1/2013 ∨ 12	2/31/2017
Orde	er: Max Gain 🗸 Desc	cending	V Suppr	ress Zero-Value	ed Rows	Signi	ificance: Over	Representation	✓ Threshold: 2	.0 🜲
C02	2: EType of Roadway Junction	/Feature:ubset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 👻	C022: E Type	of Roadway Junction/	/Feature
•	Four-Way Intersection	346	51.03	90047	48.89	1.044	14.497			
	Business Drive	33	4.87	5099	2.77	1.758*	14.228			
	Int with Bike/Pedestrian Path	11	1.62	58	0.03	51.517	10.786			
	Other Intersection	16	2.36	2664	1.45	1.631	6.193			
	Driveway Access Intersection	29	4.28	6711	3.64	1.174	4.294			
	T-Intersection	176	25.96	48533	26.35	0.985	-2.671			
	On Segment but Intersection	20	2.95	7636	4.15	0.711	-8.111			
	Bridge/Overpass/Underpass	36	5.31	13187	7.16	0.742	-12.547			
	Entrance or Exit Ramp	11	1.62	9333	5.07	0.320	-23.359	Sort by Sum	of Max Gain	
0	🗊 📾 🖉								Disp	lay Filter
				2013-2017 Alab	ama Integrated	Crash Data				
			C	C022: E Type of	FRoadway Junc	tion/Feature				
	장 60 등 40									
	B 20									
	ت 0	1	ath -	- III	l l	1 III	53			
		RESOCT.	drian P.	Planet	lersed	lersect	Rela	Exit Rai		
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		Four-	100	0	Q. A		E E	Parties Parties		
			3		Driver		5	ά. Έ		
				C022: E Typ	be of Roadway J	unction/Feature				

### **C022 E Type of Roadway Junction Feature**

The above suppressed all categories that had less than ten occurrences. The four way intersection category was not significantly over-represented; nevertheless, because of the large number of pedestrian crashes that occur in this type of intersections, it should definitely get priority as far as countermeasures are concerned. The above do not vary much with fatal pedestrian crashes; however Bridge/Overpass/Underpass becomes over-represented with 12 fatalities over the five year period of the study.

CA	ARE 10.1.0.19 - [IMP/	ACT Result	ts - 2013-	2017 Alab	oama Integ	grated Cra	ish Data -	Pedestrian I	nv — 🗖	×
E E	ile <u>D</u> ashboard <u>F</u> ilters g	<u>A</u> nalysis <u>I</u> mp	oact <u>L</u> ocatio	ns <u>T</u> ools	<u>W</u> indow <u>H</u>	elp				- 8 ×
<b>V</b>	2013-2017 Alabama Integrated C	ùrash Data	~	Pede	strian Fatal Crasł	nes		- v 💡 🦉	1/ 1/2013 v 1	2/31/2017
Order	: Max Gain 🗸 Desc	cending	V V Supp	ress Zero-Value	ed Rows	Signi	ficance: Over l	Representation	✓ Threshold: 2	.0 🖨
C407	CU Roadway Curvature and (	Grade Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C407: CU Roa	dway Curvature and	Grade
•	Straight and Level	2452	78.72	474636	70.48	1.117*	256.556			
	Straight at Hillcrest	25	0.80	5046	0.75	1.071	1.660			
	E Curve Left at Hillcrest	4	0.13	733	0.11	1.180	0.609			
	E Sag (Bottom)	2	0.06	307	0.05	1.408	0.580			
	E Curve Right at Hillcrest	2	0.06	631	0.09	0.685	-0.919			
	E Curve Left and Up Grade	21	0.67	7178	1.07	0.632	-12.202			
	Straight with Up Grade	218	7.00	50686	7.53	0.930	-16.450			
	E Curve Right and Down Gr	29	0.93	11954	1.78	0.524*	-26.294			
	E Curve Left and Level	52	1.67	17383	2.58	0.647*	-28.406			
	E Curve Right and Up Grade	7	0.22	8072	1.20	0.187	-30.337			
	E Curve Left and Down Grade	17	0.55	12732	1.89	0.289	-41.892			
	Straight with Down Grade	251	8.06	64874	9.63	0.836*	-49.077			
	E Curve Right and Level	35	1.12	18858	2.80	0.401*	-52.228	Sort by Sum of	f Max Gain	
00	) 🕼 🖉								🗌 Disp	olay Filter
				2013-2017 Alah	ama Integrated (	Crash Data				
				C407: CU Road	tway Curvature	and Grade				
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	Strai	ght at Hillcrest	E Sag (Bottom)	E Curv and Up	e Left E Grade an	Curve Right d Down Grade	E Curve Righ and Up Grade	t Straight w Down Gra	rith ide	
				C407: CU	Roadway Curva	ture and Grade				

### C407 CU Roadway Curvature and Grade – All Pedestrian Crashes

The above would lead you to believe that roadway curvature and grade has little to do with causing pedestrian crashes. However, the contrast below for fatal pedestrian crashes might give us second thoughts. The other differences in roadway classifications, rural-urban, and other differences in location types, should be considered in conjunction with curvature and grade.

C/	ARE 10.1.0.19 -	[IMPACT	Results - 2	013-2017 Al	abama Inte	grated Crash	Data - Ped	estrian Fatal	Crashes AND	) — 🗖	х
₿ E	ile <u>D</u> ashboard <u>F</u> il	ters <u>A</u> nalys	is <u>I</u> mpact	Locations <u>T</u> ools	<u>W</u> indow <u>H</u>	<u>l</u> elp					- 8 ×
<b>6</b> 2	2013-2017 Alabama Inte	grated Crash D	ata	✓ Pe	edestrian Fatal Cras	hes		/ 💡 🌠 1/	1/2013 v 12/31/2	2017 🗸 👔 🕨	•
Order	r: Max Gain	Descending	) v (	Suppress Zero-Va	alued Rows		:	Significance: Over	Representation	✓ Threshold: 2	2.0 🜲
C407	CU Roadway Curvat	ire and Grade	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 👻	C407: CU Roady	way Curvature and	Grade
•	Straight with Up Grade		5	2 12.04	50852	7.51	1.604*	19.578			
	Straight with Down Gra	de	4	6 10.65	65079	9.60	1.109	4.508			
	Straight at Hillcrest			5 1.39	5065	0.75	1.858	2.771			
	E Curve Left at Hillcrest			2 0.46	735	0.11	4.268	1.531			
	E Curve Right at Hillcre	st		1 0.23	632	0.09	2.482	0.597			
	E Curve Right and Dow	n Grade	-	8 1.85	11975	1.77	1.048	0.365			
	E Curve Left and Level		1	1 2.55	17424	2.57	0.990	-0.109			
	E Curve Left and Up Gr	ade		4 0.93	7195	1.06	0.872	-0.587			
	E Curve Right and Up (	Grade		2 0.46	8077	1.19	0.388	-3.150			
	E Curve Left and Down	Grade		4 0.93	12745	1.88	0.492	-4.126			
	E Curve Right and Leve	el		5 1.39	18887	2.79	0.498	-6.042			
	Straight and Level		29	67.13	476798	70.37	0.954	-13.992	Sort by Sum of M	Max Gain	
	D 🗠 🖉								Display Fil	ter Name	
					2013-2017 Alabar C407: CU Roadw	ma Integrated Crash vay Curvature and G	Data rade				
	80 60 40 20 0	Straight	with Down Grade	E Curve Left at Hillorest	E Cur and Do	ve Right mn Grade	E Curve Left and Up Grade	E Curve Left and Down Gra	de Straight	and Level	
					C407: CU Ro	adway Curvature an	d Grade				

## C407 CU Roadway Curvature and Grade – Fatal Pedestrian Crashes

There are significant differences between this distribution and that of pedestrian crashed in general. However we surmise that this is because of the various necessary design characteristics of rural vs. urban roads.

## C409 CU Traffic Control

CA	ARE 10.1.0.19 - [IMPA	CT Results	- 2013-2	017 Alab	ama Integ	grated Cra	sh Data -	Pedestrian Inv 🗕 🛛	□ ×
₿ E	ile <u>D</u> ashboard <u>F</u> ilters <u>A</u> n	alysis <u>I</u> mpa	t <u>L</u> ocation	s <u>T</u> ools	<u>W</u> indow <u>H</u> e	lp			_ 8 ×
<b>S</b>	2013-2017 Alabama Integrated Cra	sh Data	~	Pedes	trian Fatal Crash	es		✓ ♥ 1/ 1/2013	v <u>12/31/2017</u>
Order	: Max Gain 🗸 Descer	nding v	Suppre	ss Zero-Value	d Rows	Signit	ficance: Over F	Representation	: 2.0 🜩
C409	CU Traffic Control	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain 👻	C409: CU Traffic Control	
•	No Controls Present	1937	63.45	350055	52.37	1.212*	338.178		
	Lane Control Device	101	3.31	13427	2.01	1.647*	39.674		
	Pedestrian Control	30	0.98	91	0.01	72.180*	29.584		
	Police Officer	22	0.72	975	0.15	4.940*	17.547		
	Flag Person	16	0.52	534	0.08	6.560	13.561		
	E Crossing Guard	11	0.36	328	0.05	7.343	9.502		
	E Workzone Signs	11	0.36	1848	0.28	1.303	2.560		
	E Warning Sign	4	0.13	407	0.06	2.152	2.141		
	Railroad Gates	2	0.07	392	0.06	1.117	0.210		
	Flashing Traffic Control Signal	13	0.43	2837	0.42	1.003	0.042		
	E School Zone Sign/Device	2	0.07	480	0.07	0.912	-0.192		
	No Passing Zone	244	7.99	57510	8.60	0.929	-18.668		
	Yield Sign	5	0.16	16774	2.51	0.065	-71.613		
	Stop Sign	119	3.90	61317	9.17	0.425*	-161.056		
	Traffic Signals	536	17.56	160988	24.08	0.729*	-199.288	Sort by Sum of Max Gain	
00	) 🕸 🖉								Display Filter
			20	)13-2017 Alaba	ma Integrated C	Crash Data			
				C409: C	U Traffic Contr	ol			
	80								
	00								
	> 60								
	₩ 40								
	Free								
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	0			100 10					
			Flag Pers	on	Flas	hing Traffic C	Control Signal	Traffic Signal	S
				C4	09: CU Traffic (	Control			

This is an interesting distribution to assist in determining where pedestrian countermeasures might be more effective. The only major difference in the fatal pedestrian distribution is the elevation of No Passing Zone to the third position down with 52 fatal crashes and a significant over-representation factor of 1.420 (42% higher than what would be expected from crashes in general).
## C030 Weather

Eile Dackboard Eilters Analysis Impact Locations Tools Window Holp											
The Dashboard Filters Analysis Impact Eccations Tools Window Help	~										
2013-2017 Alabama Integrated Crash Data v Pedestrian Fatal Crashes v 🌱 😨 1/ 1/2013 v 12/31/2017											
Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0											
C030: Weather Subset Subset Other Other Odds Max Used Frequency Percent Frequency Percent Ratio Gain											
▶ Clear 2889 72.66 478427 66.59 1.091* 241.335											
Severe Winds 1 0.03 252 0.04 0.717 -0.395											
Fog 19 0.48 3799 0.53 0.904 -2.024											
Sleet/Hail/Freezing Rain 3 0.08 1457 0.20 0.372 -5.063											
Snow 1 0.03 1902 0.26 0.095 -9.526											
E Mist 64 1.61 16502 2.30 0.701* -27.324											
Cloudy 707 17.78 137936 19.20 0.926 -56.352											
Rain 292 7.34 78061 10.87 0.676* -139.998	lax Gain										
Disolay Filter											
2013-2017 Alabama Integrated Crash Data											
CU30: Weather											
100											
Rain dourdy Rain Rain Adv											
Hitter Contraction of the Contra											
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ö											
C030: Weather											

Rain works in favor of preventing pedestrian crashes. While visibility may be reduced, the fewer pedestrians greatly overcomes this factor. The under-representation factor is a significant 0.676 for all pedestrian crashes, and an amazingly close 0.653 for fatal pedestrian crashes. C403 Road-way Condition heavily reflects these findings.

## C415 CU Workzone Related – All Items

C/	🕴 CARE 10.1.0.19 - [IMPACT Results - 2013-2017 Alabama Integrated Crash Data - Pedestrian Inv 🗕 🗖 💌											
🚦 <u>F</u> ile <u>D</u> ashboard <u>F</u> ilters <u>A</u> nalysis <u>I</u> mpact <u>L</u> ocations <u>T</u> ools <u>W</u> indow <u>H</u> elp												
😵 2013-2017 Alabama Integrated Crash Data 🔻 Pedestrian Fatal Crashes 💌 🍞 😨 1/ 1/2013 v 12/31/2017												
Orde	Order: Max Gain v Descending v Suppress Zero-Valued Rows Significance: Over Representation v Threshold: 2.0											
C415: CU Workzone Related Subset Subset Other Other Odds Max Frequency Percent Frequency Percent Ratio Gain												
•	E Involving Workers/Eqpmt	24	0.76	629	0.09	8.147*	21.054					
	E Other Workzone Area	5	0.16	412	0.06	2.591	3.071					
	E In Termination Area of Wo	2	0.06	399	0.06	1.070	0.131					
	E Involving Roadway Condit	1	0.03	304	0.05	0.702	-0.424					
	E Between Warning Signs a	31	0.98	6766	1.00	0.978	-0.686					
	E At Lane Shift Transition in	2	0.06	811	0.12	0.527	-1.798					
	E Outside of the Workzone	2	0.06	830	0.12	0.515	-1.887					
	E Not Involving Workers/Co	10	0.32	2756	0.41	0.775	-2.907					
	Not In/Related to Workzone	3076	97.56	659963	98.02	0.995	-14.714	Sort by Sum	n of Max Gain			
Display Filter												
2013-2017 Alabama Integrated Crash Data												
				C415: CI	J Workzone Re	lated						
	100											
	5											
	50											
	Free											
	0											
	Buy	the for	g g	ving Vers in stra	and	ficon Fea	au sub	ving rea	gue			
		F C C C C C C C C C C C C C C C C C C C	Morto	Road	n War Signs Nork	Trans	Morks Morks ing S	invol tinty tinty	Morke.			
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	C415: CU Workzone Related											

This distribution will be of interest to those who are implementing work zone countermeasures. Of the 77 pedestrian crashes in work zones, 22 (28.6%) were fatal, which is much higher than the overall fatality rate (see severity section) of 12.02%.