Special Study
Impaired Driving Problem Identification IMPACT Study

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Data Comparisons: CY2016-2020 ID vs Non-ID
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For general information on Impaired Driving from NHTSA and other sources, please see:
http://www.safehomealabama.gov/tag/impaired-driving/

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0.0 Introduction

This document presents the results of a comparison of Impaired Driving (ID) crashes compared to non-ID crashes over a recent five-year period (CY2016-2020). This is an update of a previous special study that was based on three-years FY2015-2017 of data. Impaired Driving is a relatively recent term for what has for decades been called Driving Under the Influence (DUI) of alcohol or other drugs.

The analytical technique employed to generate most of the displays below is a component within the Critical Analysis Reporting Environment (CARE) called Information Mining Performance Analysis Control Technique (IMPACT). For a detailed description of the meaning of each element of the IMPACT outputs, please see:

http://www.caps.ua.edu/software/care/

The main objective of performing IMPACT comparisons is to surface "over-representations." An *over-represented value* of an attribute is found when that attribute has a greater share of ID crashes than would be expected if its proportion were the same as for the non-ID crashes. That is, the non-ID crashes are serving as a *control* to which the ID crashes are being compared. As an example, we find that ID crashes on the day of the week attribute value of Saturday has almost 90% higher proportion of crashes than does the non-ID crashes. When such differences are statistically significant, this surfaces characteristics that should be subjected to attention, and in some cases, further analyses for countermeasure development. For example, additional selective enforcement for ID might be performed on Saturday and other over-represented days.

The ID crash reports being considered here are those reported to have been DUI (Alcohol or Drugs), which is about 6% of the total reported crashes. While this is an accurate statement of the number reported as such, no one claims that this is the actual number of ID crashes. Many ID-caused crashes cannot be verified, and they are therefore not reported as such. These reports over time provide excellent insight into the nature of ID crashes despite their not being a totally complete set of ID reports. Generally, as the severity of a given ID crash increases, the accuracy of reports in attributing them to ID also increases dramatically. To illustrate, the amount of effort that goes into investigating a fatal crash is at least 10 times the effort than goes into reporting and obtaining the details of most Property Damage Only (PDO) crashes.

This report continues with two short sections that provide a high-level summary of recommendations and findings for those who just need an executive summary. The sections are called: (1) Executive Summary and Recommendations, and (2) Summary of Findings. Section 3 is also introductory in that it provides a detailed definition of the complex filter that was used to define ID crashes in the analytical sections that follow. The comparison between ID and non-ID crashes will be presented under the following headings with their section numbers:

- 4. Geographic Factors,
- 5. Time Factors,
- 6. Factors Affecting Severity,
- 7. Driver and Vehicle Demographics, and
- 8. Driver Behavior.

Those who are only interested in a few of these should see the Table of Contents for a guide to the sections of interest.

1.0 Executive Summary and Recommendations

The recommendations of this special study are presented first for two reasons (1) for those who do not have time to go through all of the IMPACT analyses, and/or (2) as an introduction to the more detailed analyses. Recommendations are referenced to the more detailed analyses so that questions regarding the source of any given recommendation can be easily accessed.

Recommendations are organized into the three areas of (1) law enforcement concentration and direction, (2) Legal and judicial countermeasure development, and (3) PI&E information on ID content. The ordering of these, either generally or within their respective categories, is not at all meant to imply priority. However, the information given should be quite useful in the further prioritization and allocation of traffic safety resources. This process should consider all of the recommendations, which should be validated against the information presented in the IMPACT sections 4.0-7.0 (referenced sections are given in parenthesis).

The following recommendations are made to reduce the frequency and/or severity of Impaired Driving (ID) crashes in Alabama:

- **Law enforcement concentration and direction**
    - Increased recognition is essential, both on the part of law enforcement and the general public, that the relatively high deadly combination in ID crashes is caused by their comparatively high impact speeds (6.1, 6.2) coupled with a failure of ID drivers and their passengers to use restraints (6.5). Seek out new ways to increase law enforcement methods to address these issues, both of which stem from the acceptance of risk-taking behaviors.
    - More effective drug detection techniques (8.3, 8.4) should be identified, and law enforcement officers need increased training in their use.
    - Law enforcement training should focus on the concentration on the times of day, days of the week (5.5, 5.4, 5.7), and the particular over-represented vehicle types e.g., pickups and motorcycles (7.3).
    - Training needs to focus on the specific over-representations: males (7.2), age groups (7.1, ages 24-35), and the locations that these over-represented groups tend to be driving at the over-represented times (determined by hotspot analyses).
    - Increase law enforcement focus on interdicting pedestrians who are impaired (7.4), using whatever legal remedies that are currently available.
    - Counties with a combination of medium to large metropolitan areas and fairly large rural areas (4.5) should generally be given additional emphasis in ID selective enforcement programs (4.1, 4.2). These should be evaluated on a county-by-county basis taking the population and traffic volume crash rates into consideration.
    - The rural areas (4.5) of these counties, and especially the County Roads (4.6) should be given special consideration for enforcement, since that is where relative increased fatalities occur (4.4).

- Those cities with a high frequency of ID crashes (4.3) should be given special guidance and perhaps additional funding to address their ID crash problems. Many such large city areas have a considerable amount of Open Country (4.7) that would tend to multiply their ID crashes. It should be recognized that Residential areas of these cities also have a significant ID over-representation, but it is only about a third of that of Open Country areas (4.7)
- Additional hotspot analysis needs to be done to surface those County Roads (4.6) that are largely accounting for their double over-representation in crash frequency in order to increase law enforcement presence on this road type. It appears that ID drivers may well be using the county roads as alternatives to avoid being apprehended.
- Additional emphasis needs to be given to the recognized ID days, Saturday, Sunday, and to some extent Friday (5.3). Special attention needs to accommodate irregular days such as Sunday, which behave as a "virtual Saturday" when the three-day holiday weekend includes Monday (5.5, 5.6, 5.7). Consideration should be given to the number of persons not working on a given day and thus might over-indulge the night (and early morning) before (5.4, 2.2) their day off.
- The increase in ID crashes in the springtime (5.2, March, April and July) should be recognized in general law enforcement strategic planning.
- Time for enforcement might be optimized by local culture, but for the average statewide picture, if workers are typically "off" the following day, the optimal times for enforcement would begin shortly after the afternoon rush hour and continue through at least 3 AM (5.5-5.7).

- **Legal and judicial countermeasure development**
  - Drug/Alcohol Diversion Programs should continue (or new programs adopted) that concentrate on keeping the age 25 through 35 (typically *social users*) from becoming habitual to the point where they become part of the 36-55 year old over-representation of predominantly *problem users* (7.1).
  - The role that unemployment plays should be considered in formulating remedial measures (7.6). E.g., methods should be explored to communicate with appropriate individuals through the unemployment offices.
  - New legal countermeasures or existing laws need to be developed or modified to counter impaired walking (7.4). E.g., law enforcement should detain and inform those who are seem practicing unsafe walking that they are in violation of the law even if citations are not seen to be effective in specific cases.
  - Ideally, breath-alcohol ignition interlock devices are greatly reducing the problem caused by problem drinkers. An in-depth study needs to be conducted to determine if problems exist within the current program, and how this countermeasure can be expanded to be made more generally effective.

- **PI&E information on ID content**
    - ID-related crashes continue to increase, and the general societal acceptance of certain recreational drugs is a significant part of the problem (8.3 and 8.4).
    - Combinations of recreational or medical drugs and alcohol can be particularly lethal, and medical practitioners should warn against such problems and discourage all alcohol use for their patients who have indicated of displayed these problems, or who are taking other prescription drugs.
    - Legalized recreational drugs are not a good alternative to alcohol use and should not be advertised as such. PI&E programs should take the opposite approach.
    - It would be extremely beneficial to promote social drinkers patronizing bars that are closer to their homes and in urban areas. Not only would this lower their speed at impact (6.2, 6.3 and 6.4), but it would greatly reduce EMS delay times (6.8-6.9), both or which would reduce fatalities.
    - Messages directed toward drinkers/users should concentrate on the use of a designated driver (i.e., who would not drive with any impairment at all). A subtle message, without encouraging the impaired person to drive, might be to stress the tendency of ID drivers to speed without restraints (6.3-6.5). This might also provide additional motivation for the "friends do not let friends …" efforts.
    - A new PI&E recognition needs to be developed to address "impaired and distracted walking" to counter the large increases recently experienced in pedestrian fatalities (7.4). This should emphasize the many rules for safe walking, and discourage all walking at night, but promote the use of bright reflective dress and walking against the traffic for those who must be out.
    - One of the most critical needs is for the ID drivers and their passengers to buckle up (6.6). There is little hope of surviving a crash for a large proportion of them if they fail to realize this. This is seen not only in increased fatal crashes, but in the number of injured and killed in single crashes (6.7).
    - While clearly the problems found in this study are those of ID, other driver behaviors (8.2) that are correlated with ID might provide alternatives to countermeasure development. These behaviors are:
        - Aggressive Operation,
        - Traveling Wrong Way/Wrong Side,
        - Over Speed Limit,
        - Ran off Road,
        - Fatigued/Asleep,
        - Ran Stop Sign and
        - Crossed Centerline.

      These were the Primary Contributing Circumstances that were over-represented exclusive of ID/DUI even though the standard ID filter was in effect (indicating that ID was identified by attributes other than that of PCC.

2.0 Summary of Findings

Note: subsections 2.1, 2.2 and 2.3 have been omitted in order to keep the numbering system in this Section consistent with that of the IMPACT displays that follow. The following findings are mainly from the IMPACT analysis below that compared ID vs Non-ID crashes for all five years (CY2016-2020):

- **2.4 Geographical Factors (4.0)**
    - County (4.1) - Generally, the over-represented counties are those with combined large population centers and large rural areas, as opposed to the highly urbanized counties or the extremely rural counties. One reason that the highly urbanized counties are under-represented is the large number of low severity crashes that occur there separate and apart from ID crashes. See the rural-urban comparison below. Placed in Max Gain order, the ones with the highest potential for reduction were: Baldwin, Cullman, Madison, Marshall, Limestone and Blount.
    - City Comparisons of ID crashes to Non-ID Frequency (4.2) and Odds Ratio (4.3) . There is little surprise in this output, which tracks the areas by population. Traffic safety professionals should look for any locations that fall counter to this trend. City (and rural area) Comparisons within Crash Frequency Ranges – analyses were performed for: (1) those areas that had 100-749 ID crashes with high Odds Ratios (4.2), and those that had 200-1,557 ID crash frequencies (4.3). There are presented separately to present fair comparisons among the various areas.
    - Virtual Rural Areas of Counties (4.2). The county rural areas (virtual cities) with Max Gains in excess of 160 ID crashes over their expected numbers are: Rural Mobile, Rural Cullman, Rural Madison, Rural Baldwin, Rural Tuscaloosa, Rural Limestone, Rural Blount, Rural Marshall, and Rural Elmore. [Expected numbers (or expectations) here and below are obtained from the proportion for non-ID crashes.]
    - Overall Area Comparisons Conclusions (4.1-4.4) – Generally those rural areas that are adjacent to (or contain) significant urbanized areas are over-represented, since their urban areas generate more traffic even in the rural areas. Possible factors for relatively fewer severe ID crashes within urban areas include:
        - Less need for motor vehicle travel and shorter distances to the drinking establishments;
        - Larger police presence in the metropolitan areas; and
        - Lower speeds in rural areas.

      Note: The city, county, and area comparisons are, of necessity, a selection of the total outputs that could be generated. They are given to illustrate the capabilities as much as to present the numerical results. Anyone wishing additional areas, please contact CAPS – see e-mail address above.

- Severity of Crash by Rural-Urban (4.4) – While only about 41% of crashes occur in rural areas, nearly 68% of the fatal crashes occur there. Similar results are found for the highest severity non-fatal crashes. This is obviously the result of higher impact speeds in the rural areas. Note that additional causes of increased severity are given in the Factors Affecting Severity Section, below.
- Rural/Urban ID Crash Frequency (4.5) – Not only are impaired driving crashes more severe in rural areas, but the frequency of ID crashes in rural areas is quite high, despite the much lower population and traffic volumes. ID crashes occurred in over 41% rural as compared to about 59% urban. While only 21.17% of the crashes are expected in the rural areas, the ID proportion of crashes in the rural areas is 41.37%, or close to double its expected value (significant Odds Ratio = 1.866).
- Highway Classifications (4.6) – County roads had 2.09 times their expected proportion of crashes, and State routes had about 3.4% more than expected. All other roadway classifications were under-represented. County road characteristics no doubt contribute to the crash frequency. County roads are also known to be less "crashworthy" (i.e., they result in more severe crashes at comparable impact speeds).
- Locale (4.7) – Reflecting the rural over-representation, open country and residential roadways show a high level of over-representation (1.612 and 1.333 Odds Ratios, respectively) as compared with the more urbanized area types, especially Shopping or Business, which only has about half of its expected proportion.

- **2.5 Time Factors (5.0)**
  - Year (5.1) – The years 2016 and 2020 were over-represented. There seems to be no pattern either in ID or non-ID over these years, which is further complicated by the COVID-19 outbreak in 2020.
  - Month (5.2) – The only significant over-representations by month were in March, April, and July. The number of ID crashes correlated fairly well with the other crashes during the rest of the months, with the exception of September and October, which were significantly under-represented. Weather seems to play some part in this with more outdoor activities in the spring.
  - Day of the Week (5.3-5.4) – This analysis is not only useful for the typical work week, but it also reflects the typical "holiday weekend" patterns. The days can be classified as follows:
    - Typical work weekday (Monday through Thursday) – these days are under-represented in ID crashes due to the need for many users to go to work the following day.
    - Friday – this pattern is also reflected in the day before a weekend (or holiday), i.e., before a day off. The high ID frequency on this day is due to

those who are getting an early substance abuse start to the weekend, recognizing that they have no work responsibilities the following day. However, the large numbers of non-ID crashes on Fridays causes Friday to be statistically under-represented compared to non-ID crashes. This is the typical Friday general increase due to the normal rush hours coupled with individuals leaving for vacations and weekend activities.

        - Saturday – the "Saturday" pattern is the worse for ID crashes in that it has both an early morning component (like Sunday) and a late night component (like Friday). So, it could be viewed as a combination of the typical Friday and Sunday.
        - Sunday – since this is the last day of a holiday sequence or weekend, its over-representation comes mainly from those who start on Saturday night and do not complete their use of alcohol/drugs until after midnight. Sunday is the most over-represented day with over twice its expected number of ID crashes; however, the low number of non-ID crashes on Sunday also contributes to this proportional over-representation.
    - "Holiday Weekends" (5.4-5.7) – these can be viewed as a sequence of the weekend-pattern sequence. For example, the Wednesday before Thanksgiving would follow the Friday pattern assuming that most are at work on Wednesday. The Thursday, Friday and Saturday would follow the Saturday pattern, and the Sunday at the end of the weekend would follow the typical Sunday pattern. This is the reason that long holiday events (i.e., several days off) can be much more prone to ID crashes than the typical weekend. Three-day weekends typically give Monday off, so that Monday would behave like the typical Sunday, and both the Saturday and Sunday would follow the Saturday pattern. Exception: in the past decade the over-representation of Wednesdays before Thanksgivings has been reduced by the number leaving earlier during the week.
    - Time of Day (5.5-5.6) – The extent to which night-time hours are over-represented is quite striking. Optimal times for ID enforcement would start immediately following any rush hour details, and would continue through at least 3:00 to 3:59 AM (odds ratio 5.839). The 4-5 and 5-6 AM hours are also significantly over-represented, but with lower odds ratios of 3.606 and 1.543, respectively.
    - Time of Day by Day of the Week (5.7) – This quantifies the extent of the crash concentrations on Friday nights, Saturday mornings and Saturday nights and early Sunday mornings. This is a very useful summary for deploying selective enforcement details, especially during the weekend hours.

- **2.6 Factors Affecting Severity (6.0)**

- ID Crash Severity (6.1) -- The rate of injuries and fatalities are consistently higher in ID crashes than that of non-ID crashes. Fatality crashes are nearly 6.934 times their expected proportion, while the two highest non-fatal injury classifications also have over twice their expected values when compared with non-ID crashes. The Odds Ratio is over three (3.708) for the highest non-fatal classification, Incapacitation Injury.
- Speed at Impact (6.2) – zzzz All impact speeds above 45 MPH (with the exceptions of 61-70 and 66-70 MPH) are dramatically over-represented with Odds Ratios above 2.00. See the next attribute for the effect this has on fatalities. The over-representations increase, as expected, with increased speed with 46-50 MPH having an odds ratio or 1.835, while 96-100 MPH being 10.129. Past analyses have found the general rule of thumb that for every 10 MPH increase in impact speeds, the probability of the crash being fatal doubles. This was validated in the discussion below of the cross-tabulation of impact speeds by severity.
- Severity by Impact Speed (6.3-6.4) –Past analyses have found the general rule of thumb that for every 10 MPH increase in speeds, the probability of the crash being fatal doubles. This was validated in the discussion of the cross-tabulation. In the 41-45 MPH impact speed the probability is only a little over one in every 61 crashes. As impact speeds climb to the 51-55 MPH, this probability more than doubles to one in about 24 crashes. At 61-65 MPH it increases again (exponentially) to one in about every 15 crashes, and at 71-75 it is about one in nine, which is about double again. For above 90 MPH it is about one in 4 crashes.
- Restraint Use by Impaired Drivers (6.5) – The impaired drivers are over 8 times more likely to be unrestrained than the non-ID causal drivers. Clearly ID drivers lose a good part of their concept of risk when they are willing to drive while impaired.
- Fatality Crashes by Restraint Use for Impaired Drivers (6.6) – A comparison of the probability of a fatal crash indicates that a fatality is almost six (5.84) times more likely if the impaired driver is not using proper restraints. Generally, one in 30 ID crashes are fatal; but without restraints, the fatal crash ratio is 1 in about 11. So the combined effect of lower restraint use and higher speeds is a devastating combination that accounts for much of the high lethality of ID crashes.
- Number Injured -- Including Fatalities (6.7) – Not only are ID crashes generally more severe to the driver, but the number of multiple injuries in these ID crashes is over-represented as well. This might have something to do with the preference of those going out to socialize (or coming back) to take some of their friends with them. All of the multiple injury categories are over-represented in the ID crashes, as is the single injury classification. Those above 4 injuries had at least twice

their expectations, and the 1, 2, 3 and 4 injuries all had closeto twice their expectations. Note: no statistical calculations are made if either of the values being compared is less than 20.

- Police Arrival Delay (6.8) – ID crashes generally had longer police arrival delays; in this case all arrival delays over 31 minutes were over-represented. There can be little doubt that this has to do with the rural nature of these crashes and the potential that the late night occurrence might not be discovered for some time. Delay times in the two over 90 minutes had over twice their expected proportions, up to 180 minutes and the over-180 was quite close to 2 (1.797).
- EMS Arrival Delay (6.9) – Higher EMS delays were over-represented for impaired driving injury crashes in all categories above ten minutes, and dramatically (over twice the expected) for the very longer times of 61 minutes and above. This obviously contributes to the severity of crashes and the chances that the crash results in one or more fatalities. As for the very long times, these might be due to the delay in discovering the crash as much as their generally over-represented rural locations.

- **2.7 Driver and Vehicle Demographics (7.0)**
  - Driver Age (7.1) – Younger (16-20 year old) drivers have a very serious problem in crash causation even in the absence of ID. However, young-driver crashes are not over-represented in ID. Age 24 is the first age over-representation takes place and continues on to age 55. There is a bi-modal distribution in the 24-56 year olds; 24 through about 41, and a second group from 42 to 56. Generally, the first of these might be classified as largely social drinkers; while it is inescapable that the middle aged caused ID crashes would be largely attributed to problem drinkers or those addicted to drugs.
  - Impaired Driver Gender (7.2) – Males are a far greater issue in ID crashes, and if there are countermeasures that can be directed toward them, doing so would be much more cost-effective than those that are not gender based, all other things being equal. The ratio of male to female causal ID drivers is over 3 to 1.
  - Causal Vehicle Type (7.3) – Pick-ups had a significant over-representation and came out at the top of the Max Gain order because of their large number of ID involvements. Motorcycles were also highly over-represented. Also of interest is the proportion of pedestrians that involve ID, which is close to three times their expected number. ATVs had the highest over-representation (Odds Ratio = 4.445), perhaps because drivers do not believe that the ID laws apply to them as long as they are not on the public highways. In order of their Max Gains, the following had significant odds ratios: Pick-Up (Four-Tire Light Truck), Motorcycle, Pedestrian, and 4-Wheel Off Road ATV.

- Number of Pedestrians (7.4). Pedestrians are definitely an issue in ID crashes. There were 327 pedestrians involved in ID crashes and 3,849 that were non-ID, or a total of 4,176, of which 327/4176 = 7.8% of the pedestrian crashes were ID. These resulted in 74 fatalities. Primary Contributing Circumstance shows 162 pedestrians were under the influence at the time of the crash. Some overlap of these with the total 327 pedestrians involved would be expected.
- Driver License Status (7.5) – ID crashes are very highly over-represented in causal drivers without legitimate licenses, challenging the effectiveness of license suspension and revocations as a traffic safety countermeasure. There is no way to estimate its deterrent value. Revoked is over-represented for the ID causal drivers by close to seven times its expected proportion (compared to non-ID crashes). The following gives the highest over-represented categories along with the number of crashes (in parenthesis) that were attributed to the DL Status: Suspended (2,393), Revoked (1,716), Expired (534), and Cancelled (79).
- Driver Employment Status (7.6) – ID driver unemployment rate at 33.80%, and its proportion is over 90% higher than expected. This factor should be watched carefully going forward.

- **2.8 Driver Behavior (8.0)**
  - Primary Contributing Circumstances (8.1-8.2). This was discusse at the end of Section 1.0; this was copied from that section. While clearly the problems found in this study are those of ID, other driver behaviors (8.2) that are correlated with ID might provide alternatives to countermeasure development. These behaviors are:
    - Aggressive Operation,
    - Traveling Wrong Way/Wrong Side,
    - Over Speed Limit,
    - Ran off Road,
    - Fatigued/Asleep,
    - Ran Stop Sign and
    - Crossed Centerline.

    These were the Primary Contributing Circumstances that were over-represented exclusive of ID/DUI even though the standard ID filter was in effect (indicating that ID was identified by attributes other than that of PCC.

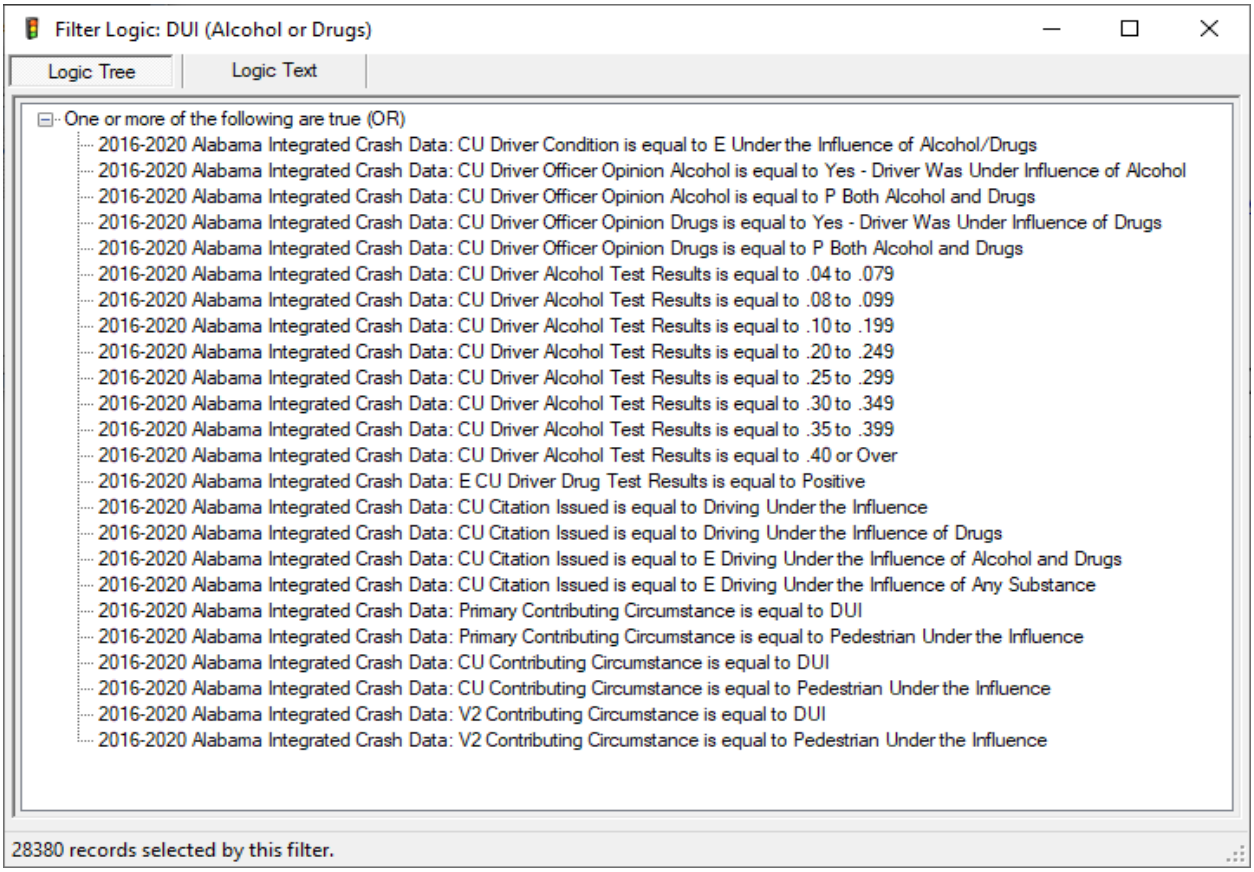
- CU Officer's Opinion Alcohol and non-alcohol Drugs (8.3-8.4). The main reason for producing this IMPACT is to enable a comparison with the next one. This shows the proportion of cases caused by alcohol (according to the crash reports) compared to the proportion caused by drugs other than alcohol.
    - The total of these two is 21,923 (alcohol) + 7,699 (other drugs) = 29,622 total cases for which an officer's opinion was assigned.
    - So 74.01% of the cases involved alcohol, and 25.99% of the cases involved non-alcohol drugs.
    - Thus, about 3 to 1 were alcohol involved.
    - There were very few reports of both alcohol and drugs; just one for Alcohol ID and one for non-alcohol Drugs ID..

3.0 Impaired Driving (ID) Definitions CY2016-2020

As part of the ongoing Alabama Office of Traffic Safety (AOTS) problem identification efforts, UA-CAPS compared FY2016-2020 Impaired Driving (ID) crashes against non-ID crashes over this same time period. The objective was to determine all significant differences between these two subsets of data. Impaired Driving (ID) includes both alcohol and all other drugs, and the goal was to pinpoint common factors and assess strategies that could be used to combat any identified issues. A review was also conducted of the current legislation in Alabama regarding ID laws and penalties. The findings were then taken into consideration when planning enforcement campaigns, as well as training and diversion programs to be funded in the upcoming fiscal year.

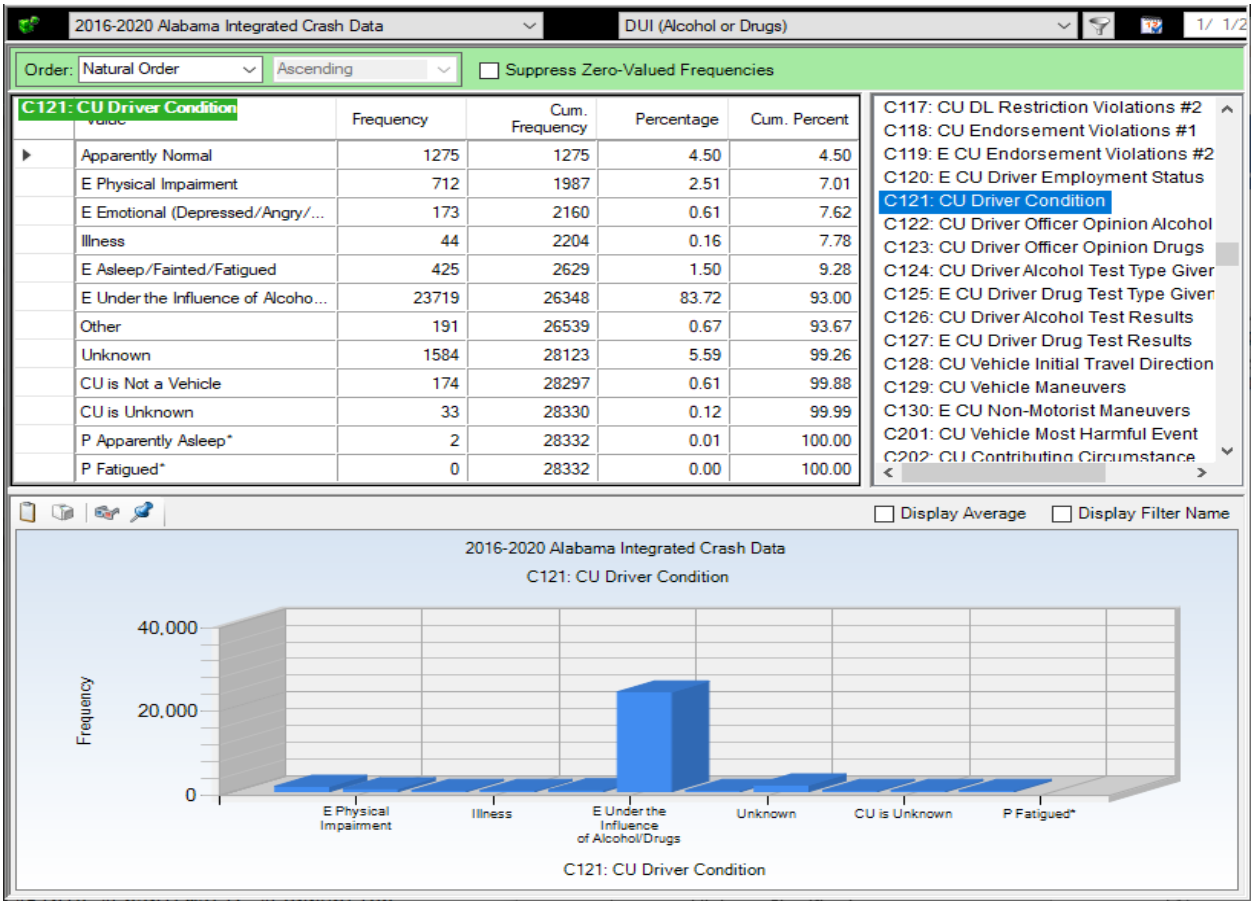
3.1 ID Filter Definition

The following is the formal filter definition for Impaired Driving (ID alcohol or drugs), which in past analyses has been called Driving Under the Influence of Alcohol or other Drugs (DUI):



This is the standard ID (DUI alcohol or drugs) filter that is used for all HSP ID analyses.

With this filter in effect, we will now present the frequency distributions for each of the attributes that appear in the filter. These attributes are ORed together, so if any one of them showed ID, the record will be included in the ID subset.



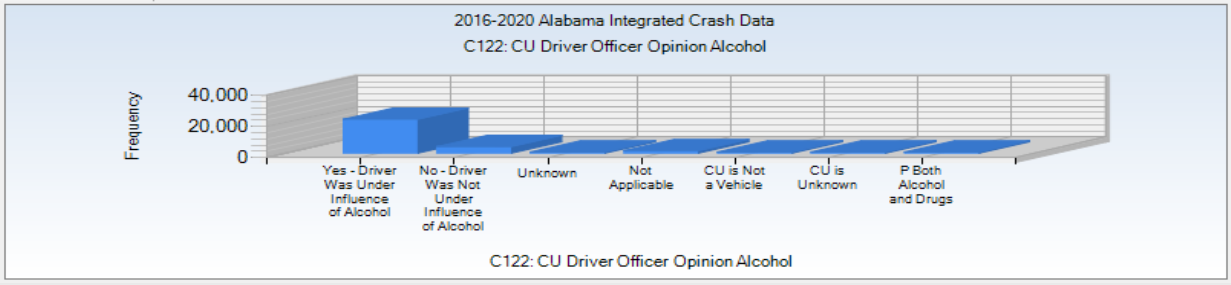
2016-2020 Alabama Integrated Crash Data | DUI (Alcohol or Drugs) | 1/ 1/2

Order: Natural Order | Ascending | Suppress Zero-Valued Frequencies

C122: CU Driver Officer Opinion Alcohol	Frequency	Cum. Frequency	Percentage	Cum. Percent
Yes - Driver Was Under Influence of Alc...	21923	21923	77.25	77.25
No - Driver Was Not Under Influence of ...	4190	26113	14.76	92.01
Unknown	507	26620	1.79	93.80
Not Applicable	1552	28172	5.47	99.27
CU is Not a Vehicle	174	28346	0.61	99.88
CU is Unknown	33	28379	0.12	100.00
P Both Alcohol and Drugs	1	28380	0.00	100.00

C117: CU DL Restriction Violations #2
C118: CU Endorsement Violations #1
C119: E CU Endorsement Violations #2
C120: E CU Driver Employment Status
C121: CU Driver Condition
C122: CU Driver Officer Opinion Alcohol
C123: CU Driver Officer Opinion Drugs
C124: CU Driver Alcohol Test Type Giver
C125: E CU Driver Drug Test Type Giver

Display Average | Display Filter Name



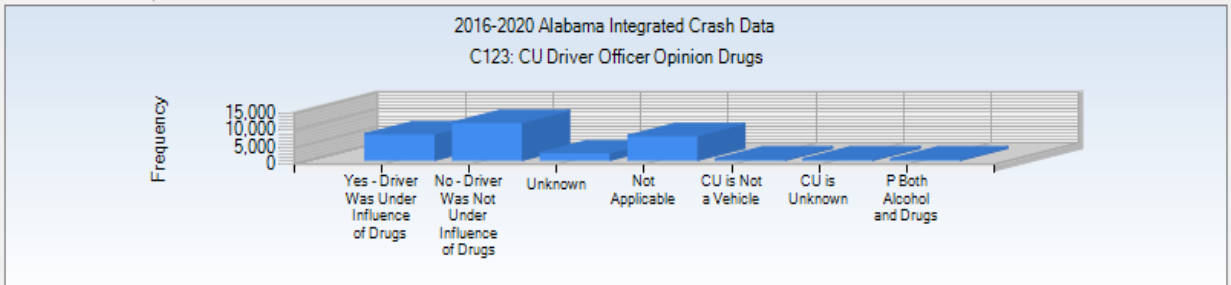
2016-2020 Alabama Integrated Crash Data | DUI (Alcohol or Drugs) | 1/ 1/2

Order: Natural Order | Ascending | Suppress Zero-Valued Frequencies

C123: CU Driver Officer Opinion Drugs	Frequency	Cum. Frequency	Percentage	Cum. Percent
Yes - Driver Was Under Influenc...	7699	7699	27.13	27.13
No - Driver Was Not Under Influ...	11033	18732	38.88	66.00
Unknown	2234	20966	7.87	73.88
Not Applicable	7206	28172	25.39	99.27
CU is Not a Vehicle	174	28346	0.61	99.88
CU is Unknown	33	28379	0.12	100.00
P Both Alcohol and Drugs	1	28380	0.00	100.00

C117: CU DL Restriction Violations #2
C118: CU Endorsement Violations #1
C119: E CU Endorsement Violations #2
C120: E CU Driver Employment Status
C121: CU Driver Condition
C122: CU Driver Officer Opinion Alcohol
C123: CU Driver Officer Opinion Drugs
C124: CU Driver Alcohol Test Type Giver
C125: E CU Driver Drug Test Type Giver

Display Average | Display Filter Name



2016-2020 Alabama Integrated Crash Data | DUI (Alcohol or Drugs) | 1/ 1/2

Order: Natural Order | Ascending | Suppress Zero-Valued Frequencies

C126: CU Driver Alcohol Test Results	Frequency	Cum. Frequency	Percentage	Cum. Percent
0.00	562	562	2.25	2.25
.01 to .039	586	1148	2.34	4.59
.04 to .079	744	1892	2.97	7.56
.08 to .099	596	2488	2.38	9.94
.10 to .199	4595	7083	18.37	28.31
.20 to .249	1240	8323	4.96	33.27
.25 to .299	426	8749	1.70	34.97
.30 to .349	128	8877	0.51	35.48
.35 to .399	25	8902	0.10	35.58
.40 or Over	24	8926	0.10	35.68
No Test Given	7005	15931	28.00	63.68
Not Applicable	8880	24811	35.49	99.17
CU is Not a Vehicle	174	24985	0.70	99.87
CU is Unknown	33	25018	0.13	100.00

C120: E CU Driver Employment Status
C121: CU Driver Condition
C122: CU Driver Officer Opinion Alcohol
C123: CU Driver Officer Opinion Drugs
C124: CU Driver Alcohol Test Type Giver
C125: E CU Driver Drug Test Type Giver
C126: CU Driver Alcohol Test Results
C127: E CU Driver Drug Test Results
C128: CU Vehicle Initial Travel Direction
C129: CU Vehicle Maneuvers
C130: E CU Non-Motorist Maneuvers
C201: CU Vehicle Most Harmful Event
C202: CU Contributing Circumstance
C203: CU First Harmful Event Location
C204: E CU Sequence of Events #1
C205: E CU Sequence of Events #2
C206: E CU Sequence of Events #3
C207: E CU Sequence of Events #4

Display Average | Display Filter Name

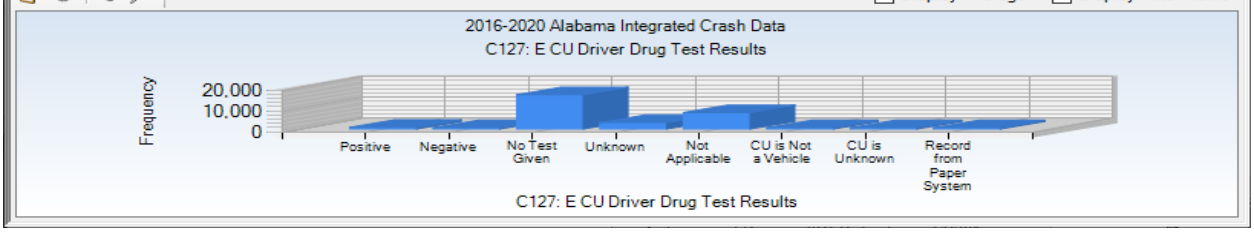
2016-2020 Alabama Integrated Crash Data | DUI (Alcohol or Drugs) | 1/ 1/2

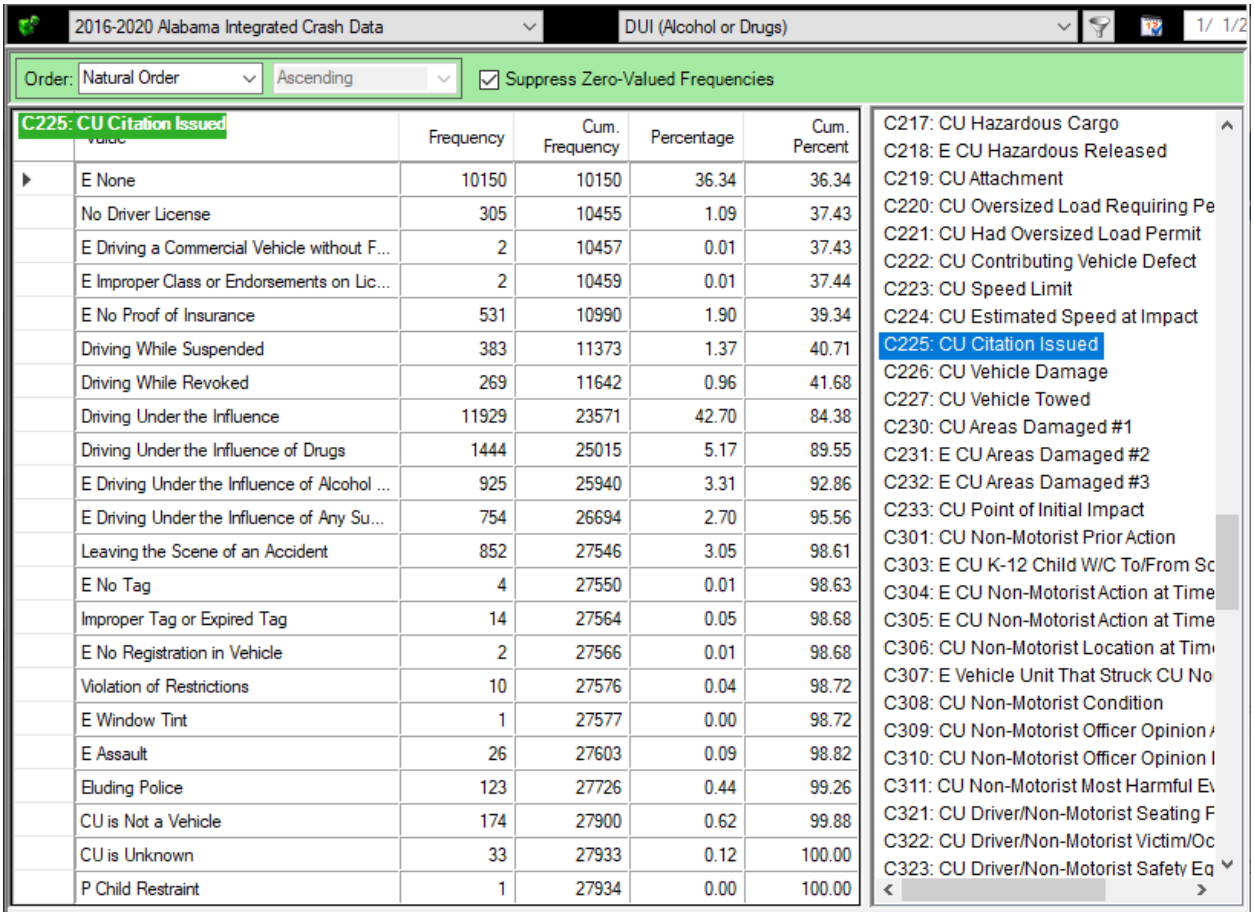
Order: Natural Order | Ascending | Suppress Zero-Valued Frequencies

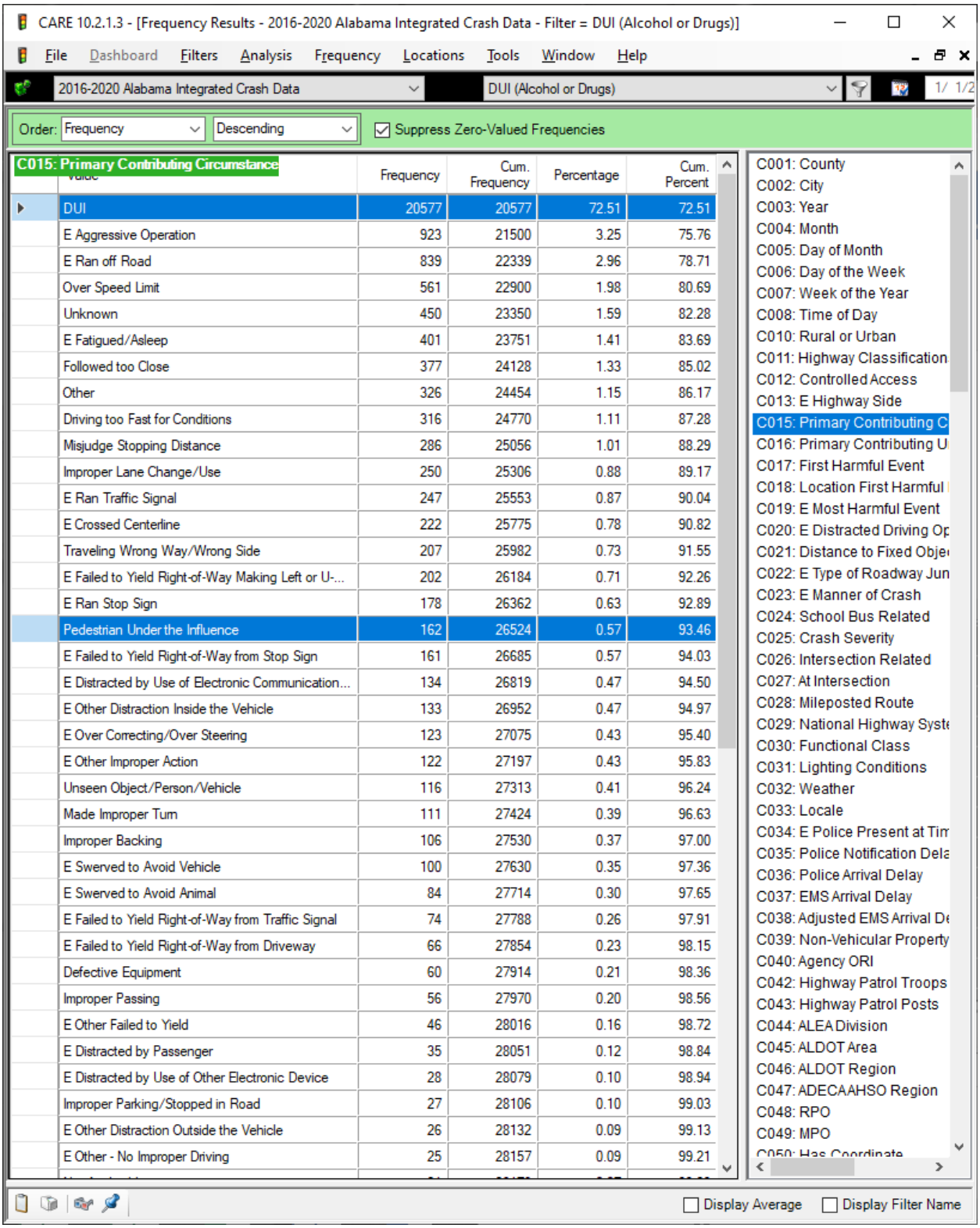
C127: E CU Driver Drug Test Results	Frequency	Cum. Frequency	Percentage	Cum. Percent
Positive	737	737	2.60	2.60
Negative	207	944	0.73	3.33
No Test Given	16349	17293	57.61	60.93
Unknown	3027	20320	10.67	71.60
Not Applicable	7807	28127	27.51	99.11
CU is Not a Vehicle	174	28301	0.61	99.72
CU is Unknown	33	28334	0.12	99.84
Record from Paper System	46	28380	0.16	100.00

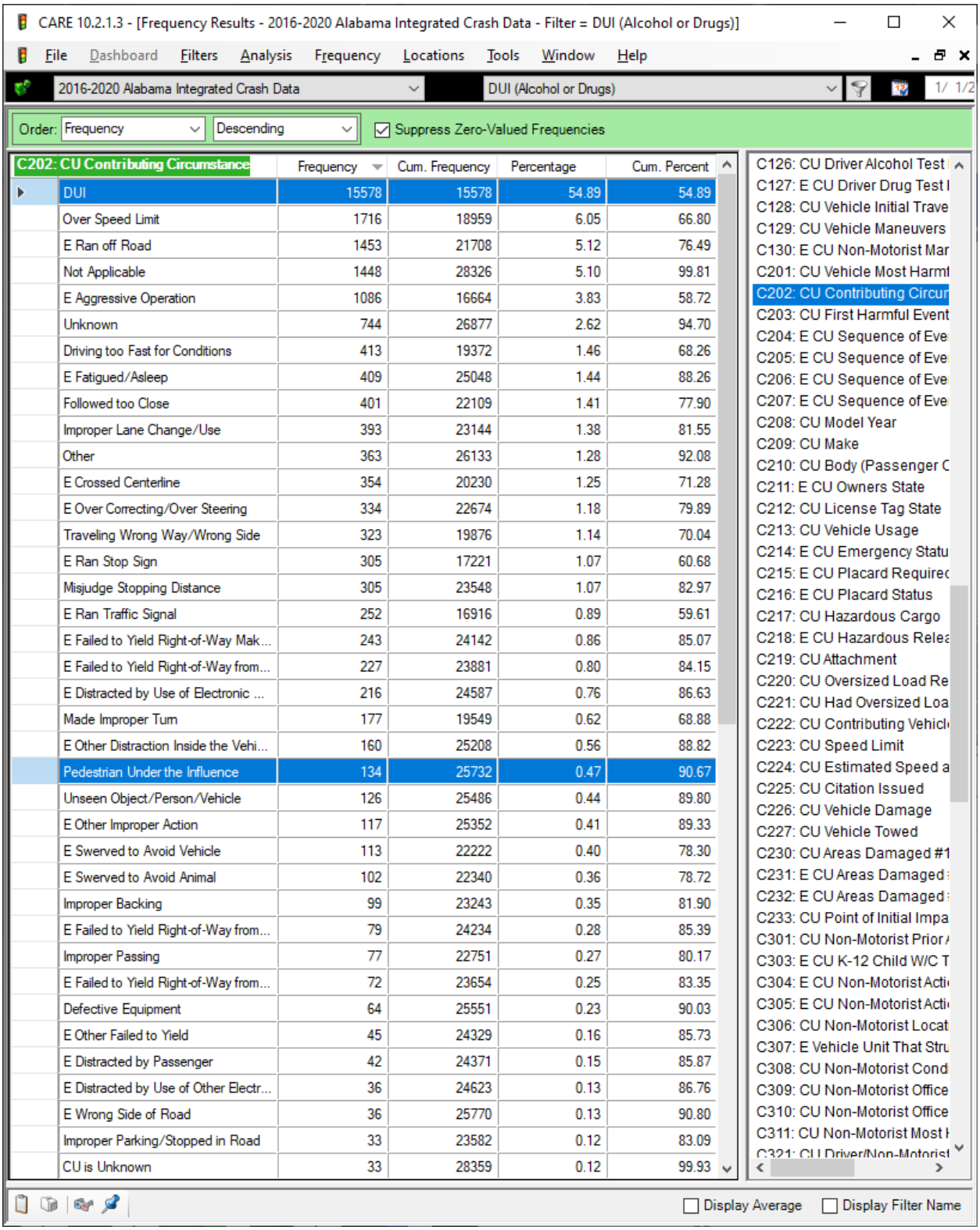
C120: E CU Driver Employment Status
C121: CU Driver Condition
C122: CU Driver Officer Opinion Alcohol
C123: CU Driver Officer Opinion Drugs
C124: CU Driver Alcohol Test Type Giver
C125: E CU Driver Drug Test Type Giver
C126: CU Driver Alcohol Test Results
C127: E CU Driver Drug Test Results
C128: CU Vehicle Initial Travel Direction
C129: CU Vehicle Maneuvers
C130: E CU Non-Motorist Maneuvers

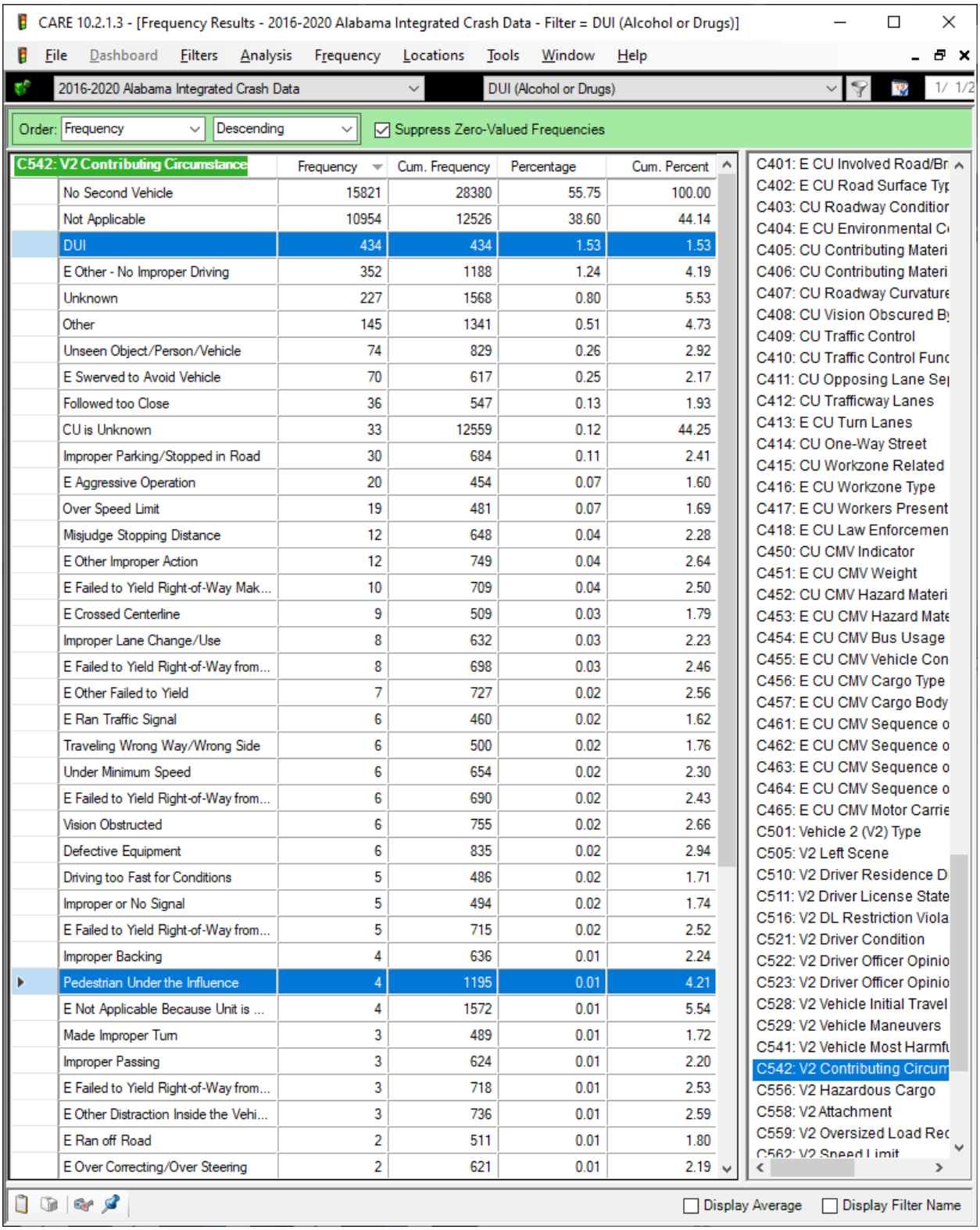
Display Average | Display Filter Name




2016-2020 Alabama Integrated Crash Data
DUI (Alcohol or Drugs)
1/ 1/2
Order: Natural Order
Ascending
Suppress Zero-Valued Frequencies
C225: CU Citation Issued
Value
Frequency
Cum. Frequency
Percentage
Cum. Percent
E None 10150 10150 36.34 36.34
No Driver License 305 10455 1.09 37.43
E Driving a Commercial Vehicle without F... 2 10457 0.01 37.43
E Improper Class or Endorsements on Lic... 2 10459 0.01 37.44
E No Proof of Insurance 531 10990 1.90 39.34
Driving While Suspended 383 11373 1.37 40.71
Driving While Revoked 269 11642 0.96 41.68
Driving Under the Influence 11929 23571 42.70 84.38
Driving Under the Influence of Drugs 1444 25015 5.17 89.55
E Driving Under the Influence of Alcohol ... 925 25940 3.31 92.86
E Driving Under the Influence of Any Su... 754 26694 2.70 95.56
Leaving the Scene of an Accident 852 27546 3.05 98.61
E No Tag 4 27550 0.01 98.63
Improper Tag or Expired Tag 14 27564 0.05 98.68
E No Registration in Vehicle 2 27566 0.01 98.68
Violation of Restrictions 10 27576 0.04 98.72
E Window Tint 1 27577 0.00 98.72
E Assault 26 27603 0.09 98.82
Eluding Police 123 27726 0.44 99.26
CU is Not a Vehicle 174 27900 0.62 99.88
CU is Unknown 33 27933 0.12 100.00
P Child Restraint 1 27934 0.00 100.00
C217: CU Hazardous Cargo
C218: E CU Hazardous Released
C219: CU Attachment
C220: CU Oversized Load Requiring Pe
C221: CU Had Oversized Load Permit
C222: CU Contributing Vehicle Defect
C223: CU Speed Limit
C224: CU Estimated Speed at Impact
C225: CU Citation Issued
C226: CU Vehicle Damage
C227: CU Vehicle Towed
C230: CU Areas Damaged #1
C231: E CU Areas Damaged #2
C232: E CU Areas Damaged #3
C233: CU Point of Initial Impact
C301: CU Non-Motorist Prior Action
C303: E CU K-12 Child W/C To/From Sc
C304: E CU Non-Motorist Action at Time
C305: E CU Non-Motorist Action at Time
C306: CU Non-Motorist Location at Tim
C307: E Vehicle Unit That Struck CU No
C308: CU Non-Motorist Condition
C309: CU Non-Motorist Officer Opinion
C310: CU Non-Motorist Officer Opinion
C311: CU Non-Motorist Most Harmful Ev
C321: CU Driver/Non-Motorist Seating F
C322: CU Driver/Non-Motorist Victim/Oc
C323: CU Driver/Non-Motorist Safety Eq


CARE 10.2.1.3 - [Frequency Results - 2016-2020 Alabama Integrated Crash Data - Filter = DUI (Alcohol or Drugs)]
File Dashboard Filters Analysis Frequency Locations Tools Window Help
2016-2020 Alabama Integrated Crash Data
DUI (Alcohol or Drugs)
Order: Frequency Descending
Suppress Zero-Valued Frequencies
C015: Primary Contributing Circumstance
Frequency
Cum. Frequency
Percentage
Cum. Percent
DUI 20577 20577 72.51 72.51
E Aggressive Operation 923 21500 3.25 75.76
E Ran off Road 839 22339 2.96 78.71
Over Speed Limit 561 22900 1.98 80.69
Unknown 450 23350 1.59 82.28
E Fatigued/Asleep 401 23751 1.41 83.69
Followed too Close 377 24128 1.33 85.02
Other 326 24454 1.15 86.17
Driving too Fast for Conditions 316 24770 1.11 87.28
Misjudge Stopping Distance 286 25056 1.01 88.29
Improper Lane Change/Use 250 25306 0.88 89.17
E Ran Traffic Signal 247 25553 0.87 90.04
E Crossed Centerline 222 25775 0.78 90.82
Traveling Wrong Way/Wrong Side 207 25982 0.73 91.55
E Failed to Yield Right-of-Way Making Left or U-... 202 26184 0.71 92.26
E Ran Stop Sign 178 26362 0.63 92.89
Pedestrian Under the Influence 162 26524 0.57 93.46
E Failed to Yield Right-of-Way from Stop Sign 161 26685 0.57 94.03
E Distracted by Use of Electronic Communication... 134 26819 0.47 94.50
E Other Distraction Inside the Vehicle 133 26952 0.47 94.97
E Over Correcting/Over Steering 123 27075 0.43 95.40
E Other Improper Action 122 27197 0.43 95.83
Unseen Object/Person/Vehicle 116 27313 0.41 96.24
Made Improper Turn 111 27424 0.39 96.63
Improper Backing 106 27530 0.37 97.00
E Swerved to Avoid Vehicle 100 27630 0.35 97.36
E Swerved to Avoid Animal 84 27714 0.30 97.65
E Failed to Yield Right-of-Way from Traffic Signal 74 27788 0.26 97.91
E Failed to Yield Right-of-Way from Driveway 66 27854 0.23 98.15
Defective Equipment 60 27914 0.21 98.36
Improper Passing 56 27970 0.20 98.56
E Other Failed to Yield 46 28016 0.16 98.72
E Distracted by Passenger 35 28051 0.12 98.84
E Distracted by Use of Other Electronic Device 28 28079 0.10 98.94
Improper Parking/Stopped in Road 27 28106 0.10 99.03
E Other Distraction Outside the Vehicle 26 28132 0.09 99.13
E Other - No Improper Driving 25 28157 0.09 99.21
C001: County
C002: City
C003: Year
C004: Month
C005: Day of Month
C006: Day of the Week
C007: Week of the Year
C008: Time of Day
C010: Rural or Urban
C011: Highway Classification
C012: Controlled Access
C013: E Highway Side
C015: Primary Contributing C
C016: Primary Contributing U
C017: First Harmful Event
C018: Location First Harmful
C019: E Most Harmful Event
C020: E Distracted Driving Op
C021: Distance to Fixed Obje
C022: E Type of Roadway Jun
C023: E Manner of Crash
C024: School Bus Related
C025: Crash Severity
C026: Intersection Related
C027: At Intersection
C028: Mileposted Route
C029: National Highway Syste
C030: Functional Class
C031: Lighting Conditions
C032: Weather
C033: Locale
C034: E Police Present at Tim
C035: Police Notification Dela
C036: Police Arrival Delay
C037: EMS Arrival Delay
C038: Adjusted EMS Arrival De
C039: Non-Vehicular Property
C040: Agency ORI
C042: Highway Patrol Troops
C043: Highway Patrol Posts
C044: ALEA Division
C045: ALDOT Area
C046: ALDOT Region
C047: ADECA/AHSO Region
C048: RPO
C049: MPO
Display Average
Display Filter Name

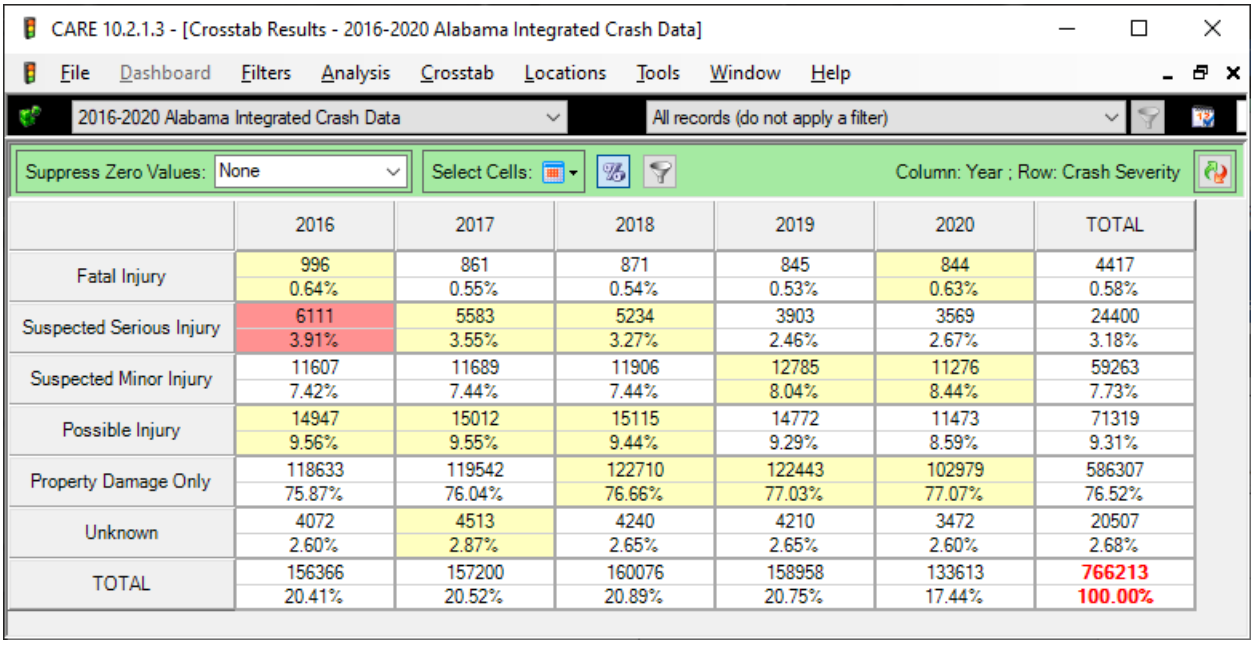

CARE 10.2.1.3 - [Frequency Results - 2016-2020 Alabama Integrated Crash Data - Filter = DUI (Alcohol or Drugs)]
File Dashboard Filters Analysis Frequency Locations Tools Window Help
2016-2020 Alabama Integrated Crash Data
DUI (Alcohol or Drugs)
Order: Frequency Descending
Suppress Zero-Valued Frequencies
C202: CU Contributing Circumstance | Frequency | Cum. Frequency | Percentage | Cum. Percent
DUI | 15578 | 15578 | 54.89 | 54.89
Over Speed Limit | 1716 | 18959 | 6.05 | 66.80
E Ran off Road | 1453 | 21708 | 5.12 | 76.49
Not Applicable | 1448 | 28326 | 5.10 | 99.81
E Aggressive Operation | 1086 | 16664 | 3.83 | 58.72
Unknown | 744 | 26877 | 2.62 | 94.70
Driving too Fast for Conditions | 413 | 19372 | 1.46 | 68.26
E Fatigued/Asleep | 409 | 25048 | 1.44 | 88.26
Followed too Close | 401 | 22109 | 1.41 | 77.90
Improper Lane Change/Use | 393 | 23144 | 1.38 | 81.55
Other | 363 | 26133 | 1.28 | 92.08
E Crossed Centerline | 354 | 20230 | 1.25 | 71.28
E Over Correcting/Over Steering | 334 | 22674 | 1.18 | 79.89
Traveling Wrong Way/Wrong Side | 323 | 19876 | 1.14 | 70.04
E Ran Stop Sign | 305 | 17221 | 1.07 | 60.68
Misjudge Stopping Distance | 305 | 23548 | 1.07 | 82.97
E Ran Traffic Signal | 252 | 16916 | 0.89 | 59.61
E Failed to Yield Right-of-Way Mak... | 243 | 24142 | 0.86 | 85.07
E Failed to Yield Right-of-Way from... | 227 | 23881 | 0.80 | 84.15
E Distracted by Use of Electronic ... | 216 | 24587 | 0.76 | 86.63
Made Improper Turn | 177 | 19549 | 0.62 | 68.88
E Other Distraction Inside the Vehi... | 160 | 25208 | 0.56 | 88.82
Pedestrian Under the Influence | 134 | 25732 | 0.47 | 90.67
Unseen Object/Person/Vehicle | 126 | 25486 | 0.44 | 89.80
E Other Improper Action | 117 | 25352 | 0.41 | 89.33
E Swerved to Avoid Vehicle | 113 | 22222 | 0.40 | 78.30
E Swerved to Avoid Animal | 102 | 22340 | 0.36 | 78.72
Improper Backing | 99 | 23243 | 0.35 | 81.90
E Failed to Yield Right-of-Way from... | 79 | 24234 | 0.28 | 85.39
Improper Passing | 77 | 22751 | 0.27 | 80.17
E Failed to Yield Right-of-Way from... | 72 | 23654 | 0.25 | 83.35
Defective Equipment | 64 | 25551 | 0.23 | 90.03
E Other Failed to Yield | 45 | 24329 | 0.16 | 85.73
E Distracted by Passenger | 42 | 24371 | 0.15 | 85.87
E Distracted by Use of Other Electr... | 36 | 24623 | 0.13 | 86.76
E Wrong Side of Road | 36 | 25770 | 0.13 | 90.80
Improper Parking/Stopped in Road | 33 | 23582 | 0.12 | 83.09
CU is Unknown | 33 | 28359 | 0.12 | 99.93
C126: CU Driver Alcohol Test
C127: E CU Driver Drug Test
C128: CU Vehicle Initial Trave
C129: CU Vehicle Maneuvers
C130: E CU Non-Motorist Mar
C201: CU Vehicle Most Harmf
C202: CU Contributing Circur
C203: CU First Harmful Event
C204: E CU Sequence of Eve
C205: E CU Sequence of Eve
C206: E CU Sequence of Eve
C207: E CU Sequence of Eve
C208: CU Model Year
C209: CU Make
C210: CU Body (Passenger C
C211: E CU Owners State
C212: CU License Tag State
C213: CU Vehicle Usage
C214: E CU Emergency Statu
C215: E CU Placard Required
C216: E CU Placard Status
C217: CU Hazardous Cargo
C218: E CU Hazardous Relea
C219: CU Attachment
C220: CU Oversized Load Re
C221: CU Had Oversized Loa
C222: CU Contributing Vehicl
C223: CU Speed Limit
C224: CU Estimated Speed a
C225: CU Citation Issued
C226: CU Vehicle Damage
C227: CU Vehicle Towed
C230: CU Areas Damaged #1
C231: E CU Areas Damaged
C232: E CU Areas Damaged
C233: CU Point of Initial Impa
C301: CU Non-Motorist Prior
C303: E CU K-12 Child W/C T
C304: E CU Non-Motorist Acti
C305: E CU Non-Motorist Acti
C306: CU Non-Motorist Locat
C307: E Vehicle Unit That Stru
C308: CU Non-Motorist Cond
C309: CU Non-Motorist Office
C310: CU Non-Motorist Office
C311: CU Non-Motorist Most
C321: CU Driver/Non-Motorist
Display Average
Display Filter Name


CARE 10.2.1.3 - [Frequency Results - 2016-2020 Alabama Integrated Crash Data - Filter = DUI (Alcohol or Drugs)]
File Dashboard Filters Analysis Frequency Locations Tools Window Help
2016-2020 Alabama Integrated Crash Data
DUI (Alcohol or Drugs)
Order: Frequency Descending
Suppress Zero-Valued Frequencies
C542: V2 Contributing Circumstance | Frequency | Cum. Frequency | Percentage | Cum. Percent
No Second Vehicle | 15821 | 28380 | 55.75 | 100.00
Not Applicable | 10954 | 12526 | 38.60 | 44.14
DUI | 434 | 434 | 1.53 | 1.53
E Other - No Improper Driving | 352 | 1188 | 1.24 | 4.19
Unknown | 227 | 1568 | 0.80 | 5.53
Other | 145 | 1341 | 0.51 | 4.73
Unseen Object/Person/Vehicle | 74 | 829 | 0.26 | 2.92
E Swerved to Avoid Vehicle | 70 | 617 | 0.25 | 2.17
Followed too Close | 36 | 547 | 0.13 | 1.93
CU is Unknown | 33 | 12559 | 0.12 | 44.25
Improper Parking/Stopped in Road | 30 | 684 | 0.11 | 2.41
E Aggressive Operation | 20 | 454 | 0.07 | 1.60
Over Speed Limit | 19 | 481 | 0.07 | 1.69
Misjudge Stopping Distance | 12 | 648 | 0.04 | 2.28
E Other Improper Action | 12 | 749 | 0.04 | 2.64
E Failed to Yield Right-of-Way Mak... | 10 | 709 | 0.04 | 2.50
E Crossed Centerline | 9 | 509 | 0.03 | 1.79
Improper Lane Change/Use | 8 | 632 | 0.03 | 2.23
E Failed to Yield Right-of-Way from... | 8 | 698 | 0.03 | 2.46
E Other Failed to Yield | 7 | 727 | 0.02 | 2.56
E Ran Traffic Signal | 6 | 460 | 0.02 | 1.62
Traveling Wrong Way/Wrong Side | 6 | 500 | 0.02 | 1.76
Under Minimum Speed | 6 | 654 | 0.02 | 2.30
E Failed to Yield Right-of-Way from... | 6 | 690 | 0.02 | 2.43
Vision Obstructed | 6 | 755 | 0.02 | 2.66
Defective Equipment | 6 | 835 | 0.02 | 2.94
Driving too Fast for Conditions | 5 | 486 | 0.02 | 1.71
Improper or No Signal | 5 | 494 | 0.02 | 1.74
E Failed to Yield Right-of-Way from... | 5 | 715 | 0.02 | 2.52
Improper Backing | 4 | 636 | 0.01 | 2.24
Pedestrian Under the Influence | 4 | 1195 | 0.01 | 4.21
E Not Applicable Because Unit is ... | 4 | 1572 | 0.01 | 5.54
Made Improper Turn | 3 | 489 | 0.01 | 1.72
Improper Passing | 3 | 624 | 0.01 | 2.20
E Failed to Yield Right-of-Way from... | 3 | 718 | 0.01 | 2.53
E Other Distraction Inside the Vehi... | 3 | 736 | 0.01 | 2.59
E Ran off Road | 2 | 511 | 0.01 | 1.80
E Over Correcting/Over Steering | 2 | 621 | 0.01 | 2.19
C401: E CU Involved Road/Br
C402: E CU Road Surface Typ
C403: CU Roadway Condition
C404: E CU Environmental C
C405: CU Contributing Materi
C406: CU Contributing Materi
C407: CU Roadway Curvature
C408: CU Vision Obscured By
C409: CU Traffic Control
C410: CU Traffic Control Func
C411: CU Opposing Lane Sel
C412: CU Trafficway Lanes
C413: E CU Turn Lanes
C414: CU One-Way Street
C415: CU Workzone Related
C416: E CU Workzone Type
C417: E CU Workers Present
C418: E CU Law Enforcemen
C450: CU CMV Indicator
C451: E CU CMV Weight
C452: CU CMV Hazard Materi
C453: E CU CMV Hazard Mate
C454: E CU CMV Bus Usage
C455: E CU CMV Vehicle Con
C456: E CU CMV Cargo Type
C457: E CU CMV Cargo Body
C461: E CU CMV Sequence o
C462: E CU CMV Sequence o
C463: E CU CMV Sequence o
C464: E CU CMV Sequence o
C465: E CU CMV Motor Carrie
C501: Vehicle 2 (V2) Type
C505: V2 Left Scene
C510: V2 Driver Residence D
C511: V2 Driver License State
C516: V2 DL Restriction Viola
C521: V2 Driver Condition
C522: V2 Driver Officer Opinio
C523: V2 Driver Officer Opinio
C528: V2 Vehicle Initial Travel
C529: V2 Vehicle Maneuvers
C541: V2 Vehicle Most Harmfu
C542: V2 Contributing Circum
C556: V2 Hazardous Cargo
C558: V2 Attachment
C559: V2 Oversized Load Rec
C562: V2 Speed Limit
Display Average
Display Filter Name

3.2 Overall Crashes by Year 2016-2020 Data

Before analyzing the ID subset, it is good to get a feel for the overall difference in the crash frequencies over the past years. The following table gives a comparison of total crashes over CY2016-2020 by severity.

Crashes by Severity for Calendar Years 2016-2020



	2016	2017	2018	2019	2020	TOTAL
Fatal Injury	996 0.64%	861 0.55%	871 0.54%	845 0.53%	844 0.63%	4417 0.58%
Suspected Serious Injury	6111 3.91%	5583 3.55%	5234 3.27%	3903 2.46%	3569 2.67%	24400 3.18%
Suspected Minor Injury	11607 7.42%	11689 7.44%	11906 7.44%	12785 8.04%	11276 8.44%	59263 7.73%
Possible Injury	14947 9.56%	15012 9.55%	15115 9.44%	14772 9.29%	11473 8.59%	71319 9.31%
Property Damage Only	118633 75.87%	119542 76.04%	122710 76.66%	122443 77.03%	102979 77.07%	586307 76.52%
Unknown	4072 2.60%	4513 2.87%	4240 2.65%	4210 2.65%	3472 2.60%	20507 2.68%
TOTAL	156366 20.41%	157200 20.52%	160076 20.89%	158958 20.75%	133613 17.44%	766213 100.00%

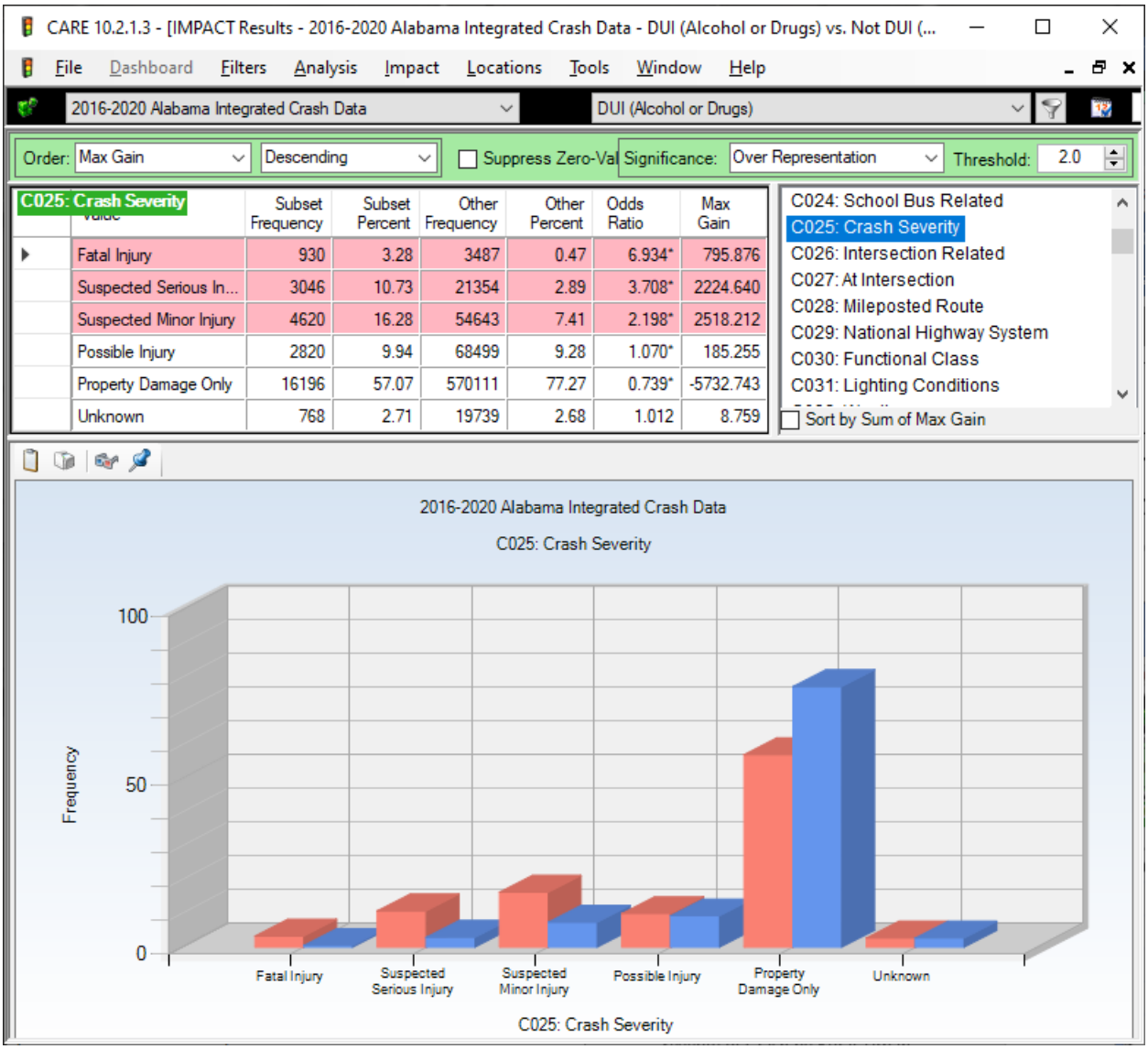
We conclude from considering the percentage numbers at the bottom of the table that 2019 was not significantly different in total crashes from 2016 through 2018. However, there was clearly a reduction in crashes in 2020 due to the COVID-19 restrictions. Fatal and Suspected Serious Injury crashes had a dramatic increase in 2016, but there was a regression to the mean in 2017 through 2019.

Considerable study has been performed in an attempt to identify the reason for the 2016 outlier in fatal crashes. The conclusions drawn pointed to increased speed, and a high correlation between ID-caused crashes with both the increased speed and the reluctance of close to half these drivers to be restrained. The correlation is due to a willingness to take risks.

3.3 Overall Severity Comparisons

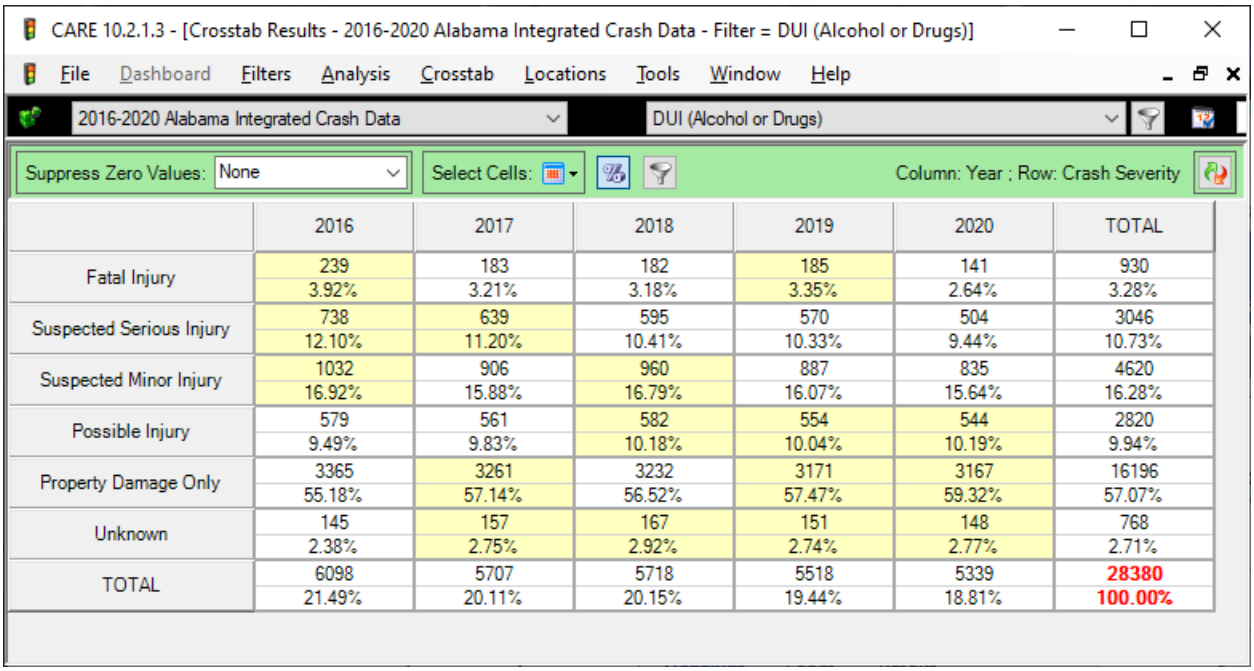
The following presents a comparison of the severities of ID crashes in over the five year period (2016-2020) against non-ID crashes.

In the table above the chart the Subset Frequency and Percent are for ID crashes, while the Other Frequency and Percent are for non-ID crashes. Comparisons must be against the percentage proportions to determine if there is a trend direction being set in increased or decreased severity for these crashes.



It is clear that ID crashes are much more severe than their non-ID counterparts All four of the injury values are over-represented, and the top most severe all by at least twice the proportion of the non-ID crashes. For fatal crashes the Odds Ratio multiplier is close to seven (6.934). In the other injury severities, there is a very significant increase in both the Incapacitating Injury and the Possible Injury. This difference tends to confirm the increase in the fatal crashes, since quite often the characteristics of an Incapacitating Injury crash are not at that different from that crash being fatal.

The following gives the severities by year for *just the ID crashes*.



	2016	2017	2018	2019	2020	TOTAL
Fatal Injury	239 3.92%	183 3.21%	182 3.18%	185 3.35%	141 2.64%	930 3.28%
Suspected Serious Injury	738 12.10%	639 11.20%	595 10.41%	570 10.33%	504 9.44%	3046 10.73%
Suspected Minor Injury	1032 16.92%	906 15.88%	960 16.79%	887 16.07%	835 15.64%	4620 16.28%
Possible Injury	579 9.49%	561 9.83%	582 10.18%	554 10.04%	544 10.19%	2820 9.94%
Property Damage Only	3365 55.18%	3261 57.14%	3232 56.52%	3171 57.47%	3167 59.32%	16196 57.07%
Unknown	145 2.38%	157 2.75%	167 2.92%	151 2.74%	148 2.77%	768 2.71%
TOTAL	6098 21.49%	5707 20.11%	5718 20.15%	5518 19.44%	5339 18.81%	**28380** **100.00%**

Year 2020 cannot be included in these conclusions since it was not at all typical. It seems clear that 2016 was an outlier for all three of the highest severity crashes, and that generally, there was a regression to the mean for subsequent years. This should be taken into consideration in the interpretation of the findings regarding the various attributes that are given in the remainder of this problem identification.

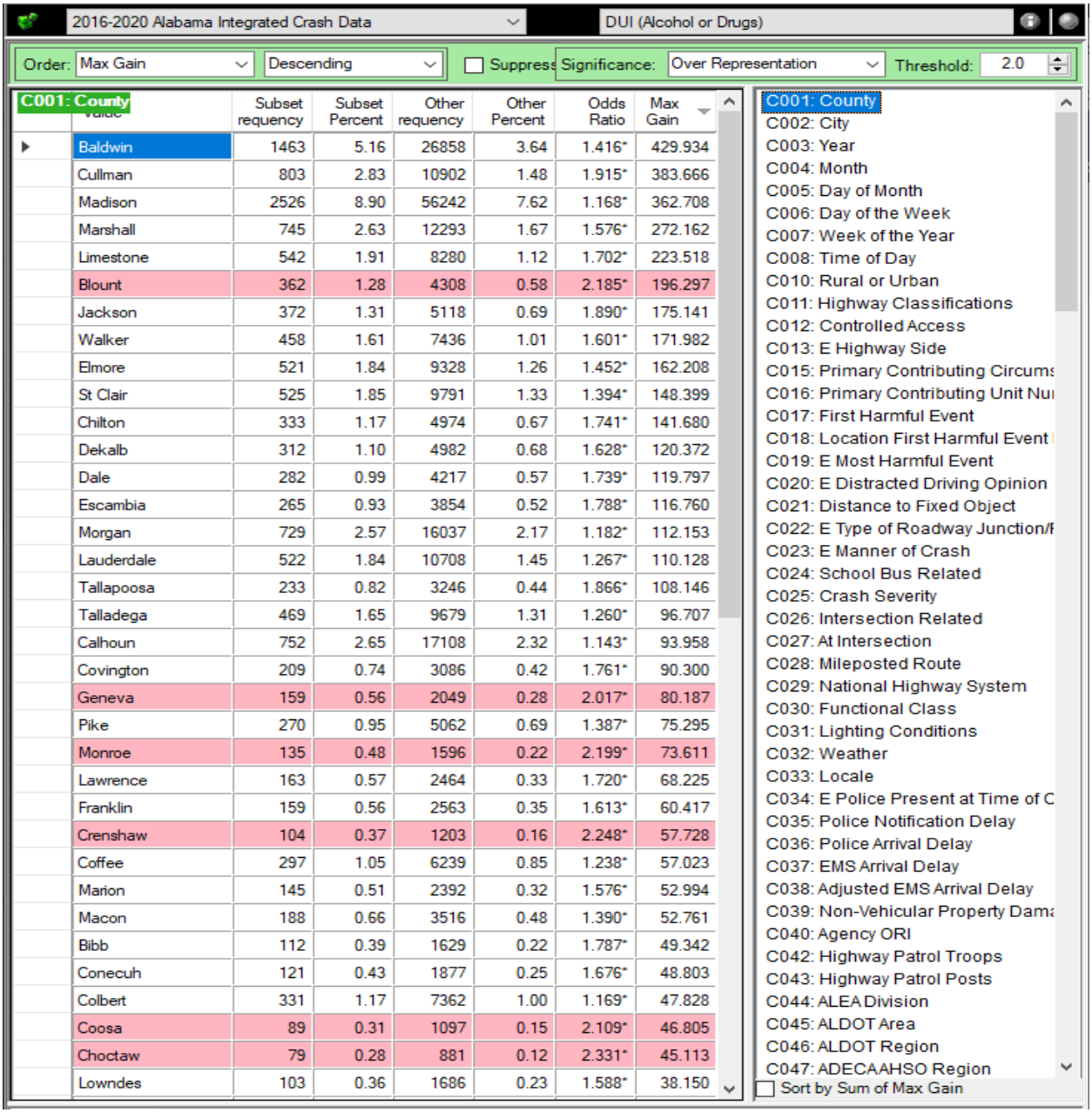
The following sections provide the IMPACT displays for the various attributes that could have an influence on countermeasure development. Unless otherwise indicated in the Order box, the outputs will be in highest Max Gain first. The Max Gain is a term that CARE users have assigned to indicate the number of crashes that would be reduced if the respective value was not at all over-represented (had an Odds Ratio of 1.000). An over-represented value of an attribute is a situation found where that attribute has a greater share of ID crashes than would be expected if it were the same as that attribute in non-ID crashes. That is, the non-ID crashes are serving as a control to which the ID crashes are being compared. In this way anything different about ID

crashes surfaces and can be subjected to further analyses. The analytical technique employed to generate most of the displays below is called Information Mining Performance Analysis Control Technique (IMPACT). For a detailed description of the meaning of each element of the IM-PACT outputs, see:

http://www.caps.ua.edu/software/care/

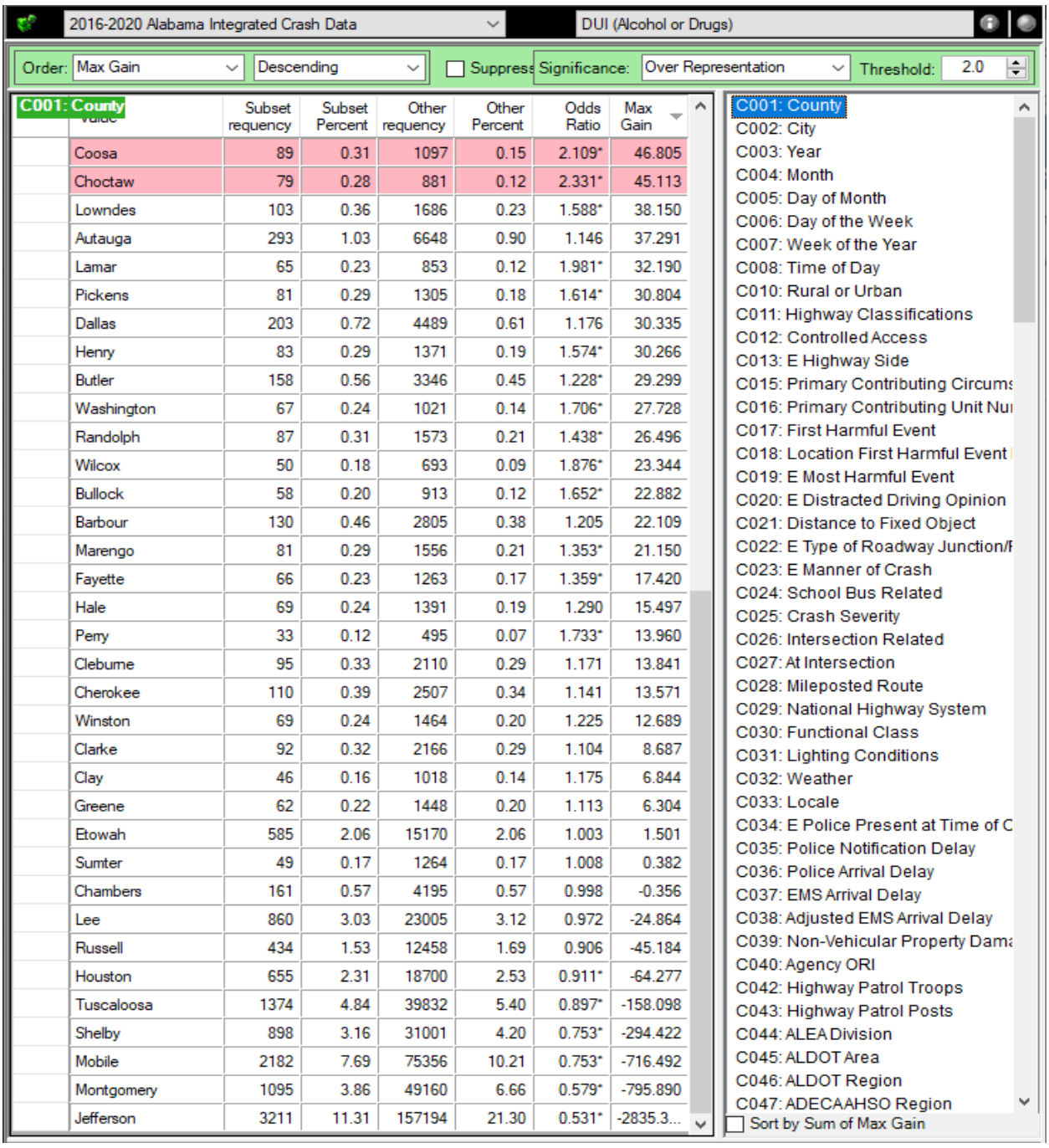
4.0 Geographical Factors

4.1 County



C001: County	Subset requency	Subset Percent	Other requency	Other Percent	Odds Ratio	Max Gain
Baldwin	1463	5.16	26858	3.64	1.416*	429.934
Cullman	803	2.83	10902	1.48	1.915*	383.666
Madison	2526	8.90	56242	7.62	1.168*	362.708
Marshall	745	2.63	12293	1.67	1.576*	272.162
Limestone	542	1.91	8280	1.12	1.702*	223.518
Blount	362	1.28	4308	0.58	2.185*	196.297
Jackson	372	1.31	5118	0.69	1.890*	175.141
Walker	458	1.61	7436	1.01	1.601*	171.982
Elmore	521	1.84	9328	1.26	1.452*	162.208
St Clair	525	1.85	9791	1.33	1.394*	148.399
Chilton	333	1.17	4974	0.67	1.741*	141.680
Dekalb	312	1.10	4982	0.68	1.628*	120.372
Dale	282	0.99	4217	0.57	1.739*	119.797
Escambia	265	0.93	3854	0.52	1.788*	116.760
Morgan	729	2.57	16037	2.17	1.182*	112.153
Lauderdale	522	1.84	10708	1.45	1.267*	110.128
Tallapoosa	233	0.82	3246	0.44	1.866*	108.146
Talladega	469	1.65	9679	1.31	1.260*	96.707
Calhoun	752	2.65	17108	2.32	1.143*	93.958
Covington	209	0.74	3086	0.42	1.761*	90.300
Geneva	159	0.56	2049	0.28	2.017*	80.187
Pike	270	0.95	5062	0.69	1.387*	75.295
Monroe	135	0.48	1596	0.22	2.199*	73.611
Lawrence	163	0.57	2464	0.33	1.720*	68.225
Franklin	159	0.56	2563	0.35	1.613*	60.417
Crenshaw	104	0.37	1203	0.16	2.248*	57.728
Coffee	297	1.05	6239	0.85	1.238*	57.023
Marion	145	0.51	2392	0.32	1.576*	52.994
Macon	188	0.66	3516	0.48	1.390*	52.761
Bibb	112	0.39	1629	0.22	1.787*	49.342
Conecuh	121	0.43	1877	0.25	1.676*	48.803
Colbert	331	1.17	7362	1.00	1.169*	47.828
Coosa	89	0.31	1097	0.15	2.109*	46.805
Choctaw	79	0.28	881	0.12	2.331*	45.113
Lowndes	103	0.36	1686	0.23	1.588*	38.150

The above has been arranged in highest Max Gain order to indicate the counties that have the highest potential for gain (by reducing the over-representation) at the top. The following output is the rest of the counties in the ordering, so it also contains those that are under-represented.



C001: County	Subset requency	Subset Percent	Other requency	Other Percent	Odds Ratio	Max Gain
Coosa	89	0.31	1097	0.15	2.109*	46.805
Choctaw	79	0.28	881	0.12	2.331*	45.113
Lowndes	103	0.36	1686	0.23	1.588*	38.150
Autauga	293	1.03	6648	0.90	1.146	37.291
Lamar	65	0.23	853	0.12	1.981*	32.190
Pickens	81	0.29	1305	0.18	1.614*	30.804
Dallas	203	0.72	4489	0.61	1.176	30.335
Henry	83	0.29	1371	0.19	1.574*	30.266
Butler	158	0.56	3346	0.45	1.228*	29.299
Washington	67	0.24	1021	0.14	1.706*	27.728
Randolph	87	0.31	1573	0.21	1.438*	26.496
Wilcox	50	0.18	693	0.09	1.876*	23.344
Bullock	58	0.20	913	0.12	1.652*	22.882
Barbour	130	0.46	2805	0.38	1.205	22.109
Marengo	81	0.29	1556	0.21	1.353*	21.150
Fayette	66	0.23	1263	0.17	1.359*	17.420
Hale	69	0.24	1391	0.19	1.290	15.497
Perry	33	0.12	495	0.07	1.733*	13.960
Cleburne	95	0.33	2110	0.29	1.171	13.841
Cherokee	110	0.39	2507	0.34	1.141	13.571
Winston	69	0.24	1464	0.20	1.225	12.689
Clarke	92	0.32	2166	0.29	1.104	8.687
Clay	46	0.16	1018	0.14	1.175	6.844
Greene	62	0.22	1448	0.20	1.113	6.304
Etowah	585	2.06	15170	2.06	1.003	1.501
Sumter	49	0.17	1264	0.17	1.008	0.382
Chambers	161	0.57	4195	0.57	0.998	-0.356
Lee	860	3.03	23005	3.12	0.972	-24.864
Russell	434	1.53	12458	1.69	0.906	-45.184
Houston	655	2.31	18700	2.53	0.911*	-64.277
Tuscaloosa	1374	4.84	39832	5.40	0.897*	-158.098
Shelby	898	3.16	31001	4.20	0.753*	-294.422
Mobile	2182	7.69	75356	10.21	0.753*	-716.492
Montgomery	1095	3.86	49160	6.66	0.579*	-795.890
Jefferson	3211	11.31	157194	21.30	0.531*	-2835.3...

Baldwin, Cullman, Madison, Marshall, Limestone and Blount have the highest potential for ID crash reduction. At the other end of the spectrum, the counties with the largest cities (e.g., Jefferson, Montgomery, and Mobile counties) were the most under-represented counties, although their numbers of ID crashes is still very large. Generally, the over-represented counties contain larger rural areas. See the rural-urban comparison below.

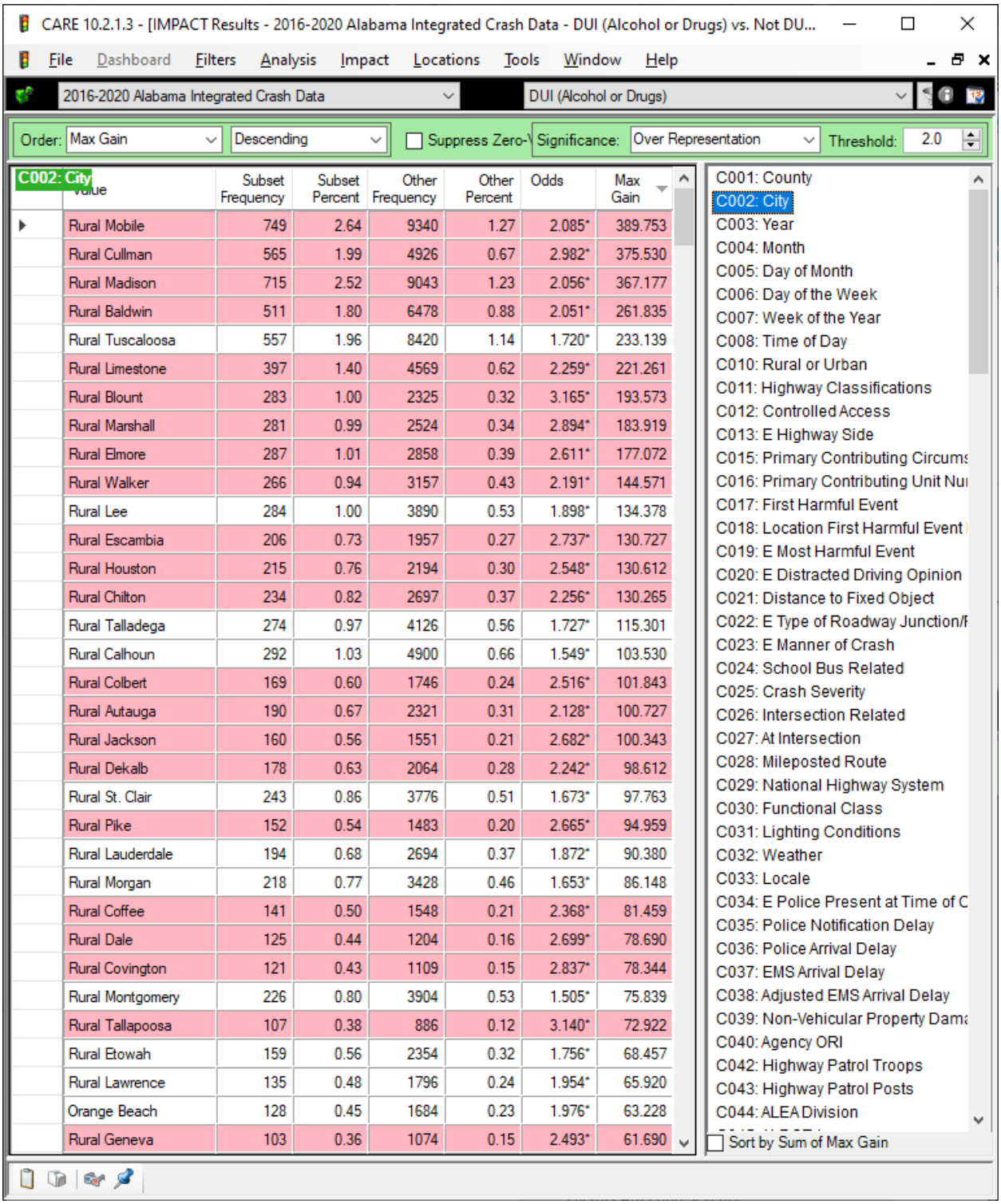
4.2 Cities Over-represented by High Odds Ratios

For comparison purposes, the rural areas of counties are considered to be "virtual cities" in that crashes that occur there are listed as "Rural County" so that these crashes can be duly accounted for and compared. Generally, these rural areas are adjacent to (or contain) significant urban areas. Contrasted with this finding, there was significant under-representation for impaired driving crashes in the largest cities themselves (e.g., Birmingham, Mobile, Montgomery, Huntsville, Tuscaloosa, etc.). This can be attributed to a number of possible factors in urban areas:

- Less need for motor vehicle travel to the drinking establishments;
- Larger police presence in the metropolitan areas; and
- Lower speeds in rural areas resulting in a lower severity of crashes, which may be less apt to be reported as caused by impaired driving. Urban crashes contain many described as fender-benders or low-speed rear-end bumper crashes.

The output display below is a list of what are considered to be the most critical cities because of their high Max Gains, which indicate the potential for crash reduction. The criteria for this list were (1) a total of 60 or more ID crashes in the five-year period, and (2) at least 1.505 times the expected proportion in the non-ID portions of these cities. The red background indicates those (virtual) city areas that had over twice their expected proportion of ID crashes.

This display is in Max Gain ordering to put those cities that have the highest potential for ID crash reduction at the top.

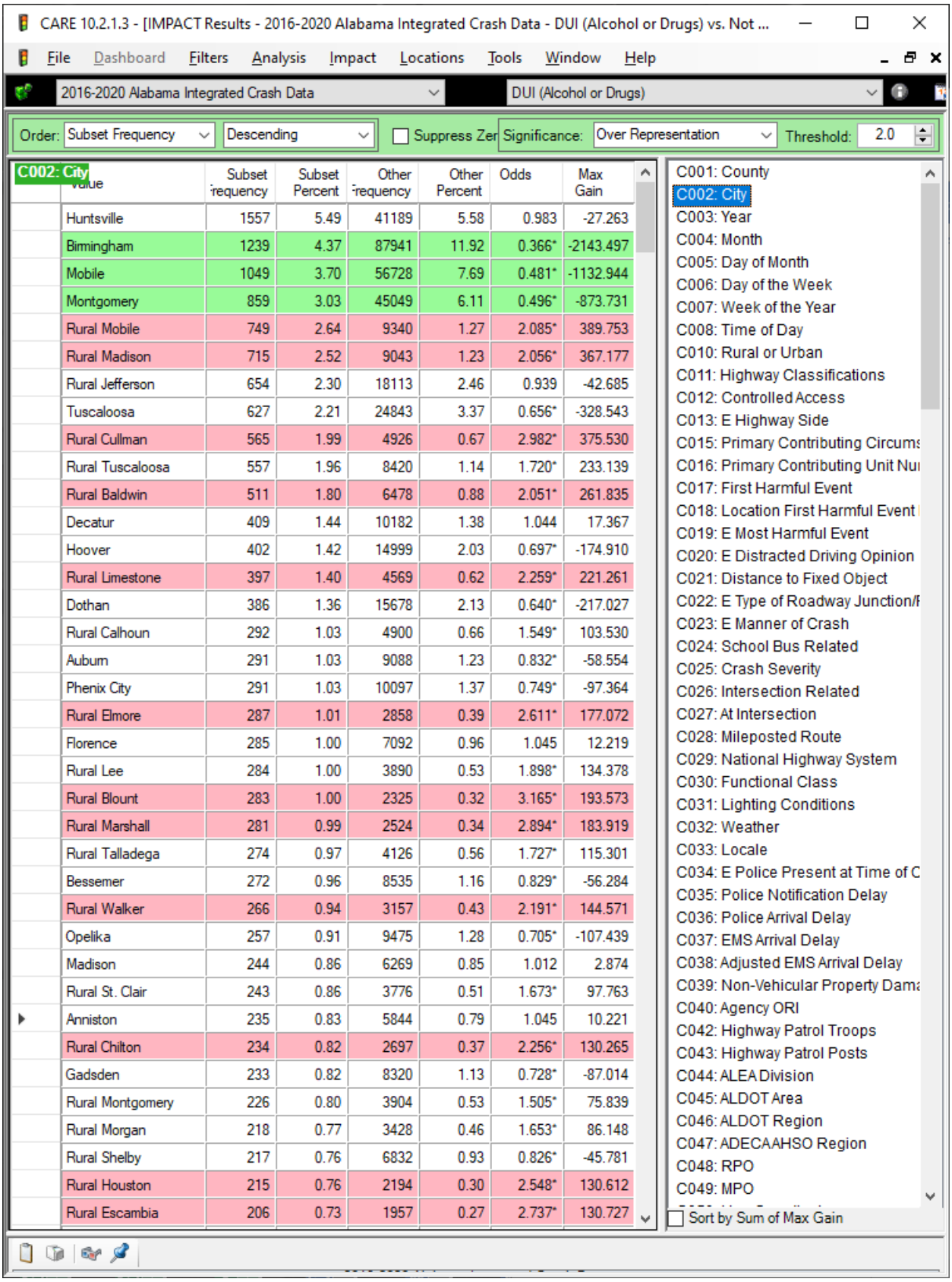

CARE 10.2.1.3 - [IMPACT Results - 2016-2020 Alabama Integrated Crash Data - DUI (Alcohol or Drugs) vs. Not DU...
File Dashboard Filters Analysis Impact Locations Tools Window Help
2016-2020 Alabama Integrated Crash Data
DUI (Alcohol or Drugs)
Order: Max Gain
Descending
Suppress Zero-
Significance: Over Representation
Threshold: 2.0
C002: City
Value
Subset Frequency
Subset Percent
Other Frequency
Other Percent
Odds
Max Gain
Rural Mobile 749 2.64 9340 1.27 2.085* 389.753
Rural Cullman 565 1.99 4926 0.67 2.982* 375.530
Rural Madison 715 2.52 9043 1.23 2.056* 367.177
Rural Baldwin 511 1.80 6478 0.88 2.051* 261.835
Rural Tuscaloosa 557 1.96 8420 1.14 1.720* 233.139
Rural Limestone 397 1.40 4569 0.62 2.259* 221.261
Rural Blount 283 1.00 2325 0.32 3.165* 193.573
Rural Marshall 281 0.99 2524 0.34 2.894* 183.919
Rural Elmore 287 1.01 2858 0.39 2.611* 177.072
Rural Walker 266 0.94 3157 0.43 2.191* 144.571
Rural Lee 284 1.00 3890 0.53 1.898* 134.378
Rural Escambia 206 0.73 1957 0.27 2.737* 130.727
Rural Houston 215 0.76 2194 0.30 2.548* 130.612
Rural Chilton 234 0.82 2697 0.37 2.256* 130.265
Rural Talladega 274 0.97 4126 0.56 1.727* 115.301
Rural Calhoun 292 1.03 4900 0.66 1.549* 103.530
Rural Colbert 169 0.60 1746 0.24 2.516* 101.843
Rural Autauga 190 0.67 2321 0.31 2.128* 100.727
Rural Jackson 160 0.56 1551 0.21 2.682* 100.343
Rural Dekalb 178 0.63 2064 0.28 2.242* 98.612
Rural St. Clair 243 0.86 3776 0.51 1.673* 97.763
Rural Pike 152 0.54 1483 0.20 2.665* 94.959
Rural Lauderdale 194 0.68 2694 0.37 1.872* 90.380
Rural Morgan 218 0.77 3428 0.46 1.653* 86.148
Rural Coffee 141 0.50 1548 0.21 2.368* 81.459
Rural Dale 125 0.44 1204 0.16 2.699* 78.690
Rural Covington 121 0.43 1109 0.15 2.837* 78.344
Rural Montgomery 226 0.80 3904 0.53 1.505* 75.839
Rural Tallapoosa 107 0.38 886 0.12 3.140* 72.922
Rural Etowah 159 0.56 2354 0.32 1.756* 68.457
Rural Lawrence 135 0.48 1796 0.24 1.954* 65.920
Orange Beach 128 0.45 1684 0.23 1.976* 63.228
Rural Geneva 103 0.36 1074 0.15 2.493* 61.690
C001: County
C002: City
C003: Year
C004: Month
C005: Day of Month
C006: Day of the Week
C007: Week of the Year
C008: Time of Day
C010: Rural or Urban
C011: Highway Classifications
C012: Controlled Access
C013: E Highway Side
C015: Primary Contributing Circums
C016: Primary Contributing Unit Nu
C017: First Harmful Event
C018: Location First Harmful Event
C019: E Most Harmful Event
C020: E Distracted Driving Opinion
C021: Distance to Fixed Object
C022: E Type of Roadway Junction/
C023: E Manner of Crash
C024: School Bus Related
C025: Crash Severity
C026: Intersection Related
C027: At Intersection
C028: Mileposted Route
C029: National Highway System
C030: Functional Class
C031: Lighting Conditions
C032: Weather
C033: Locale
C034: E Police Present at Time of C
C035: Police Notification Delay
C036: Police Arrival Delay
C037: EMS Arrival Delay
C038: Adjusted EMS Arrival Delay
C039: Non-Vehicular Property Dama
C040: Agency ORI
C042: Highway Patrol Troops
C043: Highway Patrol Posts
C044: ALEA Division
Sort by Sum of Max Gain

4.3 Cities by Number of ID Crashes in FY2016-2020

The display on the next page lists the cities with over 200 ID crashes in 2016-2020 (at least 40 per year) in order of ID crash frequency.

Huntsville, at the top of the list, is interesting in that it also has a relatively high proportion of non-ID crashes (5.58%). And while it is at the top of the list for frequency, it is slightly under-represented in ID crashes (5.49/5.58=0.983 Odds Ratio). The three largest cities that follow are shown with a green background in that their Odds Ratios are less than 0.500 (i.e., less than half) of the ID crashes that you would expect from the proportion of non-ID crashes.

Some of the highest frequency ID cities tend to be under-represented because of the large proportion of their crashes that are non-ID. The red background indicates that the cell has over twice the expected number of ID crashes, and the green indicates that they have less than half of those expected.


CARE 10.2.1.3 - [IMPACT Results - 2016-2020 Alabama Integrated Crash Data - DUI (Alcohol or Drugs) vs. Not ...
File Dashboard Filters Analysis Impact Locations Tools Window Help
2016-2020 Alabama Integrated Crash Data
DUI (Alcohol or Drugs)
Order: Subset Frequency Descending Suppress Zer Significance: Over Representation Threshold: 2.0
C002: City
Value Subset Frequency Subset Percent Other Frequency Other Percent Odds Max Gain
Huntsville 1557 5.49 41189 5.58 0.983 -27.263
Birmingham 1239 4.37 87941 11.92 0.366* -2143.497
Mobile 1049 3.70 56728 7.69 0.481* -1132.944
Montgomery 859 3.03 45049 6.11 0.496* -873.731
Rural Mobile 749 2.64 9340 1.27 2.085* 389.753
Rural Madison 715 2.52 9043 1.23 2.056* 367.177
Rural Jefferson 654 2.30 18113 2.46 0.939 -42.685
Tuscaloosa 627 2.21 24843 3.37 0.656* -328.543
Rural Cullman 565 1.99 4926 0.67 2.982* 375.530
Rural Tuscaloosa 557 1.96 8420 1.14 1.720* 233.139
Rural Baldwin 511 1.80 6478 0.88 2.051* 261.835
Decatur 409 1.44 10182 1.38 1.044 17.367
Hoover 402 1.42 14999 2.03 0.697* -174.910
Rural Limestone 397 1.40 4569 0.62 2.259* 221.261
Dothan 386 1.36 15678 2.13 0.640* -217.027
Rural Calhoun 292 1.03 4900 0.66 1.549* 103.530
Auburn 291 1.03 9088 1.23 0.832* -58.554
Phenix City 291 1.03 10097 1.37 0.749* -97.364
Rural Elmore 287 1.01 2858 0.39 2.611* 177.072
Florence 285 1.00 7092 0.96 1.045 12.219
Rural Lee 284 1.00 3890 0.53 1.898* 134.378
Rural Blount 283 1.00 2325 0.32 3.165* 193.573
Rural Marshall 281 0.99 2524 0.34 2.894* 183.919
Rural Talladega 274 0.97 4126 0.56 1.727* 115.301
Bessemer 272 0.96 8535 1.16 0.829* -56.284
Rural Walker 266 0.94 3157 0.43 2.191* 144.571
Opelika 257 0.91 9475 1.28 0.705* -107.439
Madison 244 0.86 6269 0.85 1.012 2.874
Rural St. Clair 243 0.86 3776 0.51 1.673* 97.763
Anniston 235 0.83 5844 0.79 1.045 10.221
Rural Chilton 234 0.82 2697 0.37 2.256* 130.265
Gadsden 233 0.82 8320 1.13 0.728* -87.014
Rural Montgomery 226 0.80 3904 0.53 1.505* 75.839
Rural Morgan 218 0.77 3428 0.46 1.653* 86.148
Rural Shelby 217 0.76 6832 0.93 0.826* -45.781
Rural Houston 215 0.76 2194 0.30 2.548* 130.612
Rural Escambia 206 0.73 1957 0.27 2.737* 130.727
C001: County
C002: City
C003: Year
C004: Month
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C023: E Manner of Crash
C024: School Bus Related
C025: Crash Severity
C026: Intersection Related
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C028: Mileposted Route
C029: National Highway System
C030: Functional Class
C031: Lighting Conditions
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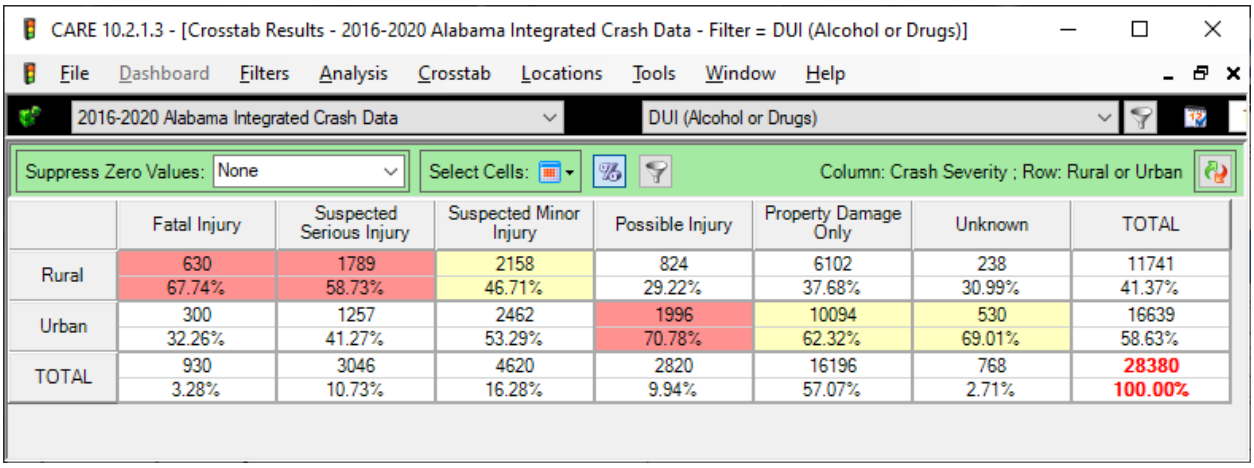
C043: Highway Patrol Posts
C044: ALEA Division
C045: ALDOT Area
C046: ALDOT Region
C047: ADECAAHSO Region
C048: RPO
C049: MPO
Sort by Sum of Max Gain

4.4 Severity of Crash by Rural-Urban

It is obvious in the above outputs that the rural areas tend to be more over-represented in ID crashes than do the urbanized areas. It is interesting to perform a cross-tabulation over the rural and urban areas to determine to what extent their crashes might be causing relatively more fatalities than would be expected from just a comparison of their crash frequencies. The following, *which is strictly for ID crashes*, gives this analysis.



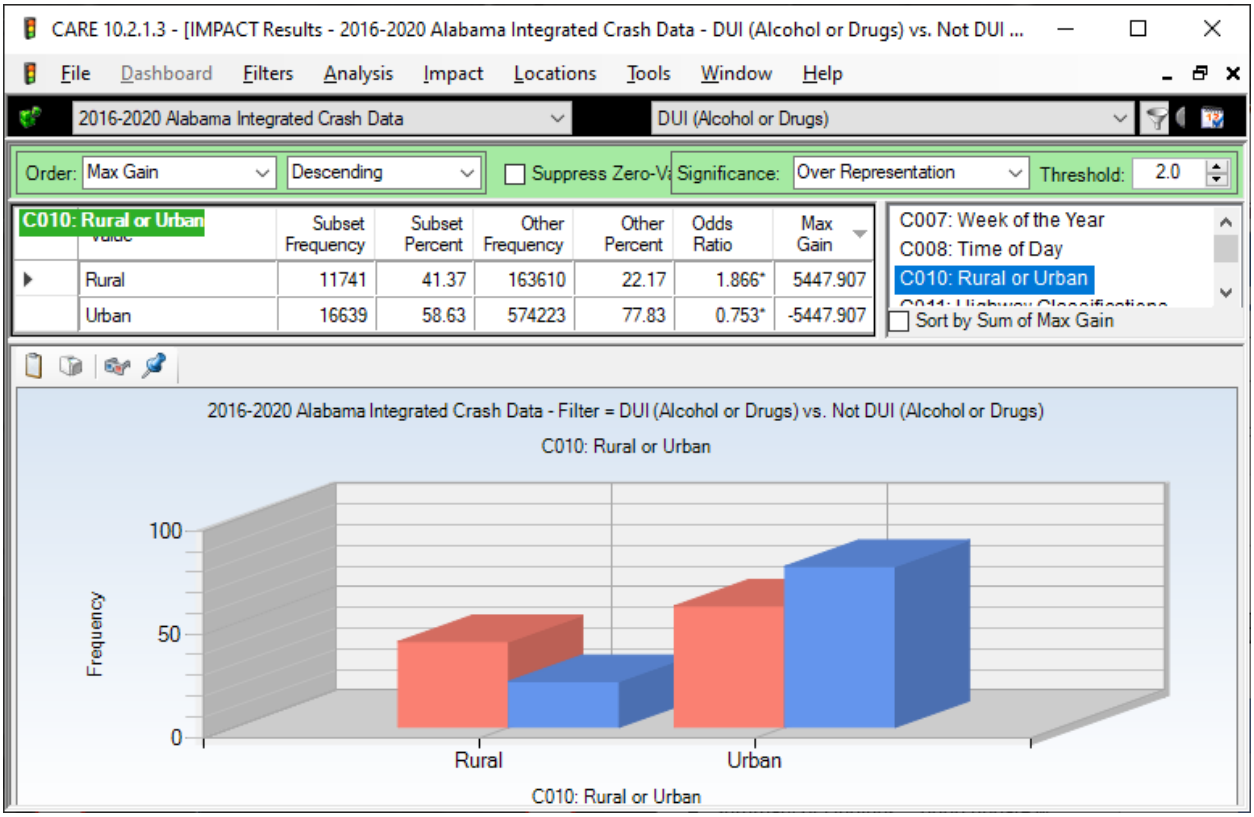
	Fatal Injury	Suspected Serious Injury	Suspected Minor Injury	Possible Injury	Property Damage Only	Unknown	TOTAL
Rural	630 67.74%	1789 58.73%	2158 46.71%	824 29.22%	6102 37.68%	238 30.99%	11741 41.37%
Urban	300 32.26%	1257 41.27%	2462 53.29%	1996 70.78%	10094 62.32%	530 69.01%	16639 58.63%
TOTAL	930 3.28%	3046 10.73%	4620 16.28%	2820 9.94%	16196 57.07%	768 2.71%	28380 100.00%

The red cells in the cross-tabulation above indicate over-representation by more than 10%. For example, while 41.37% of crashes occur in rural areas, close to 68% of the fatal crashes occur there. It is imperative to take into consideration crash severity when making geographical decisions regarding countermeasure implementation. Any of the geographic analyses shown in this report could be restricted to fatal crashes or some combination of fatal and severe injury crashes.

Clearly fatalities and the highest severity of injuries are over-represented in the rural areas, since all three of the most severe crashes are over-represented there.

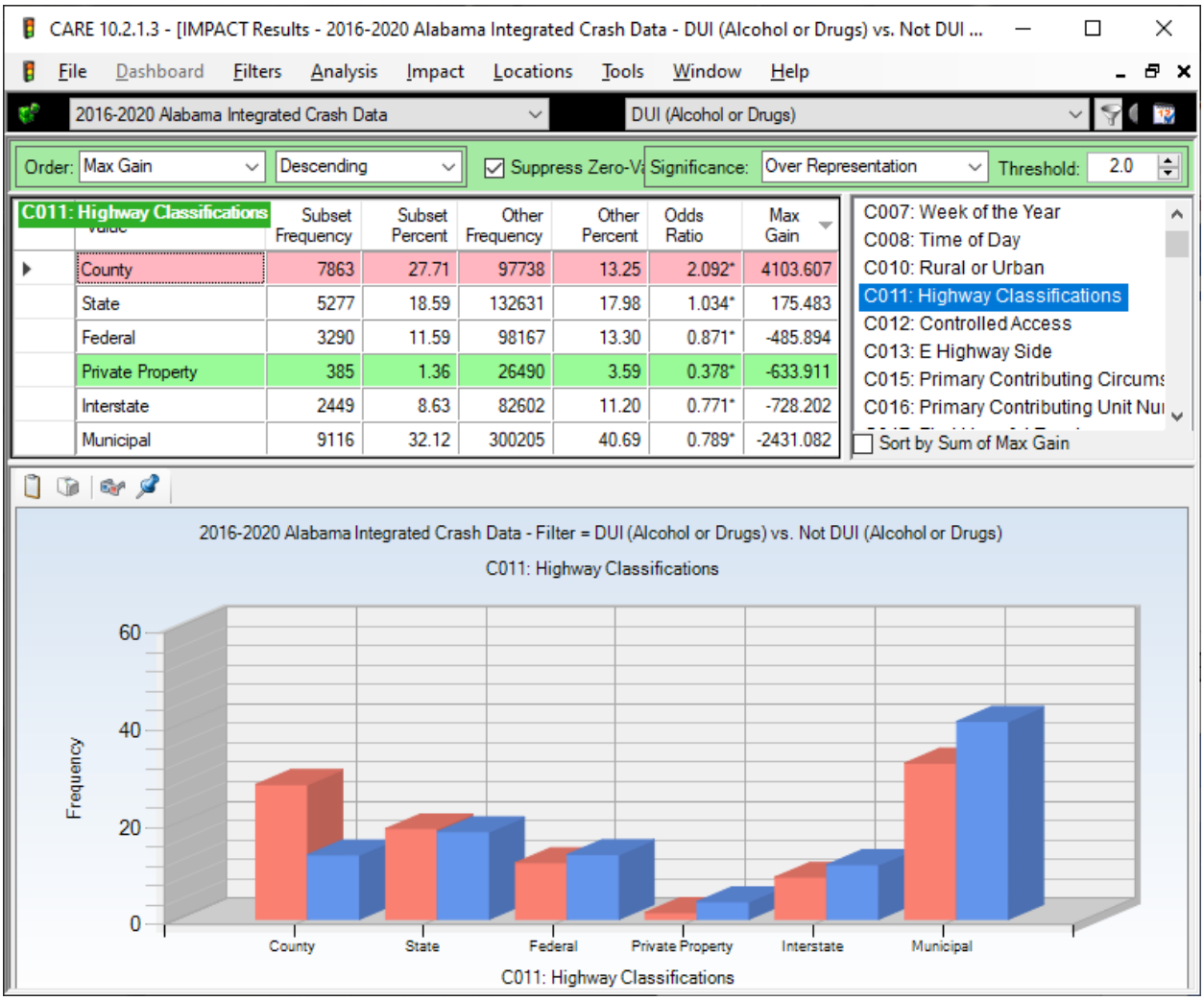
Some recent ads have stated that some large urban areas contain the ID hotspots. This is only true if looking at the total frequency of the ID crashes as the criterion and ignoring severity. It also ignores the high number of crashes in general that are expected to occur in the large population centers. Lifesaving is more important than just crash-saving.

4.5 Rural or Urban



Not only are impaired driving crashes more severe in rural areas, but the table above shows that 41.37% of the ID crashes occur in the rural areas. This is almost double what would be expected from the rural crashes in general (22.17%).

4.6 Highway Classifications



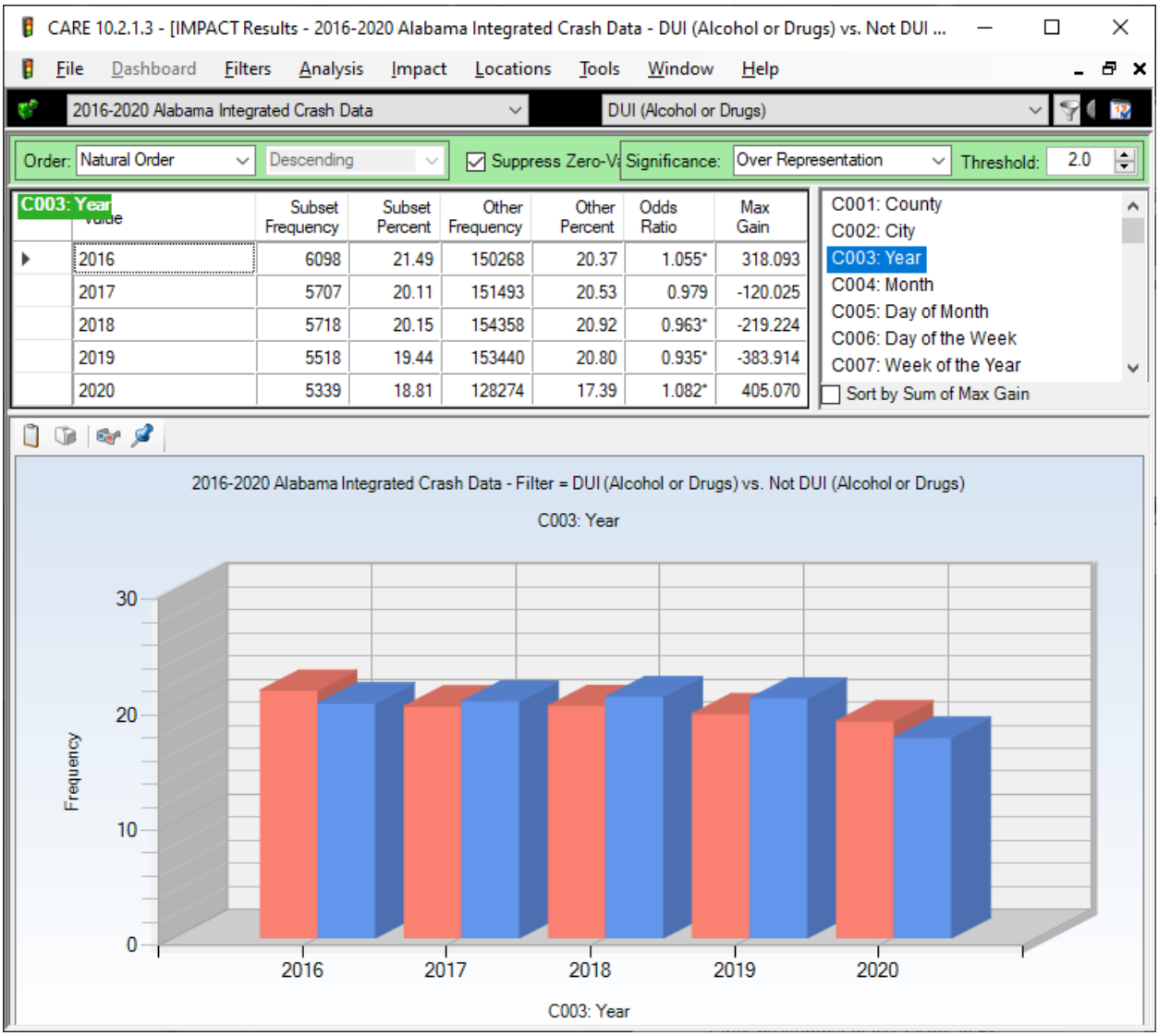
Analysis of highway classifications indicates that ID crashes had their greatest over-representation on county roads. County roads had well over twice their expected proportion of crashes, while, except for State routes, all other roadway classifications were under-represented. It is very possible that ID locals in the rural areas use the county road system to evade police. Their cunning in this regard does not seem to extend to making it home safely. It is recommended that further hotspot analysis be performed to identify the specific county roads that are most highly over-represented, and that some enforcement activities be conducted on the county roads in an attempt to move this traffic onto the safer (more forgiving) roadways. Just law enforcement presence could have a major effect here.

4.7 Locale

Reflecting the urban over-representation, open country and residential roadways show a higher level of over-representation as compared to the more urbanized roadways.

5.0 Time Factors

5.1 Year

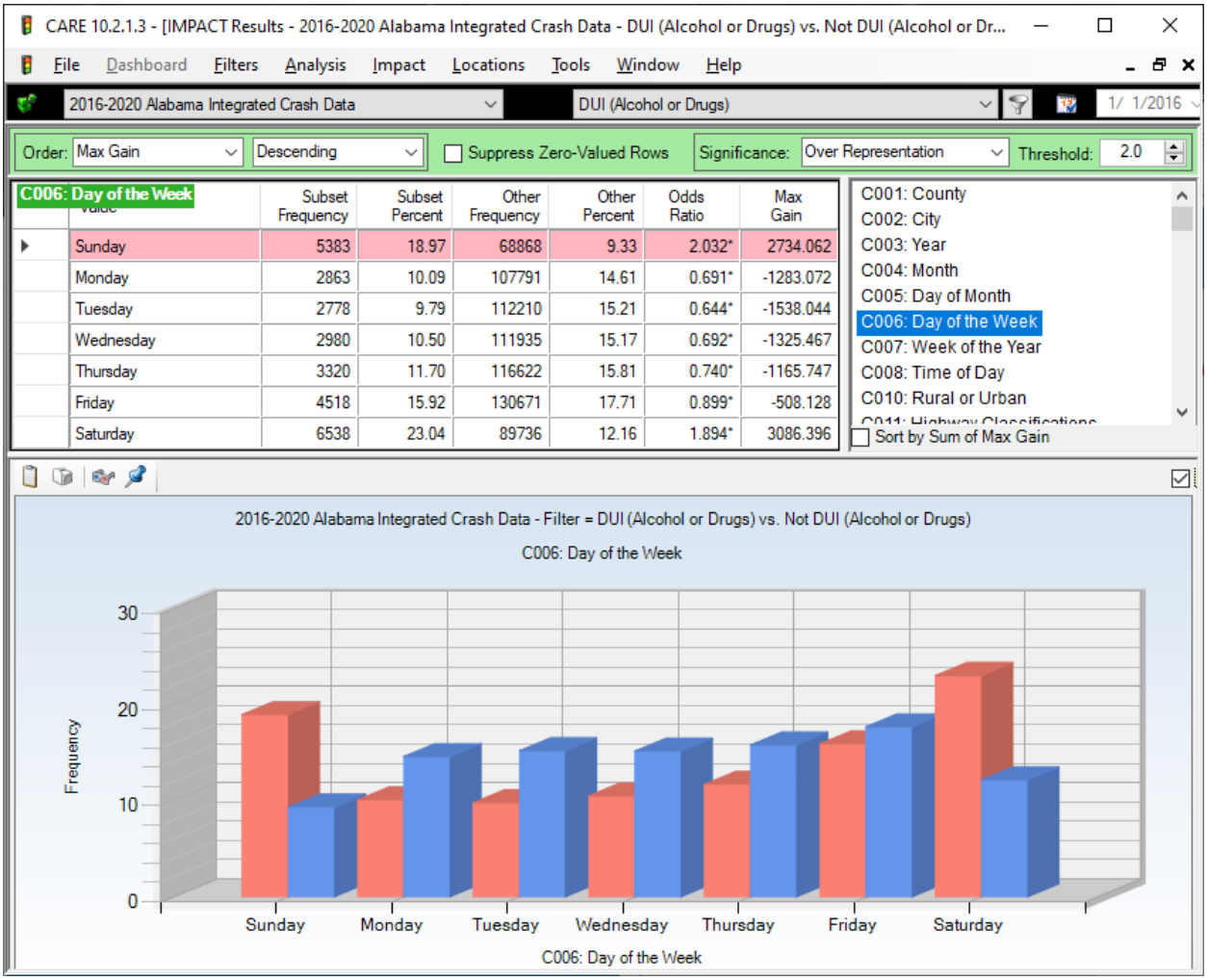


The chart above is useful for tracking the relative changes. ID crashes were significantly over-represented in CY2016, and even to a greater degree in 2020. The three years between were all under-represented in ID crashes, with 2018 and 2019 being significantly so. It is clear that there are no overall consistent trends here, and 2020 should be recognized for its irregularities due to COVID-19.

5.2 Month

Significant over-representations by month were found in March, April and July. Significant under-representations occurred in September and October. We do not see any practical applications to these differences with the possible exception of pleasant weather in the Spring months.

5.3 Day of the Week



The above is a well-established and recognized pattern for ID crashes, with their concentrations on the weekend periods.

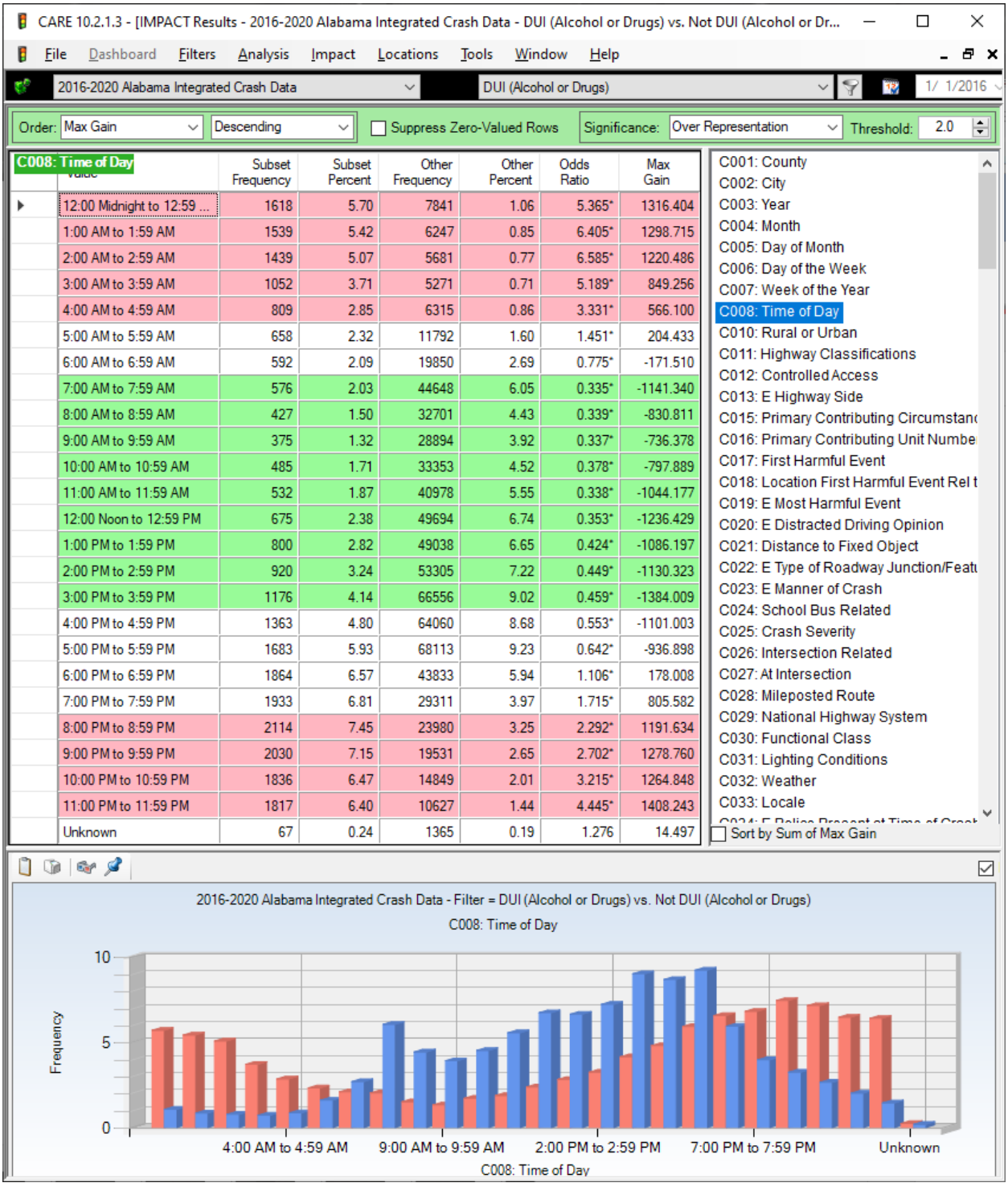
5.4 Day of the Week Discussion

The chart above shows the typical non-holiday week pattern that has been experienced for ID for decades. The days can be classified as follows:

- Weekday (Monday through Thursday) – these days are under-represented in ID crashes we would surmise due to the need for many to go to work the following day.
- Friday – the day before a weekend (or holiday) before a day off work. The Friday pattern is slightly under-represented in ID crashes, not because they do not occur more frequently than weekdays, but because non-ID crashes occur even more. Friday is both "work commuting day" and a "departure for recreation" time, causing increased traffic of combined commuters and vacationers (including short week-end vacations) that also resulting in a bad traffic mix. It may be only slightly denser than a typical rush hour, but it is not homogeneous and restricted to commuters as is the case during most weekday rush hours. No doubt much drug use and increased alcohol consumption is initiated on Friday afternoons.
- Saturday – the "Saturday" pattern is the worse for ID crashes in that it has both an early morning component (like Sunday) and a late (pre-midnight) night component (like Friday). So, it could be viewed as a combination of the typical Friday and Sunday, with one exception. It does not have the increased complexity of the Friday afternoon commuters.
- Sunday – this is the last day of a holiday sequence or as given above, the weekend. Its over-representation comes strictly from those who start on Saturday night and do not complete their use of alcohol/drugs until after midnight.

A holiday "weekend," such as Thanksgiving, can be viewed as a sequence of a Friday-, Saturdays- and Sunday-pattern sequence. The Wednesday before Thanksgiving would follow the Friday pattern assuming that most are at work that Wednesday. The Thursday, Friday and Saturday would follow the Saturday pattern, and the Sunday would follow the typical Sunday pattern. Holidays that fall mid-week could also be so mapped. This is the reason that long holiday events (i.e., several days off from work) can be much more prone to ID crashes than the normal weekend. There could be a cumulative effect that could show up at any time of the day for some problem abusers. Recently the trend on the pre-Thanksgiving week has been for the holiday to start earlier and earlier in the week, so that Wednesday itself is not one of the worse crash days of the year, as it had been a decade or more ago. This if favorable in reducing the concentration of the traffic and the resultant conflicts.

5.5 Time of Day



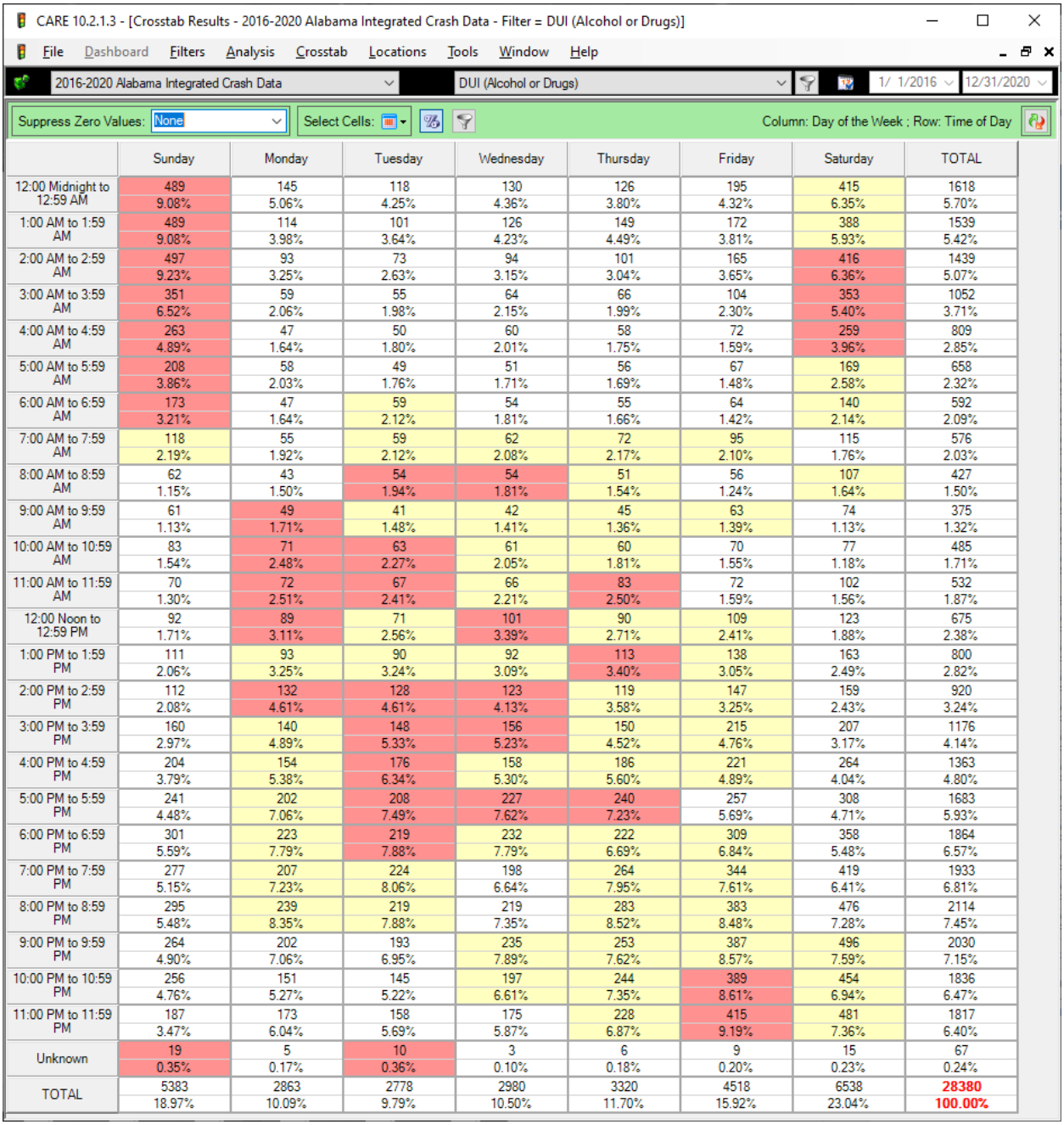
5.6 Discussion on Time of Day

It is no surprise to find ID crashes over-represented during the late night/early morning hours. The extent of these over-representations, however, is quite amazing. The blue bars above follow the typical traffic patterns of high traffic in the morning and afternoon rush hours. ID crashes are just getting started in the afternoon rush hours and they continue to grow through midnight and the early morning hours, not tapering off until about 5:00 AM. It is clear that if selective enforcement is going to have an effect on ID crashes, it would have to be conducted at the times when these crashes are most occurring. Optimal times for enforcement would start immediately following any rush hour details, and would continue through at least 3:00 AM.

The *Time of Day by Day of the Week* cross-tabulation (given in the next section) shows the optimal times for selective enforcement, with one qualifier: Saturday night (before midnight). Generally, the worst times in any day are given in red for that day. This works well for Saturday and Sunday mornings, and also for Friday night. Why does it not work for Saturday night? The answer is that Saturday morning has drained all the red into its cells, so to speak, and there is none left over for Saturday night. Note, for example, that the frequencies of crashes on Saturday exceed those on Friday for *all time slots*. However, because of the high numbers and proportions on Saturday morning, the proportions on Saturday night are lower despite the frequencies being higher. We urge users to look at both the numbers and the colors. This is also especially true when the numbers in all of the cells is relatively low. When the cell numbers get less than 20, it is best to ignore the colors and just look at the cell frequencies to get a feel for the situation.

This is an excellent example to demonstrate how the color coding of CARE cross-tabulations can be misleading in some special cases. The red background indicates that the over-representation of the cell is greater than expected. The expected proportion for all cells in a given row is given at the extreme right in the total row percentage for that row. If there were absolutely no over-representations for the columns, then all of the proportions for that column cell would be identical to the one for the total. Notice for example, the 12 midnight to 12:59 AM row has a total percentage value of 5.85%. Those that are under this value have a neutral (white) background. Those that are higher, but not more than 10% of the proportion are yellow; and those above 10% of the proportion are red.

5.7 Time of Day by Day of the Week



CARE 10.2.1.3 - [Crosstab Results - 2016-2020 Alabama Integrated Crash Data - Filter = DUI (Alcohol or Drugs)]

File Dashboard Filters Analysis Crosstab Locations Tools Window Help

2016-2020 Alabama Integrated Crash Data | DUI (Alcohol or Drugs) | 1/ 1/2016 | 12/31/2020

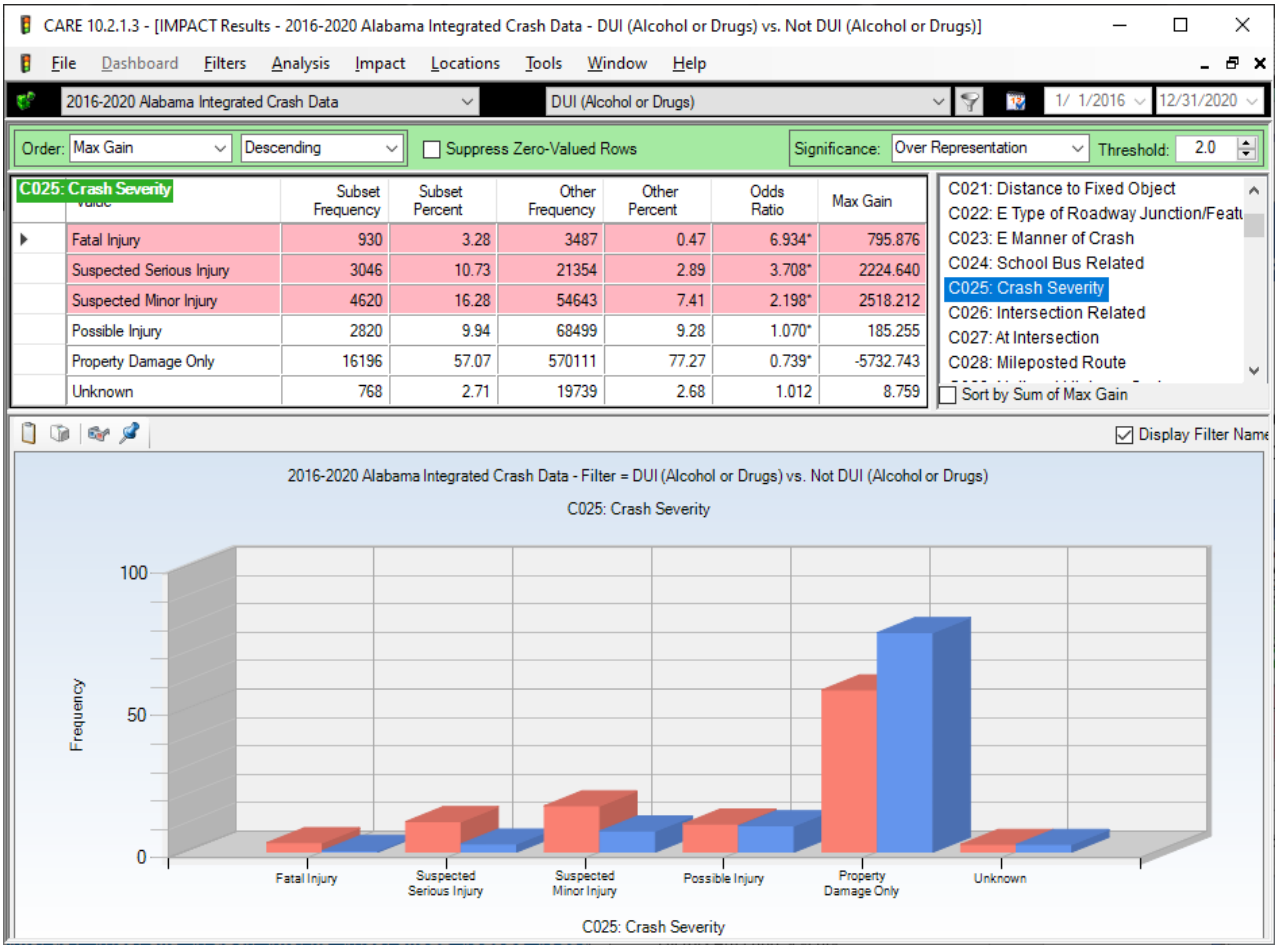
Suppress Zero Values: None | Select Cells: | Column: Day of the Week ; Row: Time of Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	TOTAL
12:00 Midnight to 12:59 AM	489 9.08%	145 5.06%	118 4.25%	130 4.36%	126 3.80%	195 4.32%	415 6.35%	1618 5.70%
1:00 AM to 1:59 AM	489 9.08%	114 3.98%	101 3.64%	126 4.23%	149 4.49%	172 3.81%	388 5.93%	1539 5.42%
2:00 AM to 2:59 AM	497 9.23%	93 3.25%	73 2.63%	94 3.15%	101 3.04%	165 3.65%	416 6.36%	1439 5.07%
3:00 AM to 3:59 AM	351 6.52%	59 2.06%	55 1.98%	64 2.15%	66 1.99%	104 2.30%	353 5.40%	1052 3.71%
4:00 AM to 4:59 AM	263 4.89%	47 1.64%	50 1.80%	60 2.01%	58 1.75%	72 1.59%	259 3.96%	809 2.85%
5:00 AM to 5:59 AM	208 3.86%	58 2.03%	49 1.76%	51 1.71%	56 1.69%	67 1.48%	169 2.58%	658 2.32%
6:00 AM to 6:59 AM	173 3.21%	47 1.64%	59 2.12%	54 1.81%	55 1.66%	64 1.42%	140 2.14%	592 2.09%
7:00 AM to 7:59 AM	118 2.19%	55 1.92%	59 2.12%	62 2.08%	72 2.17%	95 2.10%	115 1.76%	576 2.03%
8:00 AM to 8:59 AM	62 1.15%	43 1.50%	54 1.94%	54 1.81%	51 1.54%	56 1.24%	107 1.64%	427 1.50%
9:00 AM to 9:59 AM	61 1.13%	49 1.71%	41 1.48%	42 1.41%	45 1.36%	63 1.39%	74 1.13%	375 1.32%
10:00 AM to 10:59 AM	83 1.54%	71 2.48%	63 2.27%	61 2.05%	60 1.81%	70 1.55%	77 1.18%	485 1.71%
11:00 AM to 11:59 AM	70 1.30%	72 2.51%	67 2.41%	66 2.21%	83 2.50%	72 1.59%	102 1.56%	532 1.87%
12:00 Noon to 12:59 PM	92 1.71%	89 3.11%	71 2.56%	101 3.39%	90 2.71%	109 2.41%	123 1.88%	675 2.38%
1:00 PM to 1:59 PM	111 2.06%	93 3.25%	90 3.24%	92 3.09%	113 3.40%	138 3.05%	163 2.49%	800 2.82%
2:00 PM to 2:59 PM	112 2.08%	132 4.61%	128 4.61%	123 4.13%	119 3.58%	147 3.25%	159 2.43%	920 3.24%
3:00 PM to 3:59 PM	160 2.97%	140 4.89%	148 5.33%	156 5.23%	150 4.52%	215 4.76%	207 3.17%	1176 4.14%
4:00 PM to 4:59 PM	204 3.79%	154 5.38%	176 6.34%	158 5.30%	186 5.60%	221 4.89%	264 4.04%	1363 4.80%
5:00 PM to 5:59 PM	241 4.48%	202 7.06%	208 7.49%	227 7.62%	240 7.23%	257 5.69%	308 4.71%	1683 5.93%
6:00 PM to 6:59 PM	301 5.59%	223 7.79%	219 7.88%	232 7.79%	222 6.69%	309 6.84%	358 5.48%	1864 6.57%
7:00 PM to 7:59 PM	277 5.15%	207 7.23%	224 8.06%	198 6.64%	264 7.95%	344 7.61%	419 6.41%	1933 6.81%
8:00 PM to 8:59 PM	295 5.48%	239 8.35%	219 7.88%	219 7.35%	283 8.52%	383 8.48%	476 7.28%	2114 7.45%
9:00 PM to 9:59 PM	264 4.90%	202 7.06%	193 6.95%	235 7.89%	253 7.62%	387 8.57%	496 7.59%	2030 7.15%
10:00 PM to 10:59 PM	256 4.76%	151 5.27%	145 5.22%	197 6.61%	244 7.35%	389 8.61%	454 6.94%	1836 6.47%
11:00 PM to 11:59 PM	187 3.47%	173 6.04%	158 5.69%	175 5.87%	228 6.87%	415 9.19%	481 7.36%	1817 6.40%
Unknown	19 0.35%	5 0.17%	10 0.36%	3 0.10%	6 0.18%	9 0.20%	15 0.23%	67 0.24%
TOTAL	5383 18.97%	2863 10.09%	2778 9.79%	2980 10.50%	3320 11.70%	4518 15.92%	6538 23.04%	**28380** **100.00%**

6.0 Factors Affecting Severity

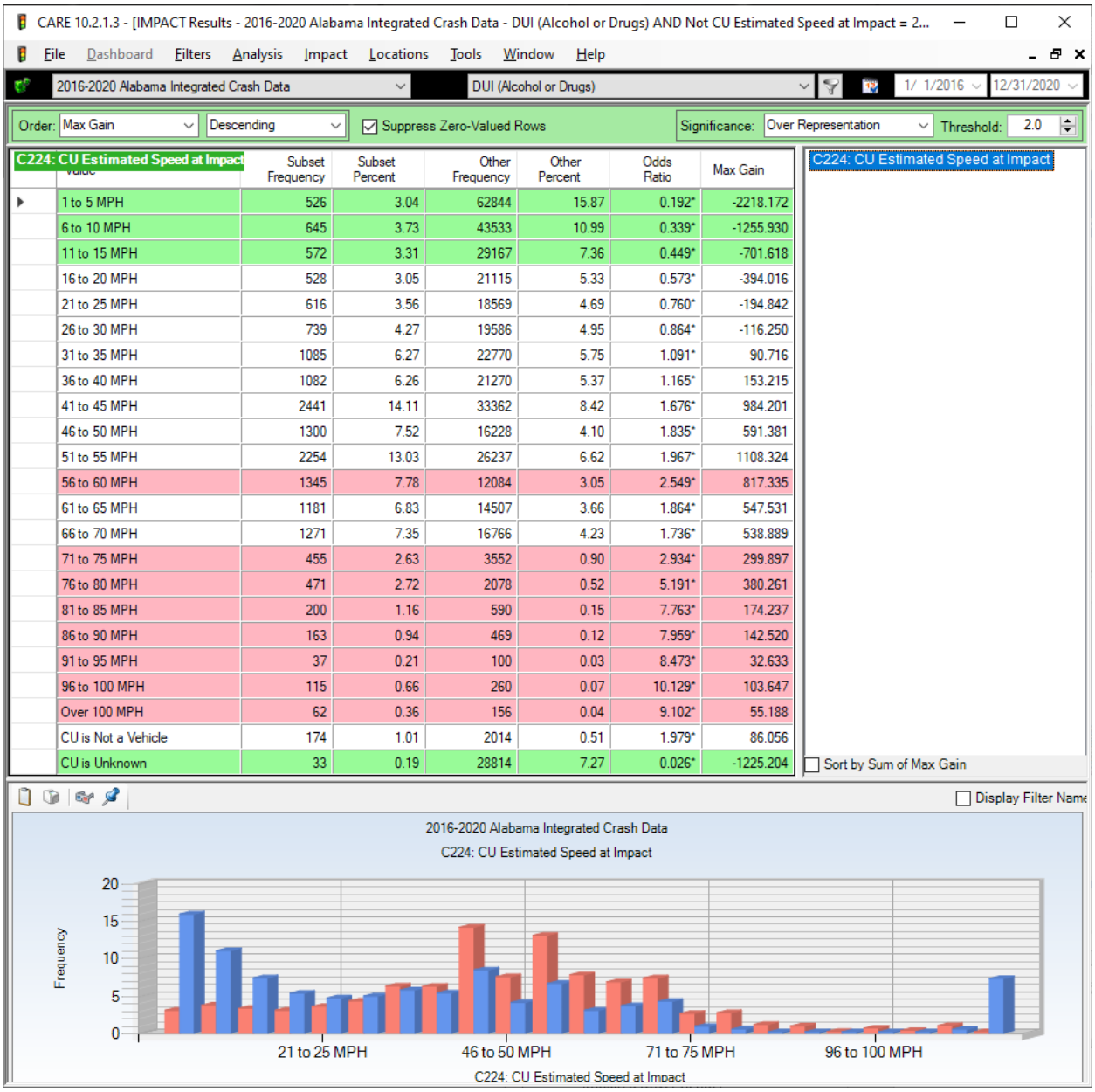
6.1 ID Crash Severity

The following compares crash severities for ID (Subset, red bars) vs. Non-ID crashes (Other, blue bars).



The rate of fatal injury crashes and the two highest injury classifications are consistently higher in ID crashes than that of non-ID crashes. Fatality crashes have close to seven times their expected proportion, while the two highest non-fatal injury classifications have over twice their expected values when compared with non-impaired driving crashes. The Speed-at-Impact variable, considered next, indicates one of the primary reasons for this. However, the greatest cause of ID increased severity is their lack of proper restraints.

6.2 Speed at Impact



It should be noted that the speed limit on county roads is generally 45 MPH. All speeds above 40 MPH are dramatically over-represented, and the over-representation increases with the increase in impact speeds: from 1.676 at 45 MPH to 10.129 at 100 MPH. Why do those who know they are not in full command of their physical capabilities insist upon speeding? It all gets back to the affinity toward risk-taking.

The next cross-tabulation quantifies how this relates to the severity of the crash for ID crashes.

6.3 Severity by Impact Speed

2016-2020 Alabama Integrated Crash Data | DUI (Alcohol or Drugs) | 1/ 1/2016

Suppress Zero Values: None | Select Cells: | Column: Crash Severity ; Row: CU Estimated Speed at Impact

	Fatal Injury	Suspected Serious Injury	Suspected Minor Injury	Possible Injury	Property Damage Only	Unknown	TOTAL
0 MPH	1 0.11%	0 0.00%	0 0.00%	0 0.00%	1 0.01%	0 0.00%	2 0.01%
1 to 5 MPH	4 0.43%	23 0.76%	37 0.80%	40 1.42%	413 2.55%	9 1.17%	526 1.85%
6 to 10 MPH	8 0.86%	40 1.31%	50 1.08%	58 2.06%	476 2.94%	13 1.69%	645 2.27%
11 to 15 MPH	6 0.65%	31 1.02%	55 1.19%	58 2.06%	416 2.57%	6 0.78%	572 2.02%
16 to 20 MPH	3 0.32%	33 1.08%	60 1.30%	53 1.88%	371 2.29%	8 1.04%	528 1.86%
21 to 25 MPH	2 0.22%	28 0.92%	71 1.54%	50 1.77%	453 2.80%	12 1.56%	616 2.17%
26 to 30 MPH	7 0.75%	42 1.38%	107 2.32%	60 2.13%	508 3.14%	15 1.95%	739 2.60%
31 to 35 MPH	11 1.18%	67 2.20%	134 2.90%	134 4.75%	725 4.48%	14 1.82%	1085 3.82%
36 to 40 MPH	11 1.18%	112 3.68%	175 3.79%	111 3.94%	649 4.01%	24 3.13%	1082 3.81%
41 to 45 MPH	40 4.30%	293 9.62%	454 9.83%	236 8.37%	1386 8.56%	32 4.17%	2441 8.60%
46 to 50 MPH	28 3.01%	180 5.91%	277 6.00%	117 4.15%	679 4.19%	19 2.47%	1300 4.58%
51 to 55 MPH	93 10.00%	374 12.28%	488 10.56%	159 5.64%	1112 6.87%	28 3.65%	2254 7.94%
56 to 60 MPH	71 7.63%	263 8.63%	286 6.19%	98 3.48%	599 3.70%	28 3.65%	1345 4.74%
61 to 65 MPH	78 8.39%	229 7.52%	218 4.72%	94 3.33%	550 3.40%	12 1.56%	1181 4.16%
66 to 70 MPH	89 9.57%	244 8.01%	250 5.41%	91 3.23%	576 3.56%	21 2.73%	1271 4.48%
71 to 75 MPH	49 5.27%	92 3.02%	91 1.97%	35 1.24%	184 1.14%	4 0.52%	455 1.60%
76 to 80 MPH	55 5.91%	94 3.09%	93 2.01%	38 1.35%	186 1.15%	5 0.65%	471 1.66%
81 to 85 MPH	20 2.15%	44 1.44%	44 0.95%	14 0.50%	76 0.47%	2 0.26%	200 0.70%
86 to 90 MPH	15 1.61%	44 1.44%	39 0.84%	13 0.46%	49 0.30%	3 0.39%	163 0.57%
91 to 95 MPH	11 1.18%	9 0.30%	6 0.13%	0 0.00%	10 0.06%	1 0.13%	37 0.13%
96 to 100 MPH	25 2.69%	34 1.12%	17 0.37%	9 0.32%	29 0.18%	1 0.13%	115 0.41%
Over 100 MPH	19 2.04%	13 0.43%	7 0.15%	4 0.14%	18 0.11%	1 0.13%	62 0.22%
E Stationary	3 0.32%	12 0.39%	30 0.65%	13 0.46%	80 0.49%	4 0.52%	142 0.50%
Unknown	233 25.05%	665 21.83%	1492 32.29%	1252 44.40%	6273 38.74%	454 59.11%	10369 36.54%
Not Applicable	3 0.32%	29 0.95%	79 1.71%	65 2.30%	349 2.16%	45 5.86%	570 2.01%
CU is Not a Vehicle	42 4.52%	50 1.64%	53 1.15%	14 0.50%	10 0.06%	5 0.65%	174 0.61%
CU is Unknown	3 0.32%	1 0.03%	7 0.15%	4 0.14%	16 0.10%	2 0.26%	33 0.12%
TOTAL	930 3.28%	3046 10.73%	4620 16.28%	2820 9.94%	16194 57.07%	768 2.71%	28378 100.00%

6.4 Discussion of Severity vs Speed Cross-Tabulation

The display above presents information on the effect of increased impact speed on the severity of the crash. Notice the red in the fatality and severe injury cells as speeds increase. What is more enlightening is the probability that the crash results in a fatality as a function of impact speed.

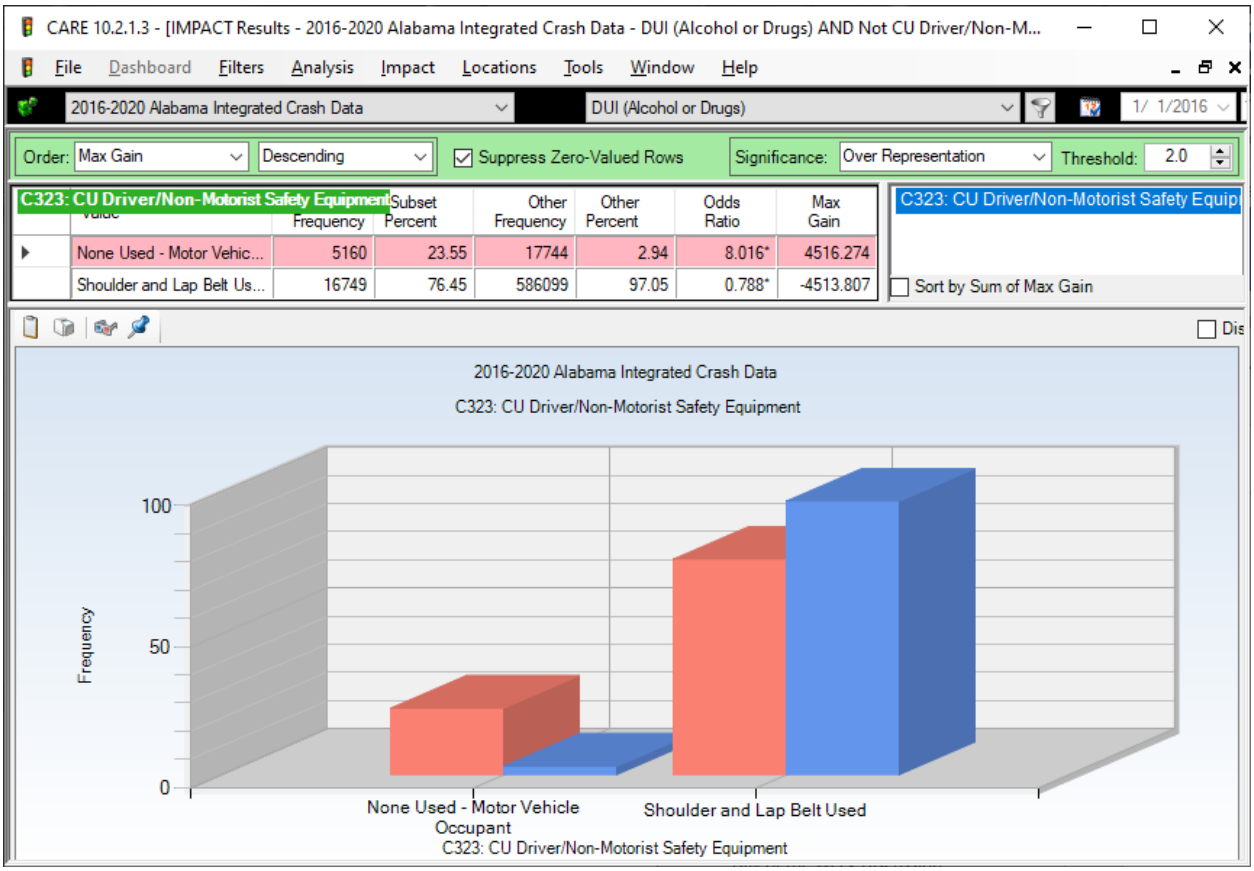
In the 41-45 MPH impact speed the probability is only a little over one in every 61 crashes. As impact speeds climb to the 51-55 MPH, this probability more than doubles to one in about 24 crashes. At 61-65 MPH it increases again (exponentially) to one in about every 15 crashes, and at 71-75 it is about one in nine, which is about double again. For above 90 MPH it is about one in 4 crashes.

The rule of thumb is that for every 10 MPH increase in speeds, the averaged probability that the given crash will be fatal doubles. Conversely, a reduction in impact speeds by 10 MPH would cut the number of fatal crashes in half. Even a 5 MPH reduction in speed of impact could result in significant fatality reduction. This is the reason that selective enforcement is effective.

However, there is another major factor in effect here as well – the failure of ID drivers to be properly restrained, which will be covered in a separate attribute below (Restraint Use by Impaired Drivers).

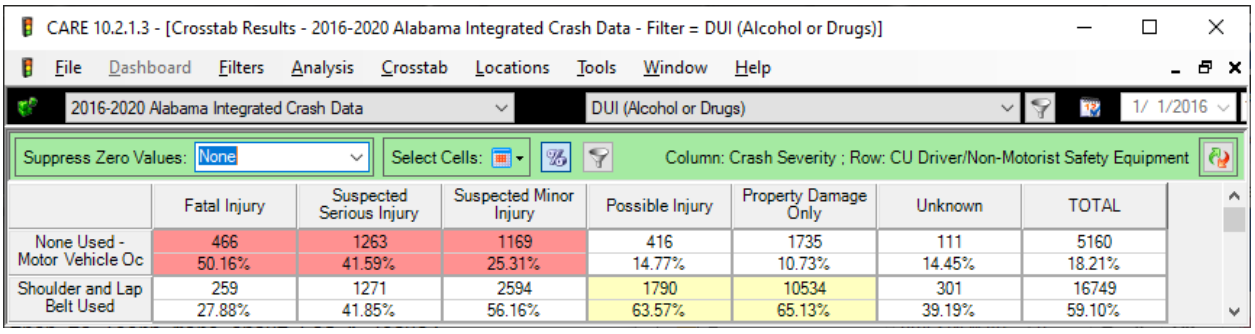
6.5 Restraint Use by Impaired Drivers

The following display presents a comparison of ID driver safety belt use against those who were not ID in the same five-year time period.



Risk-taking involved in ID does not stop with excess speed; it extends to not being properly restrained. The above analysis demonstrates that the impaired driver is over eight (8.016) times more likely to be unrestrained as in the non-ID crash. The next analysis demonstrates how this contributes to fatality crashes.

6.6 Fatality Crashes by Restraint Use for Impaired Drivers

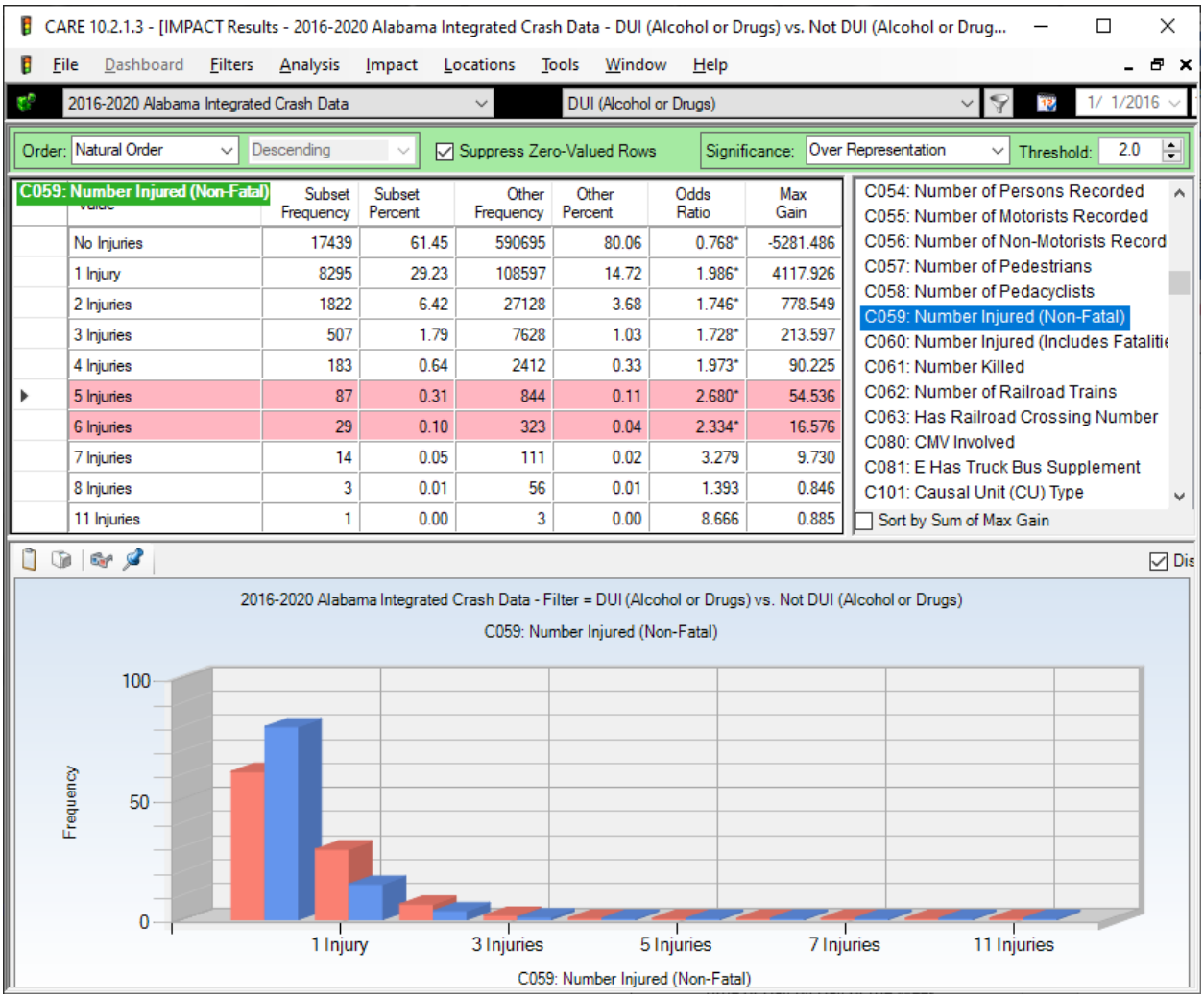


	Fatal Injury	Suspected Serious Injury	Suspected Minor Injury	Possible Injury	Property Damage Only	Unknown	TOTAL
None Used - Motor Vehicle Oc	466 50.16%	1263 41.59%	1169 25.31%	416 14.77%	1735 10.73%	111 14.45%	5160 18.21%
Shoulder and Lap Belt Used	259 27.88%	1271 41.85%	2594 56.16%	1790 63.57%	10534 65.13%	301 39.19%	16749 59.10%

A comparison of the probability of a fatal crash indicates that a fatality is almost six (5.84) times more likely if the impaired driver is not using proper restraints. The probability is estimated by 466 fatality crashes out of 5,160 when restraints were not used (1 in 11.1), as opposed to only 259 fatal crashes out of 16,749 crashes when restraints were used (1 in 64.7). So the combined effect of lower restraint use and higher speed is a devastating combination that accounts for the high lethality of ID crashes. But that is not all; see the following three items for additional related information.

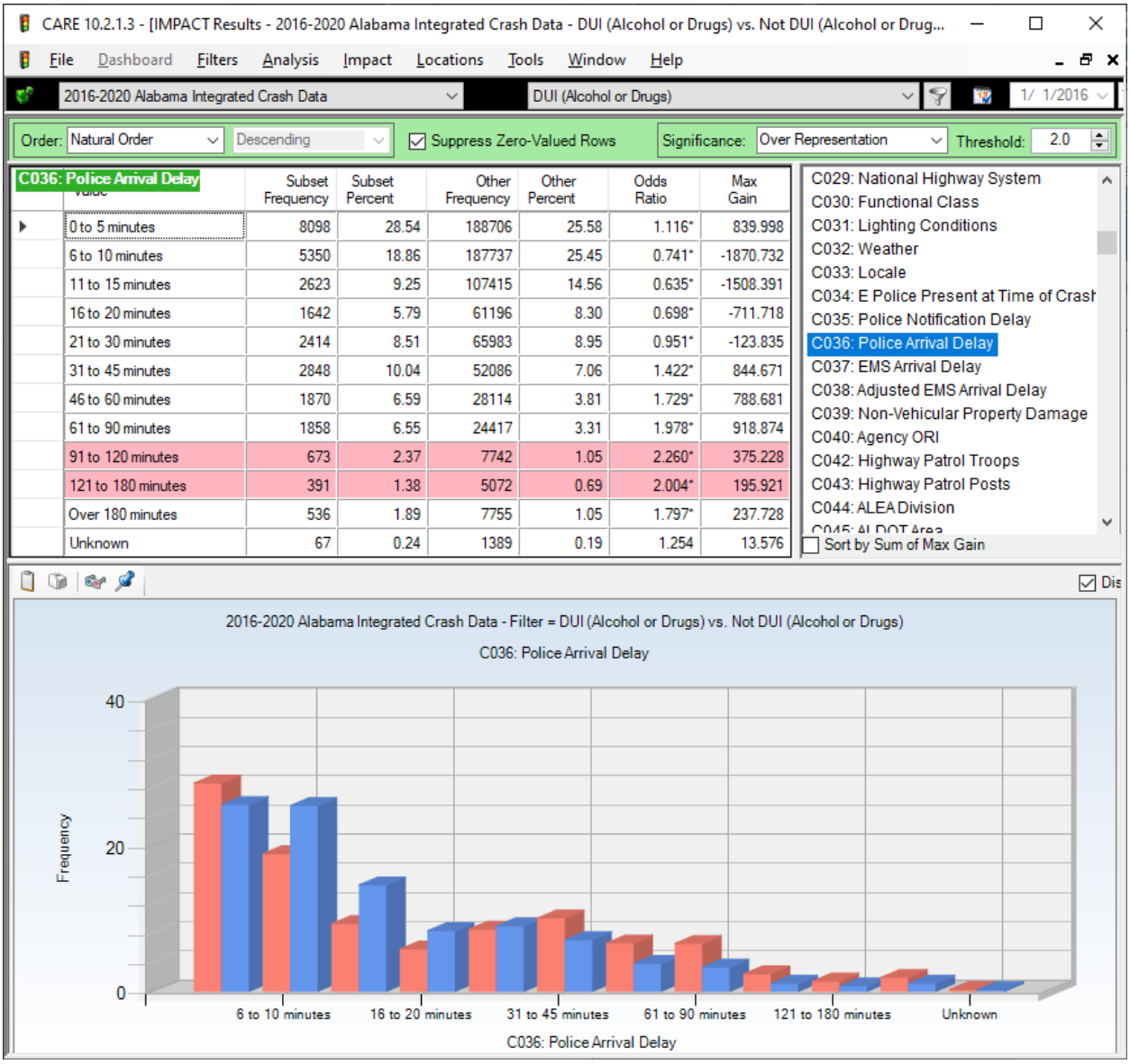
6.7 Number Injured (Including Fatalities)

The following display presents a comparison of ID crash number of injuries against number of injuries in crashes that were not ID in the same time period.



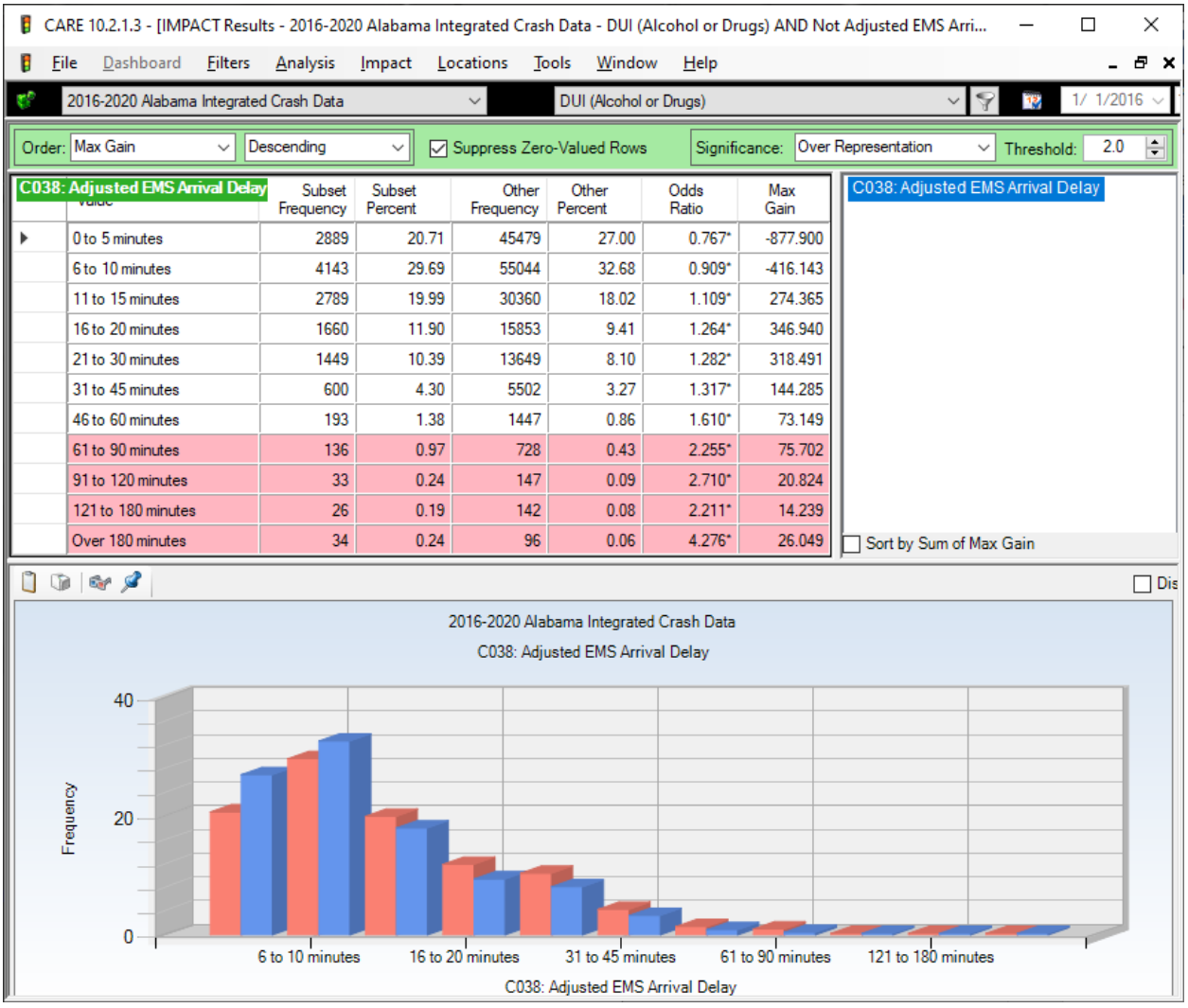
The above shows that not only are ID crashes more severe to those injured, but also the number of multiple injuries in these ID crashes is over-represented as well. Some might suspect that an ID crash might involve just a driver returning home from a night of indulgence. However, rarely is the impaired driver alone, and, of course, if another vehicle is involved, then that would also generally increase the number of injuries. It is interesting that all of the multiple-injury categories are significantly over-represented (not computed for less than 20 occurrences).

6.8 Police Arrival Delay



ID crashes generally had longer police arrival delays; in this case all arrival delays over 30 minutes were over-represented. There can be little doubt that this has to do with the rural nature of these crashes and the potential that at night they might not be discovered for some time. The analysis below shows how this impacts EMS arrival time, which is a comparison of crashes that include injuries, and thus would generally call for an EMS response.

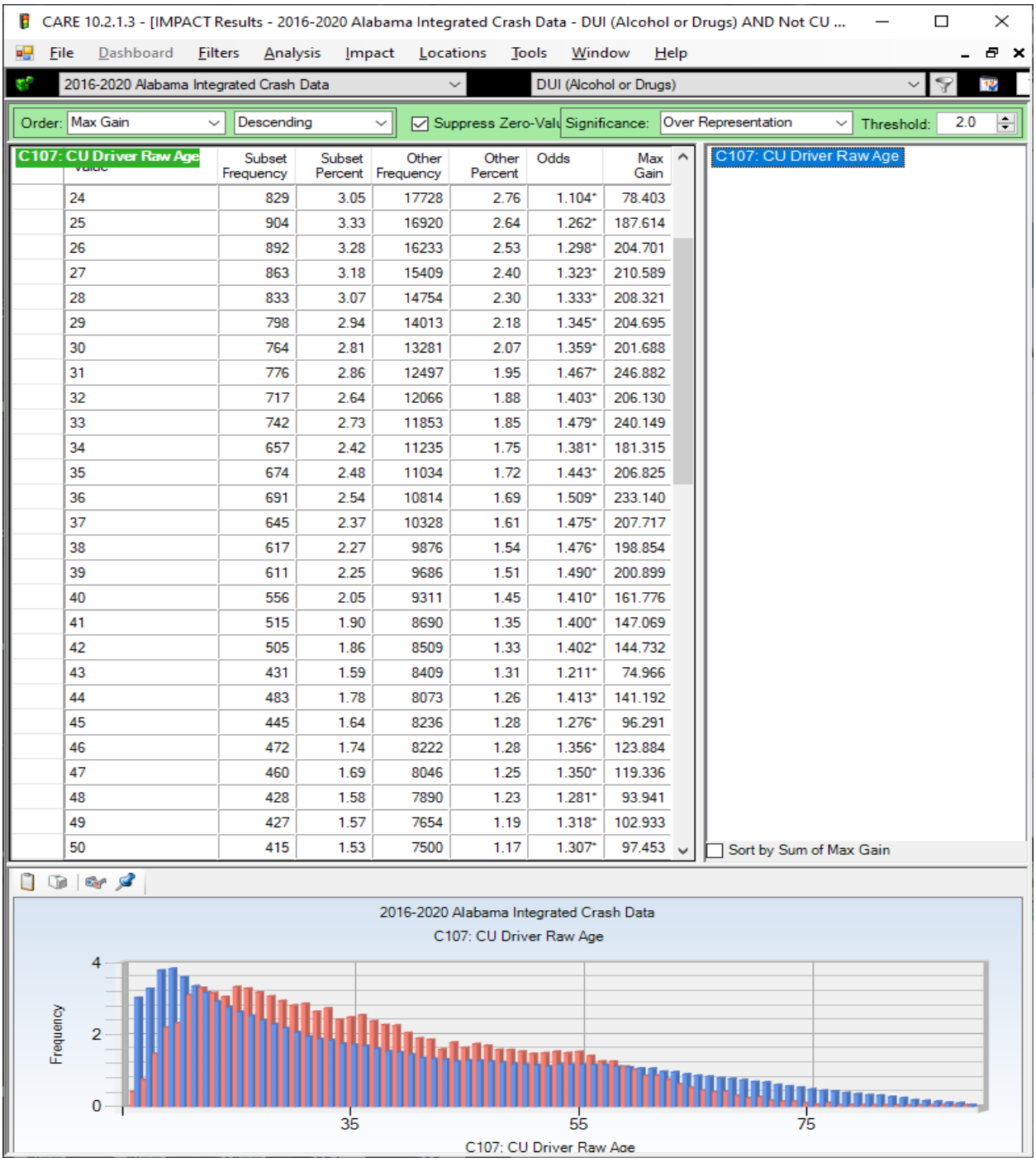
6.9 EMS Arrival Delay



For much the same reasons as the longer police arrival delays, EMS delays were over-represented for impaired driving crashes in all categories above ten minutes, and dramatically for the very longer times of 61 minutes and above (indicated by the red background in the table). This obviously contributes to the severity of crashes and the chances that the crash results in one or more fatalities. As for the very long times, these might be due to the delay in discovering the crash since they generally over-represented late night in rural locations.

7.0 Driver and Vehicle Demographics

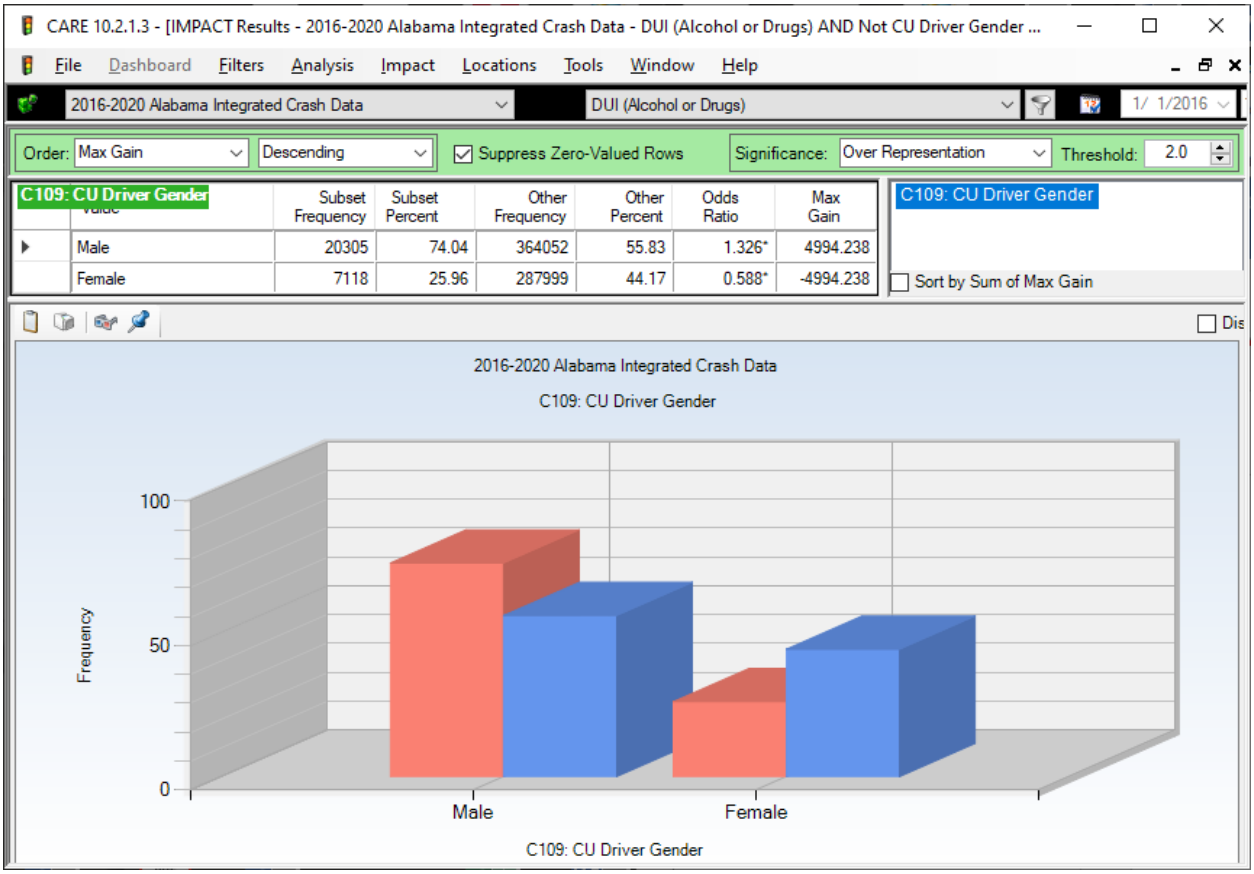
7.1 Driver Age



The display above presents a comparison of ID crash causal driver age against the same for crashes that were not ID for Odds Ratios of 1.300 and higher. The blue (non-ID) bars illustrate the problems that 16-20-year-old drivers have in general, but they are under-represented in ID crashes. ID over-representation does not appear until age 24 and it continues on to age 56.

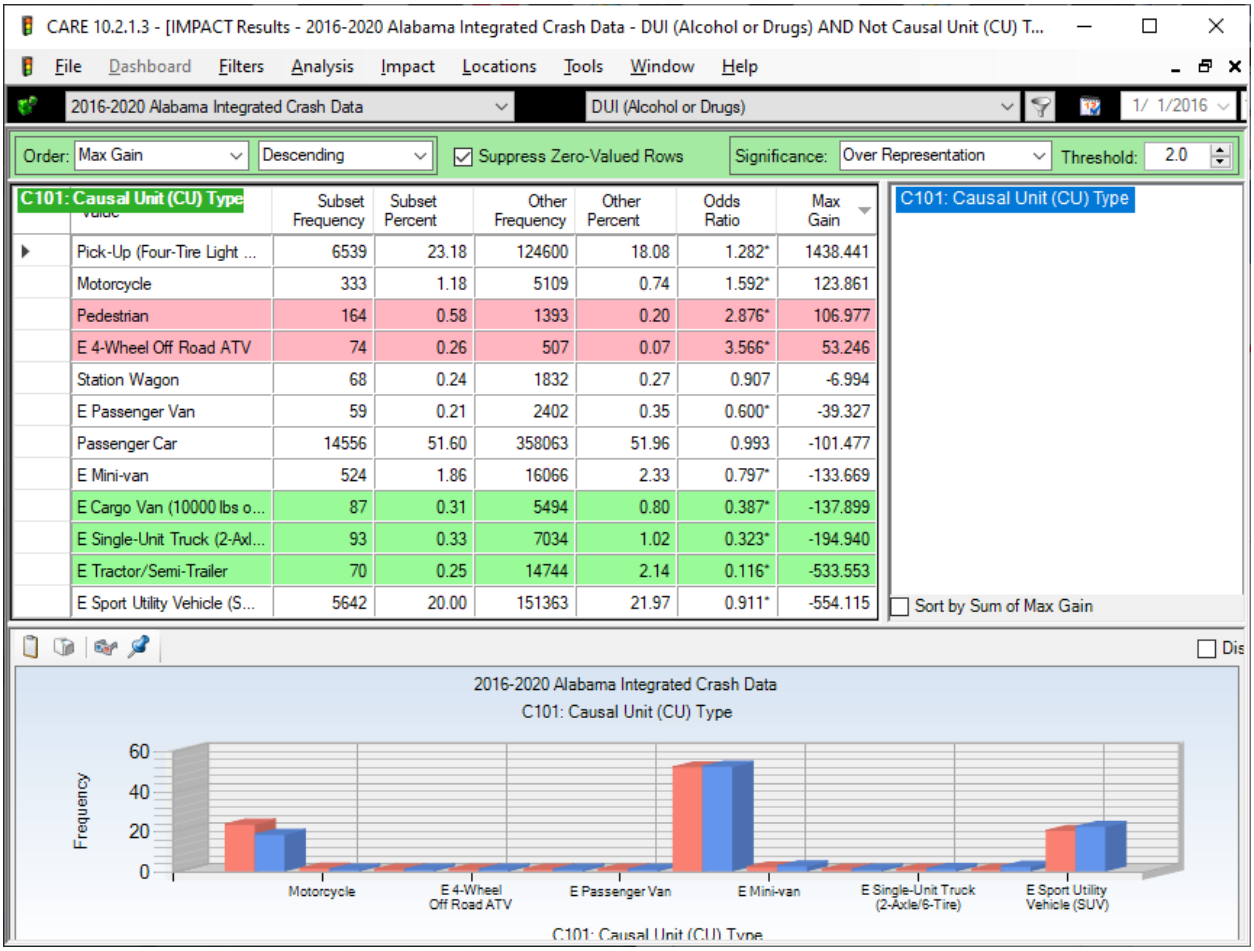
There is a bi-modal distribution in the 24-56 year olds; 21 through about 35, and a second group from 36 to 56. Generally, the first of these are classified as social drinkers. However, it is hard to escape the fact that those who are in their late 30s up through their middle ages would not be close to becoming problem drinkers, if not already. Countermeasures for these two groups will typically be quite different.

7.2 Impaired Driver Gender



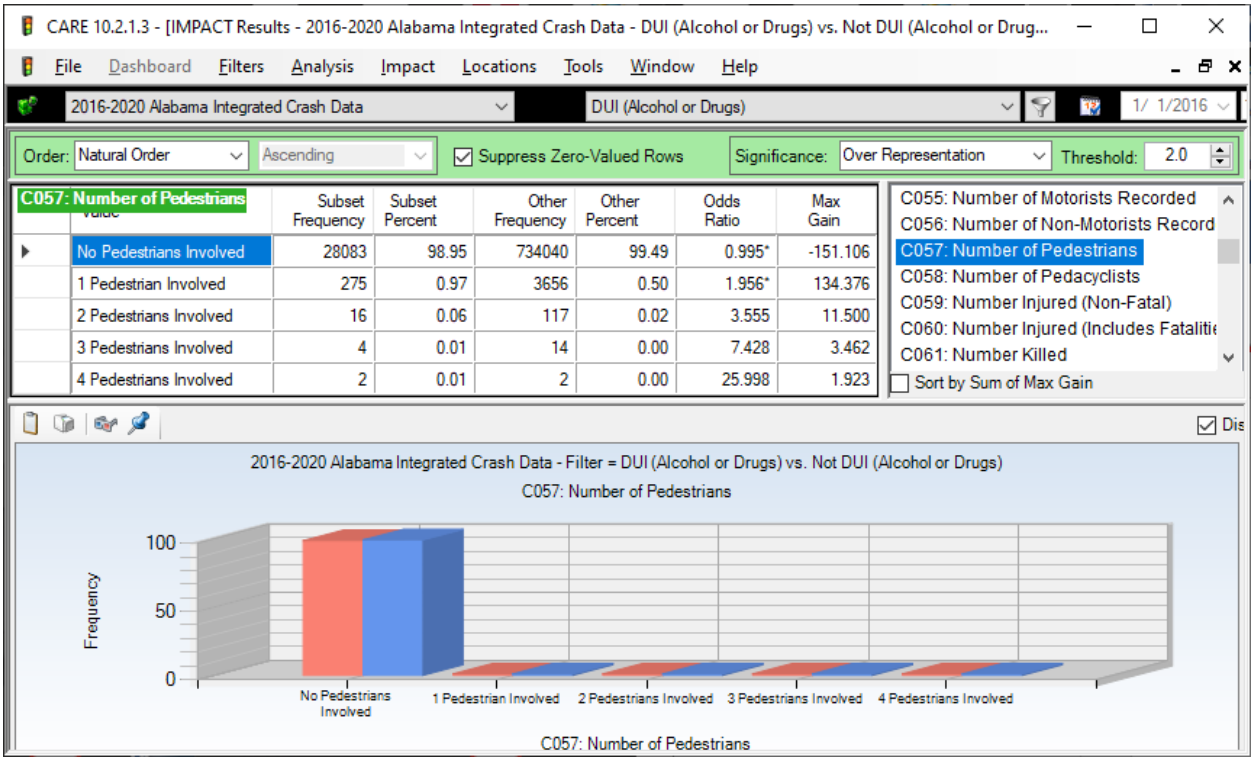
The red bars and the blue bars each sum to 100%. So the breakdown in male ID causal drivers is 74.04% male and 25.96% female. For non-ID, the percentage is 55.83 male and 44.17 female. These differences certainly indicate that males are a far greater cause of the ID problems, and if there are countermeasures that can be directed toward them, doing so would be much more cost-effective, all other things being equal.

7.3 Causal Vehicle Types with 30 or more Crashes



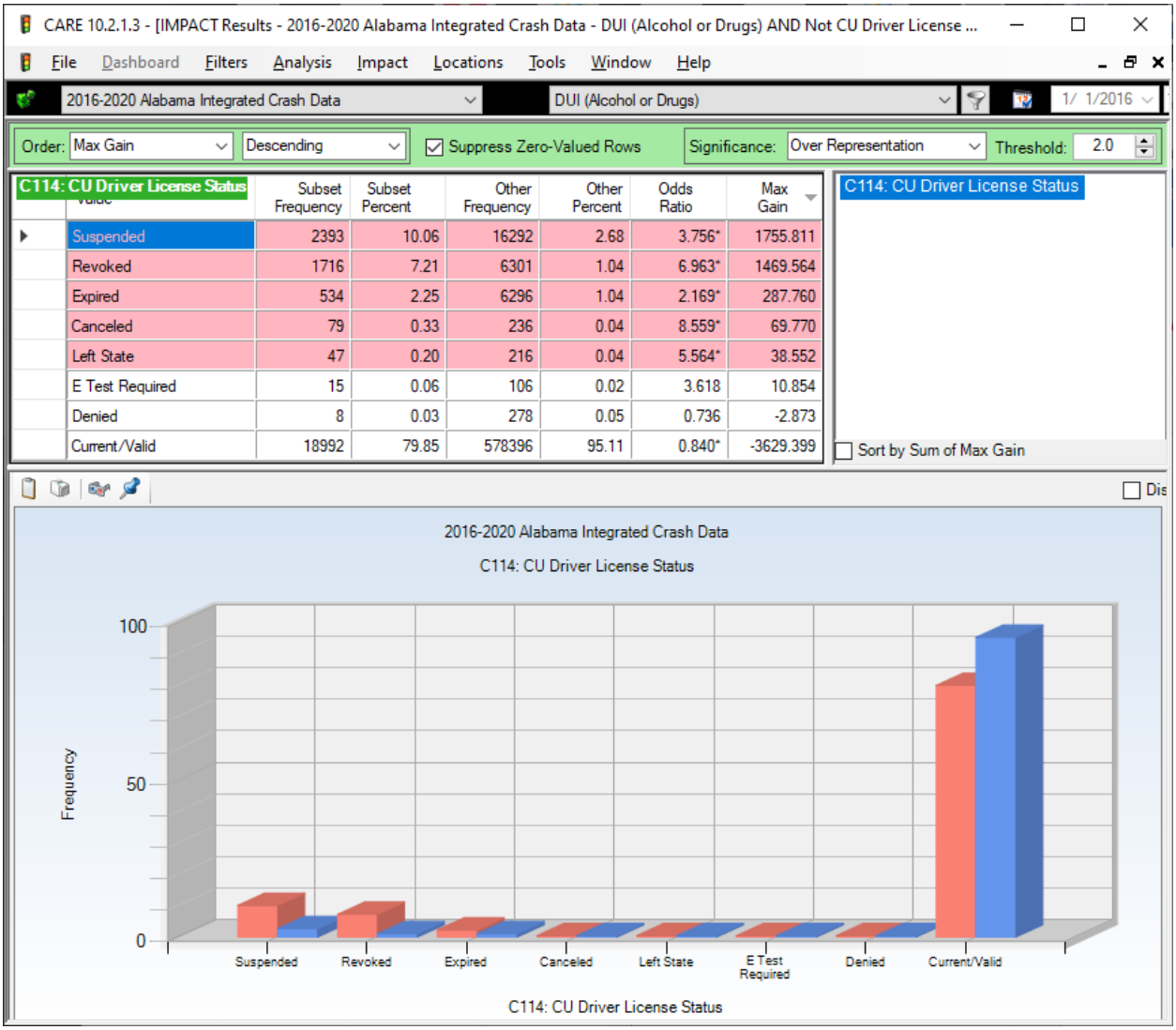
The display above presents a comparison of ID crash causal unit type against the same for crashes that were not ID. Vehicles types with less than 30 crashes in the ID dataset were removed for the above display, and pedestrians were considered a unit type. While pickups have the highest Max Gain indicting the greatest potential for reduction, Motorcycles, Pedestrian and ATVs all have higher over-representations (by Odds Ratio), but their Max Gains are lower because of their lower frequencies. Of interest is the proportion of pedestrians and off road 4-wheelers that involve ID, both of which are over two times their expected proportion. So the major finding of this analysis is that motorcycle, pedestrian and 4-wheeler crashes have far more than their share of ID causation. Pedestrians will be given additional consideration in the next attribute considered.

7.4 Number of Pedestrians



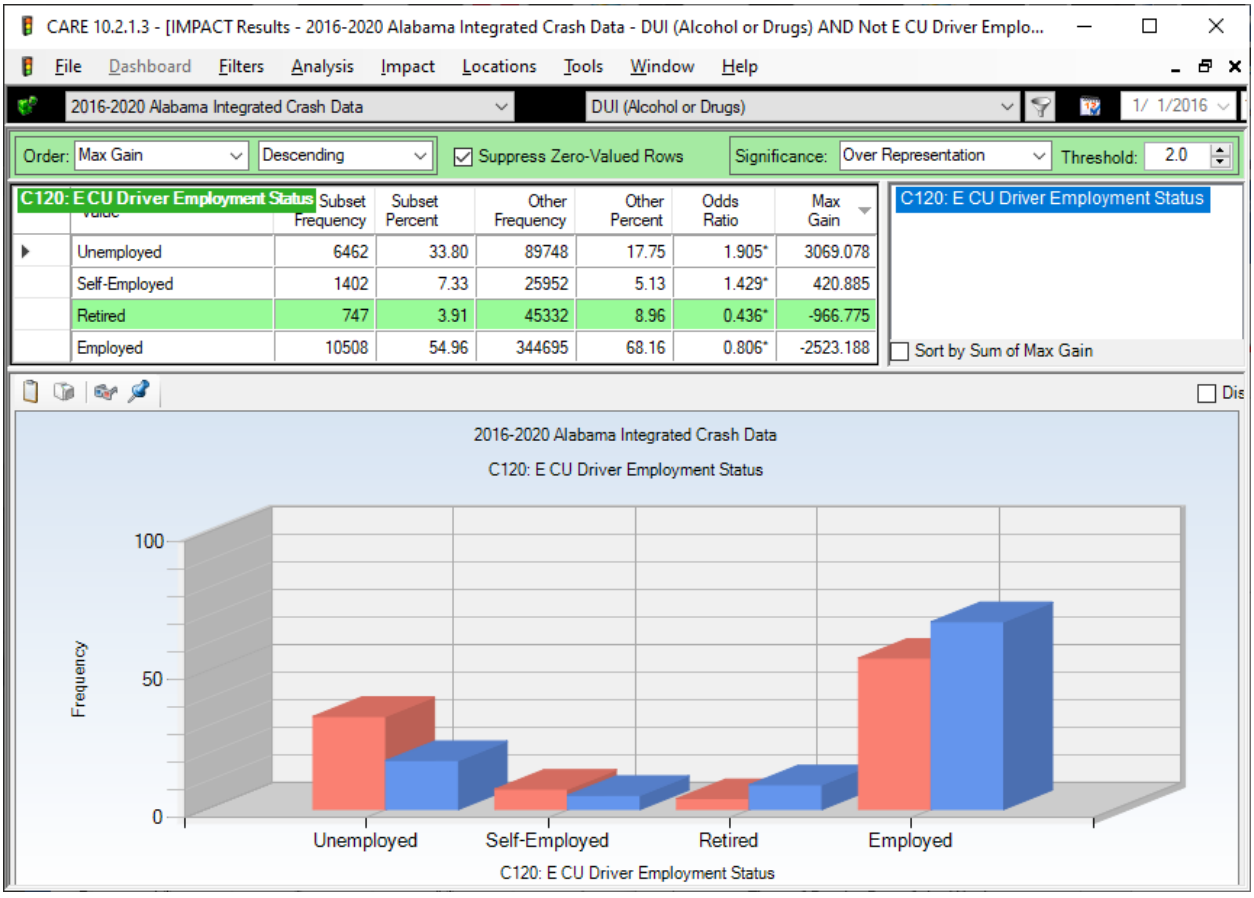
Pedestrians are definitely an issue in ID crashes. There were 327 pedestrians involved in ID crashes and 3,849 that were non-ID, or a total of 4,176, of which 327/4176 = 7.8% of the pedestrian crashes were ID. These resulted in 74 fatalities. Primary Contributing Circumstance shows 162 pedestrians were under the influence at the time of the crash. There would be some overlap of these with the total 327 pedestrians involved.

7.5 Driver License Status



Clearly ID crashes are extremely over-represented in ID causal drivers without legitimate licenses, so that the question might be asked: Does suspending or revoking their licenses even make a difference? Making it a mandatory arrest if a driver is found to not have a current license might be considered. The results of this analysis need to be given serious consideration by those determining the direction of the legislative process regarding ID. It seems clear that the suspension/revocation of licenses is not bringing about the desired effect, although it cannot be concluded that it is having no effect.

7.6 Driver Employment Status



In our current era when the economy is playing such a big role in traffic safety, the quantification and tracking of the employment proportion of drivers involved in ID crashes will be important. This indicates that their unemployment rate is about 90.5% higher than expected. This is probably not surprising, and the correlation between not having a job and being involved in an ID crash should be watched carefully going forward in that it could affect the type and location for countermeasures.

8.0 Driver Behavior

8.1 Primary Contributing Circumstances (ID & Items < 100 Crashes Removed)

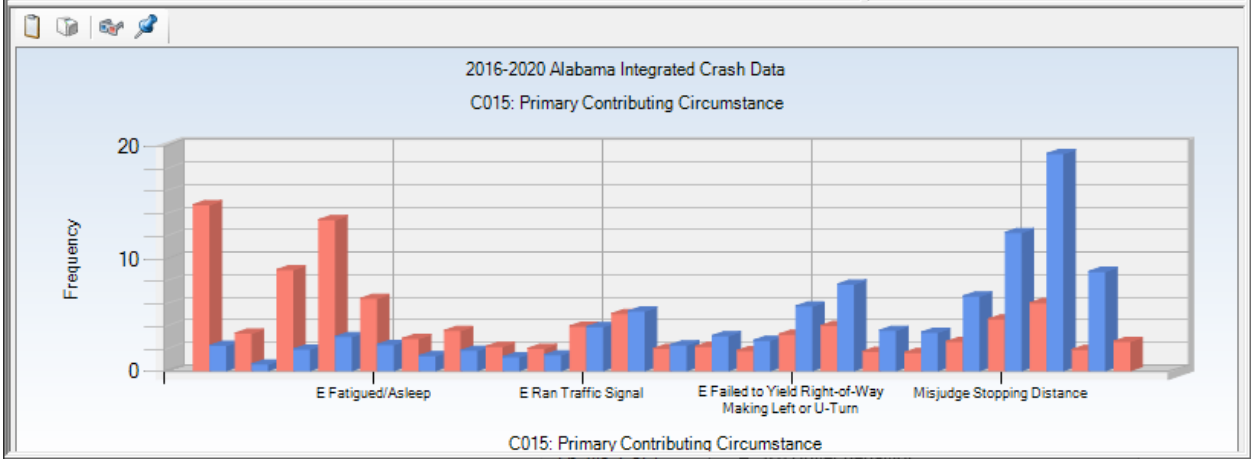
2016-2020 Alabama Integrated Crash Data | DUI (Alcohol or Drugs) | 1/ 1/2

Order: Odds Ratio | Descending | Suppress Zero-Valued Ro | Significance: Over Representation | Threshold: 2.0

C015: Primary Contributing Circumstance	Subset	Subset	Other quency	Other Percent	Odds Ratio	Max Gain
E Aggressive Operation	923	14.70	12110	2.21	6.643*	784.0...
Traveling Wrong Way/Wrong Side	207	3.30	3090	0.56	5.839*	171.5...
Over Speed Limit	561	8.94	10378	1.90	4.712*	441.9...
E Ran off Road	839	13.37	16443	3.01	4.447*	650.3...
E Fatigued/Asleep	401	6.39	12609	2.30	2.772*	256.3...
E Ran Stop Sign	178	2.84	7120	1.30	2.179*	96.314
E Crossed Centerline	222	3.54	9732	1.78	1.988*	110.3...
E Distracted by Use of Electronic Communicati...	134	2.13	6578	1.20	1.776*	58.532
E Over Correcting/Over Steering	123	1.96	7619	1.39	1.407*	35.589
E Ran Traffic Signal	247	3.94	21222	3.88	1.014	3.525
Driving too Fast for Conditions	316	5.03	28824	5.27	0.956	-14.691
E Other Improper Action	122	1.94	12423	2.27	0.856	-20.526
E Other Distraction Inside the Vehicle	133	2.12	16868	3.08	0.687*	-60.523
Made Improper Turn	111	1.77	14676	2.68	0.659*	-57.374
E Failed to Yield Right-of-Way Making Left or U...	202	3.22	31224	5.71	0.564*	-156....
Improper Lane Change/Use	250	3.98	41920	7.66	0.520*	-230....
Improper Backing	106	1.69	19435	3.55	0.475*	-116....
E Swerved to Avoid Vehicle	100	1.59	18528	3.39	0.470*	-112....
E Failed to Yield Right-of-Way from Stop Sign	161	2.56	36099	6.60	0.389*	-253....
Misjudge Stopping Distance	286	4.56	66938	12.23	0.372*	-481....
Followed too Close	377	6.01	105222	19.23	0.312*	-830....
Unseen Object/Person/Vehicle	116	1.85	48064	8.78	0.210*	-435....
Pedestrian Under the Influence	162	2.58	0	0.00	0.000	162.0...

C015: Primary Contributing Circumstance

Sort by Sum of Max Gain



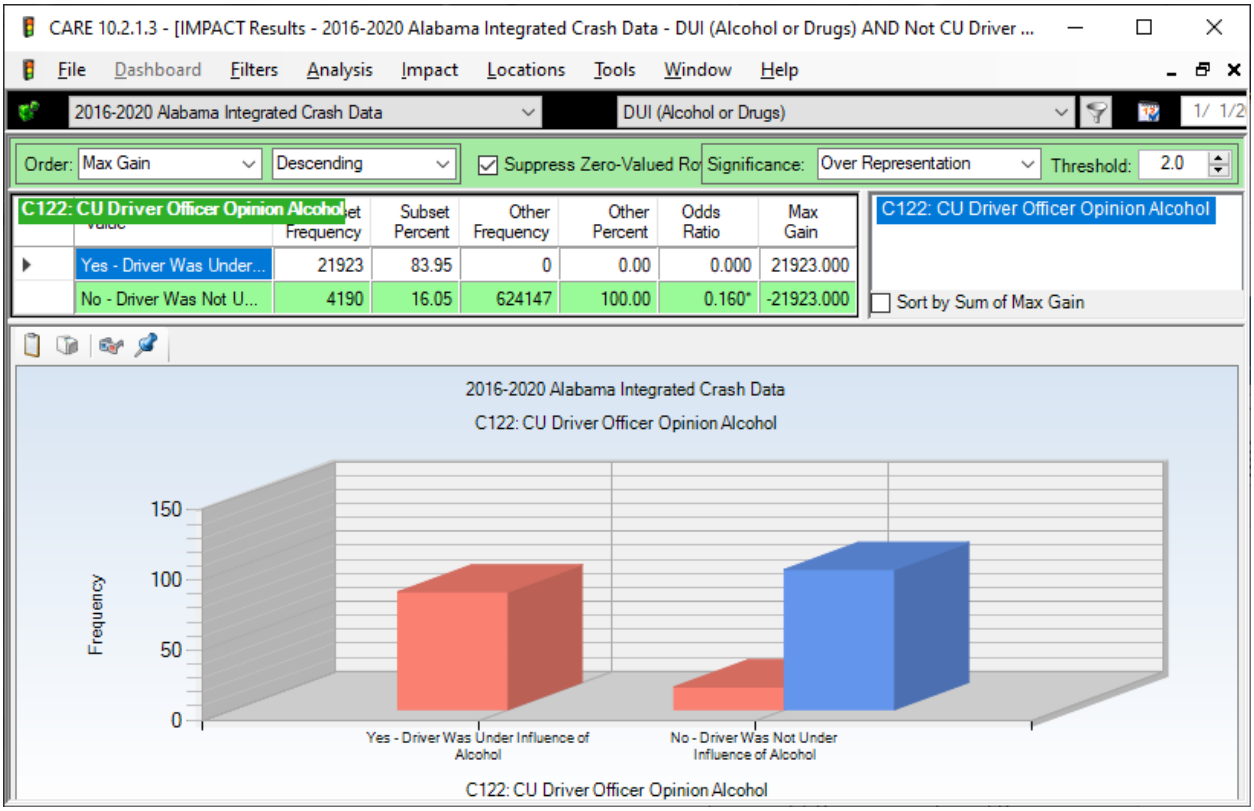
8.2 Discussion of Primary Contributing Circumstances (PCC) Result Above

ID (Frequency:20,577 ; Proportion: 72.51%) was removed from the comparisons for this analysis because it prevented the other items from being apparent. It was forced to be this high by the filter (see 3.1). Items listed were reported along with the other non-PCC items. So, in essence, these results demonstrate the driver behaviors that accompanied the ID as it was defined by other attributes in the filter. The display above is for all crash PCCs that had 100 or more occurrences. Unlike most other IMPACT displays that are sorted by Max Gain, this one is sorted by highest Odds Ratio first.

Items over-represented by over twice their expected results (when compared to non-ID crashes) are ordered by Odds Ratio as follows:

- Aggressive Operation,
- Traveling Wrong Way/Wrong Side,
- Over Speed Limit,
- Ran off Road,
- Fatigued/Asleep,
- Ran Stop Sign and
- Crossed Centerline.

8.3 Officer's Opinion Alcohol



The main reason for producing this IMPACT is to enable a comparison with the next one. This shows the proportion of cases caused by alcohol (according to the crash reports) compared to the proportion caused by drugs other than alcohol.

The total of these two is 21,923 (alcohol) + 7,699 (other drugs) = 29,622

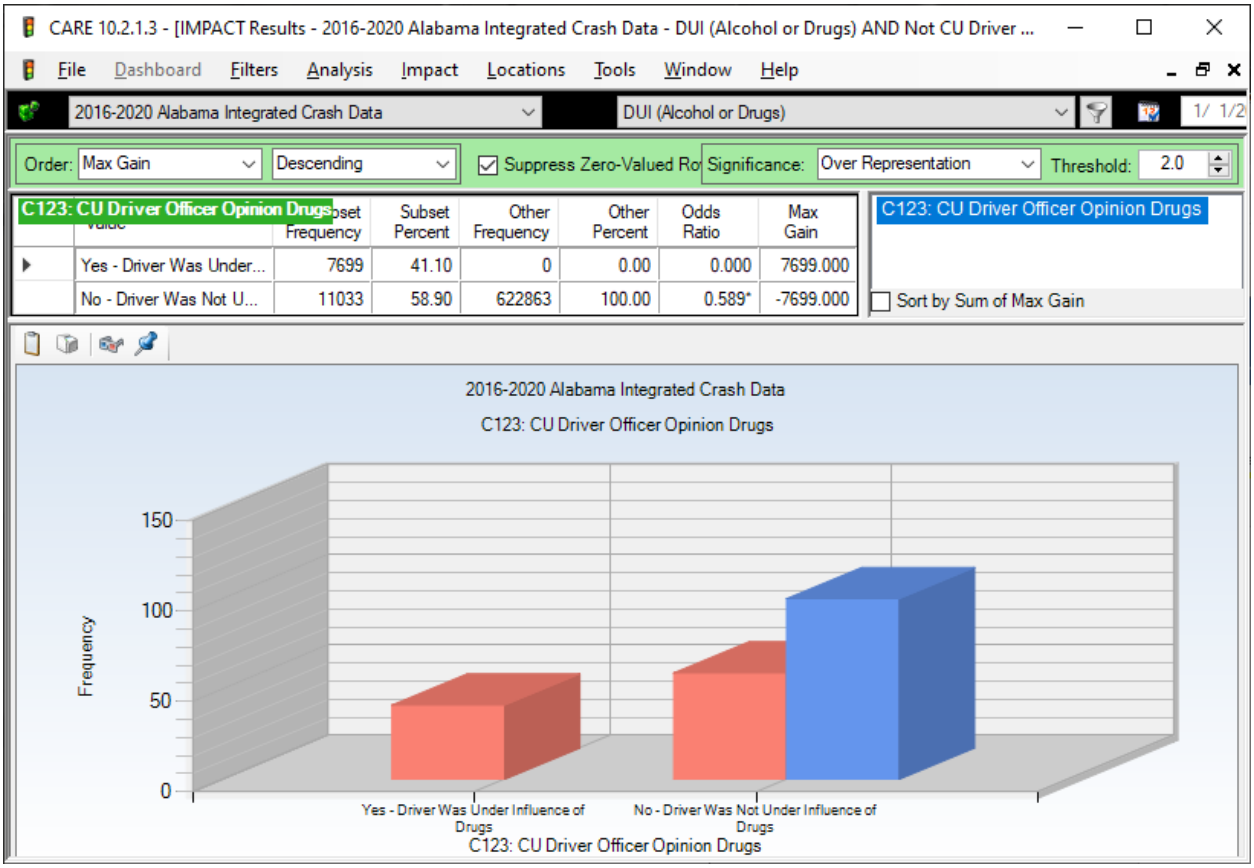
So 74.01 of the cases involved alcohol,

and 25.99 of the cases involved non-alcohol drugs.

About 3 to 1 alcohol involved.

Very few reported both alcohol and drugs.

8.4 CU Driver Officer's Opinion Drugs



For general information on Impaired Driving from NHTSA and other sources, please see:
http://www.safehomealabama.gov/tag/impaired-driving/