

# **CARE IMPACT Study of Senior Driver Caused Traffic Crashes 2013-2017 Data**

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For more information on senior drivers, please see:  
<http://www.safehomealabama.gov/tag/senior-drivers/>

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## Recommendations

The recommendations that will be given here relate primarily to those of the research findings. For general recommendations on senior drivers that have been made to the traffic safety community by NHTSA and others, please see the information on the senior driver page:

<http://www.safehomealabama.gov/tag/senior-drivers/>

Recommendations will be ordered according to the Executive Summary given in the next section and no priority should be implied from this ordering.

- **Crash Characteristics**

- Perception improvement countermeasures should be developed to address the major problem that senior drivers have with a failure to yield the right of way. The risk avoidance aspects of senior drivers lead us to the conclusion that the over-representation of this primary contributing circumstance is caused by some physical perception issues as opposed to carelessness or ignorance on their parts. Merely making older drivers aware of this as a problem could go a long way to solving it. That is, they should be trained on where to expect the need to yield. C409 showed that for intersections, the problems were at Stop Signs (67.2% more than expected) and Traffic Signals (6% more than expected).
- In addition to information on failure to yield, advice should be given to senior drivers to make a conscious effort to put distance between themselves and other vehicles. Vehicles cannot crash if they are not close to each other, and this can be controlled to some extent by drivers, although it is recognized that situations exist where this is not possible.

- **Time Characteristics**

- Overall crashes by age should be monitored closely for purposes of countermeasure allocation. An optimal balance should be maintained between the two problem subsets: the youngest and the oldest. This should be checked by ongoing annual comparisons of these two subsets.
- Senior drivers need to be trained to avoid all nighttime driving to the extent possible. Their over-representation at these times is caused by their reduced vision capabilities at these times. Since older drivers tend to be responsive to information, some PI&E efforts might be made to discourage any unnecessary driving, or perhaps allowing a younger person to drive. Months of the year when daylight savings time is no longer in effect are of particular concern. The data show that many senior drivers recognize these limitations and make accommodations for them, providing more confidence in the value of educational programs.

- **Driver Characteristics**
  - Additional information should be conveyed to senior drivers on the problems of driving under the influence of their prescription drugs and in situations where they are ill.
  - Additional training would be beneficial for senior drivers operating (1) School Buses; (2) Mobile Home/Recreational Vehicles; and (3) Agricultural vehicles.
- **Severity Characteristics**
  - No new recommendations. There is little that can be done to increase older age survivability of crashes. The usual seatbelt promotions have been effective and older causal drivers are dramatically under-represented in being unrestrained (42.2% less than what is expected compared to the younger drivers).
- **Geographical Characteristics**
  - Issues of failure to yield the right of way should concentrate on where most of the driving is being done (and crashes incurred) by older drivers. This includes the following (1) urban areas, (2) shopping or business areas and (3) federal, state and municipal roadways.
- **Vehicle Characteristics**
  - Training should recognize that older drivers are not necessarily avoiding larger vehicles as indicated by the following over-represented five-year frequencies: Pickups (2653), Mini-vans (1337), Motor Homes – RVs (153), Other Bus (124), Passenger Vans (73.2) and Station Wagon (54).
  - Perception problems do not disappear at railroad crossings. Since the proportion of RR train involved crashes was about 59% greater than the younger drivers, this would be a good target population group for those implementing RR counter-measures.
- **Roadway Environment/Pavement Characteristics**
  - Vision problems are surfaced by C408 (Vision Obscured by), which indicates that special training attention should be given to: Moving Vehicles (450), Blinded by Sun (377), Parked Vehicles (169), Weather Conditions (157), and Hillcrest (157).
  - Special attention might also be valuable in the particular types of intersections that are over-represented by senior drivers, as follow: 4-Way Intersections (2148), T-Intersections (988), Crossovers in Median (230), Driveway Access Intersections (228), and Business Drives (227).

## Introduction and Executive Summary

The comparisons in this document are between those crashes that were *caused* by senior drivers (age 65 or older) compared to all other crashes. This enabled the characteristics for these crashes to surface so that traffic safety professionals can determine their magnitude and optimize senior driver safety programs to place emphasis on the most important factors. In many cases the comparison led to conclusions that were expected, being well established over the years.

A very important general finding that confirms studies done by CAPS personnel from well over a decade ago is that senior drivers are relatively risk averse compared to younger drivers. This will be noticed in virtually all of the IMPACT comparisons below: the older driver red bars will be higher in those categories that generally involve lower risk. Examples include lower speeds, avoidance of late night driving and bad weather, and many other categories that will be noticed as risk-avoidance. Since these results should be well understood, they will not be discussed unless there some aspects of them that bear mentioning.

The following summary is a list of conclusions that were either counter to the general pattern of risk-aversion or else it was felt that they needed additional explanation:

- **Crash Characteristics**

- C015. Failure to yield the right of way is by far the greatest primary contributing circumstance when all of its subcategories are added together.
- C129. While making turns, especially left turns, are expected to be a problem with senior drivers, their under-representation in negotiating curves is not, and it can probably be explained by their caution and reduction in speed when entering dangerous curves.
- C023. Over-representation in side impacts is related to the failure to yield the right of way problem. Single vehicle and rear end crashes are under-represented.
- C201, C017. Collisions with vehicle in traffic (multi-vehicle crashes) are by far the greatest problem both from an overall numeric count (76%) and a significant over-representation.
- C203. Reflecting the large number of “vehicle in traffic” the vast majority of crashes occur on the roadway as opposed to running off the road.
- C051. Two-vehicle crashes are over-represented for senior drivers by 13.4%. This is expected in that it correlates with the failure to yield results given above. Multiple vehicle crashes above two vehicles are generally under-represented.

- **Time Characteristics**

- C003. Year is of interest because it shows if senior crashes are increasing or decreasing over time. Clearly they are increasing from 11,733 in 2013 to 14,962 in 2017 (27.5%). However, the increase in the younger drivers was all quite significant, from 116,029 to 142,039 (22.4%). This is clearly not due to any changes in

their driving habits over the five years. It is probably largely due to their increased proportion of the driving population along with their increased ability, which could lead to their driving greater distances. The underlying causes are not as important as the fact that this is clearly a growing proportion of our driver population, giving justification to the increasing focus on older driver traffic safety issues. The percentage increase is about the same for males and females (see C109).

- C004. Month. Older drivers have proportionately more problems toward the end of the year. They are significantly under-represented in March, and then there seems to be a general increase proportionately each month until they become significantly over-represented in November and December. Since it is known that older persons have increased problems with vision at night, the proportion of lighted hours would seem to be a major causal factor. A cross-tabulation of time-of-day by month clearly bears this out, with very high over-representation in the 5:00 to 7:00 in November through February.
- C008. Time of Day. From the results above it might be expected that the night-time hours would be over-represented for senior drivers. The results of the IMPACT show that this is clearly not the case because older drivers are clearly avoiding these hours (risk-avoidance), since most of them seem to accept their relative loss of night vision. This is clearly an example of risk avoidance.
- C029. Lighting Conditions. The results here are consistent and tend to reinforce those for C008 immediately above.
- C006. Day of the Week. There is another reason that older drivers are under-represented in the night-time hours, especially late night and early morning. There is a very large correlation of DUI (drugs and alcohol) in the weekend times starting Friday night and ending late Sunday night and Monday morning. The under-representation of senior drivers at these times is clear evidence that they are relatively not engaged in “partying.” Relatively is not absolute, as shown in the next finding.
- Day of the Week by Time of Day. While senior drivers are relatively under-represented in their weekend crashes compared to other drivers. However, compared to themselves, the typical DUI hours are over-represented, as shown by this time of day by day of the week crosstab. This indicates that while for the most part this would not be seen to be a serious problem, there is no doubt that there are a few senior drivers who are venturing out and probably engaging in DUI in the late-night hours.

- **Driver Characteristics**

- C107. CU Driver Raw Age Frequency Distribution. This shows the number of drivers over 68 drops off in a linear fashion as age increases. This seems to be almost perfectly correlated with both the number in the population and the amount of driving that they do.
- C121. CU Driver Condition. See this result for the alternatives within this attribute. Senior drivers are clearly over-represented in the Physical Impairment and

Illness categories. “Under the Influence of Alcohol/Drugs” was also significantly under-represented, where the proportion is only 28.4% of that of the younger drivers. These results are further confirmed in the two following IMPACT findings: C122 and C123.

- C213. CU Vehicle Usage. While the vast majority (95.8%) of vehicle usages were “Personal,” some of the other very significantly over-represented usages are of interest. These are, in order of their Max Gain: (1) School Bus; (2) Mobile Home/Recreational Vehicle; and (3) Agriculture. While others are significantly over-represented, they all have less than 100 crashes over the five years (see the display).
- C109. CU Driver Gender. The generally accepted life expectancy in developed countries is 72 for men and 79 for women. The population in Alabama estimated in 2016 is 443,560 for women and 340,991 for men, which indicates that there are about 13.1% more women than men. Nevertheless, senior men drivers have 55.4% of the crashes for this age range, which is quite comparable to the younger age proportion. One potential reason for this is that the general health and perception capabilities of senior women are superior to that of men for the older age ranges.
- C020. Distracted Driving Officer’s Opinion. Senior drivers are dramatically under-represented in being distracted by electronic devices, being only about a third or less of the rest of the driving population. However, they are about 50% higher than expected in distractions outside of the vehicle, which accounts for close to 40% of their crashes caused by distractions.

- **Severity Characteristics**

- C025. Crash Severity. All of the injury classifications (including fatal) are over-represented for senior drivers despite their slower speeds. This is probably due to their increased vulnerability due to age. See the next item for speed at impact.
- C224. Estimated Speed at Impact. All speeds above 30 MPH were under-represented. It can be concluded that senior drivers avoid the risk of higher speeds, which fits the general paradigm. We mention it here to provide a contrast with the crash severity given above.
- C036. Adjusted EMS Arrival Delay. The significant over-representation in the 0 to 5 minute category correlates well with seniors’ urban driving, which is discussed next.

- **Geographical Characteristics**

- C010. Rural or Urban. Urban crashes are significantly over-represented for senior drivers, but only by about 6% above expectation.
- C031. Locale. Senior drivers’ crashes are over-represented in Shopping or Business areas, that being 54.8% of their crashes, which is about 19.3% higher than expected.

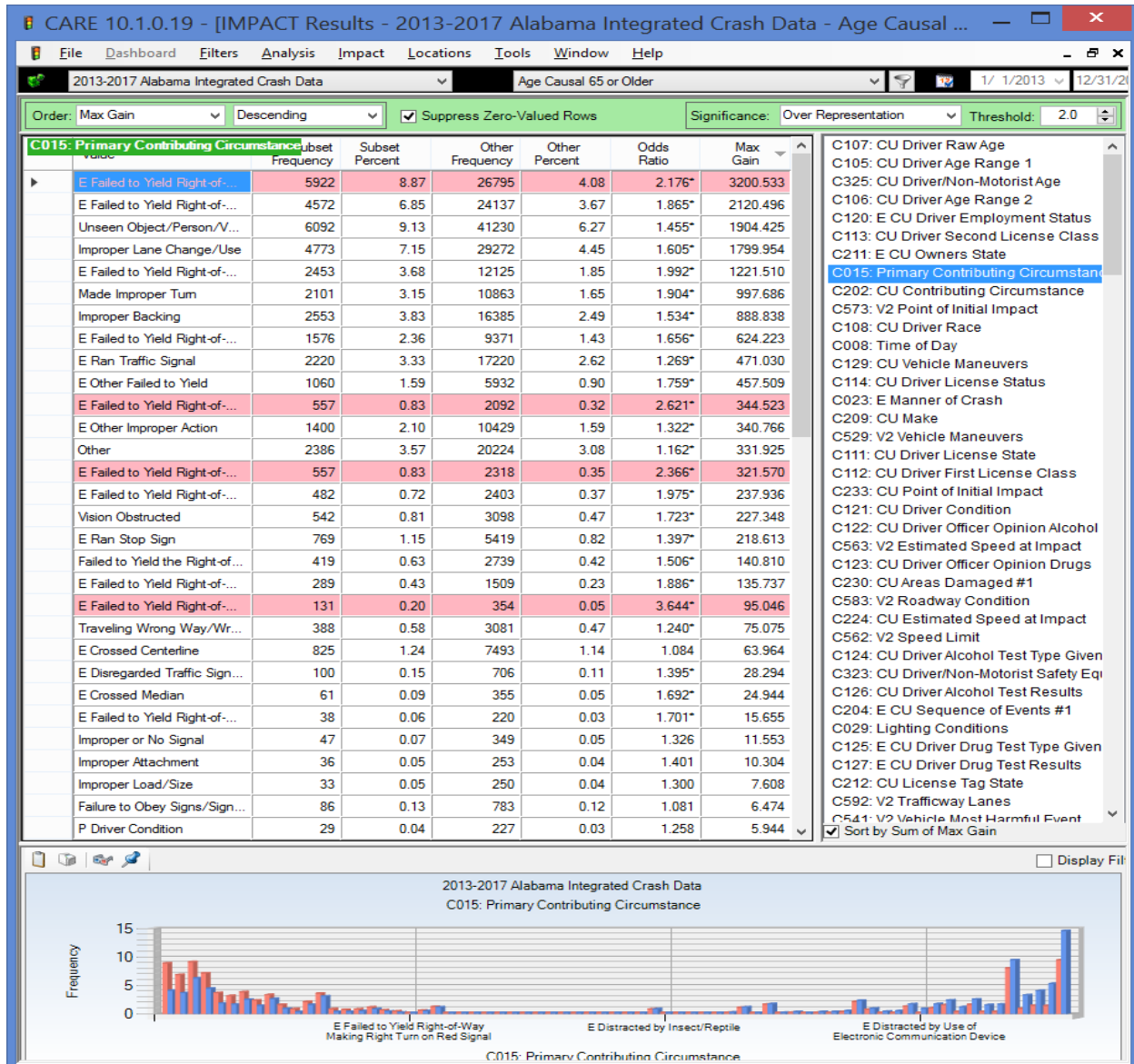


- C011. Highway Classification. In order of significant over-representation: Federal (23.3%), State (12%) and Municipal (3.9%).
- **Vehicle Characteristics**
  - C101. CU Vehicle Type. Passenger cars are under-represented for senior drivers, although they account for about half of their crashes. Max Gain gives an idea of both the over-representation and the number of crashes that make up the differential. In order of Max Gain with the highest first: Pickups (2653), Mini-vans (1337), Motor Homes – RVs (153), Other Bus (124), Passenger Vans (73.2) and Station Wagon (54).
  - C061. Train Involved. While only accounting for about 7% of their crashes, this proportion is about 59% greater than the younger drivers. There can be little doubt that older drivers risk aversion is not sufficient to overcome their perception problems at railroad crossings.
- **Roadway Environment/Pavement Characteristics**
  - C408. CU Vision Obscured by. This display has been reduced to only those crashes that had a vision obstruction listed. In order of Max Gain, the items with the greatest problems are: Moving Vehicles (450), Blinded by Sun (377), Parked Vehicles (169), Weather Conditions (157), and Hillcrest (157). Others had Max Gains of less than 100.
  - C022. Type of Roadway Junction. From the worst first, those with a Max Gain greater than 100 are: 4-Way Intersection (2148), T-Intersection (988), Crossover in Median (230), Driveway Access Intersection (228), Business Drive (227), On Segment but Intersection Related (149).
  - C409. CU Traffic Control. The only two significantly over-represented items were Stop Sign (67.2% more than expected) and Traffic Signals (6% more than expected). Clearly the largest problem for senior drivers is stop signs.

Only about half of the attributes considered in the remainder of this report are discussed above. Traffic safety professionals who are involved with senior driver countermeasures are urged to consider each of the IMPACT outputs carefully, and if there are any questions, please contact Dr. David Brown at [brown@cs.ua.edu](mailto:brown@cs.ua.edu).

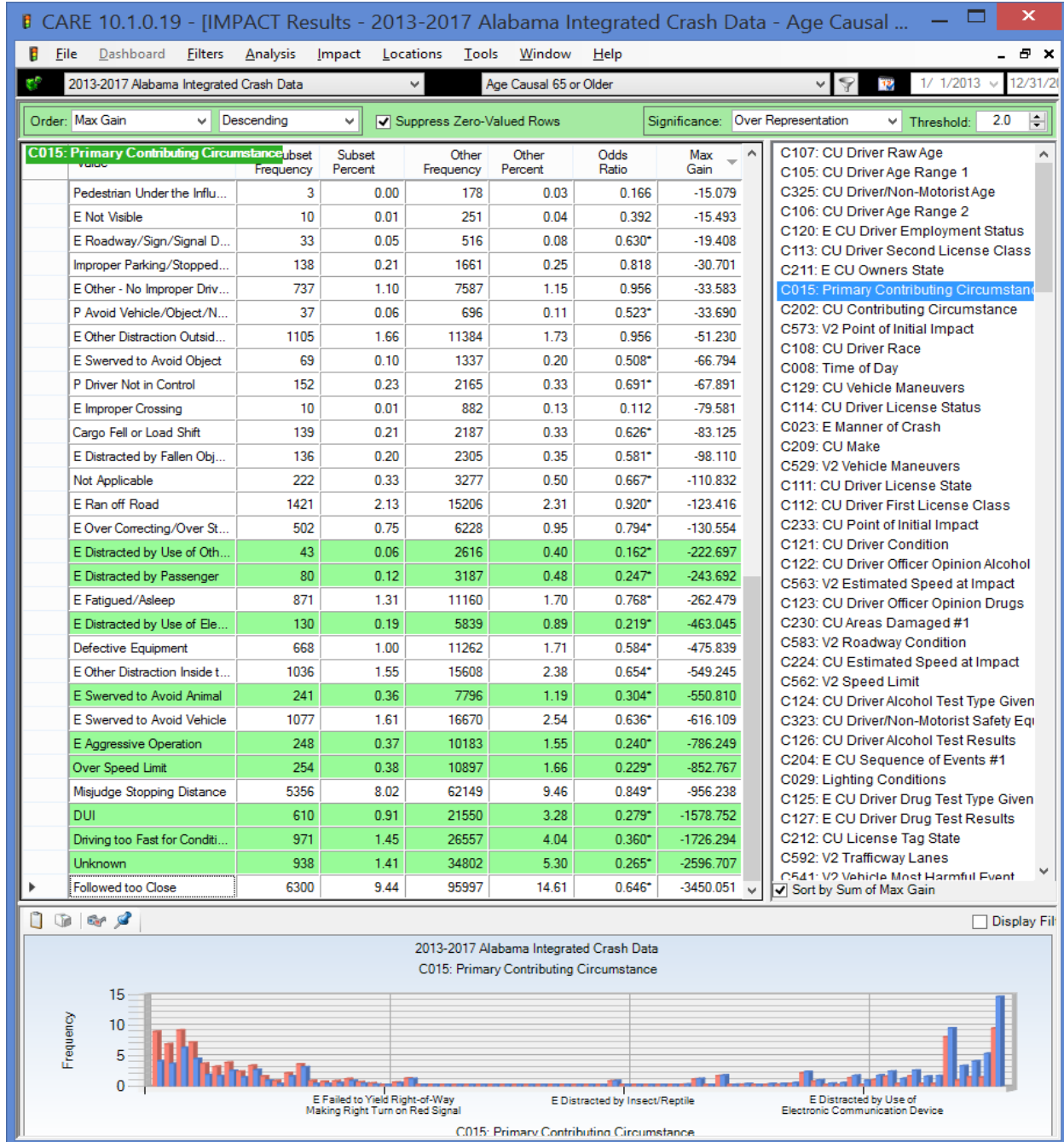
## Crash Characteristics

### C015 Primary Contributing Circumstance – Most Overrepresented



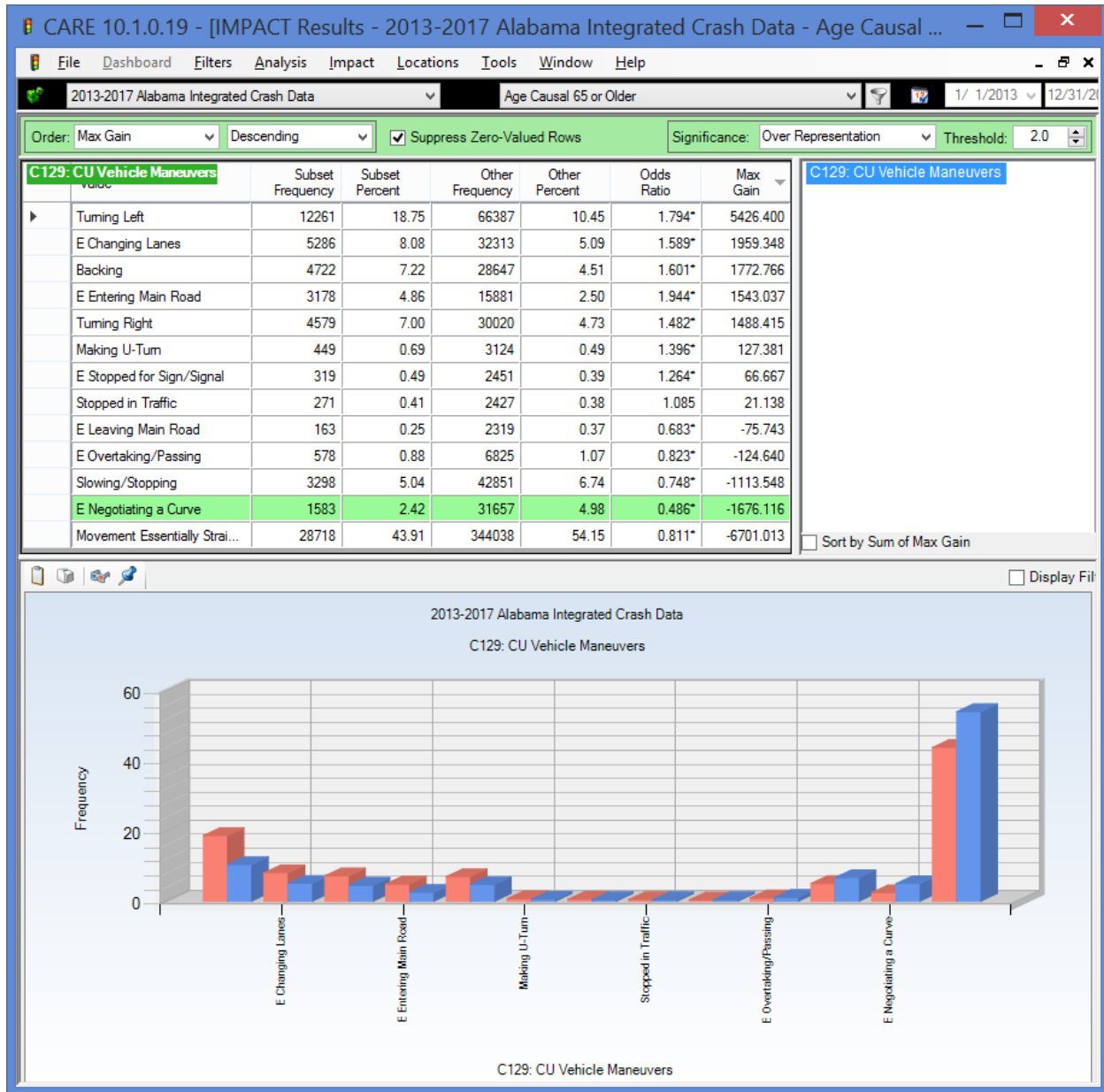
There are eight different “Failed to Yield ...” categories. Adding them up gives 14,870, which is 22.3% of all crashes, and thus collectively these would be the greatest concern as far as Primary Contributing circumstances.

## C015 Primary Contributing Circumstance – Most Underrepresented



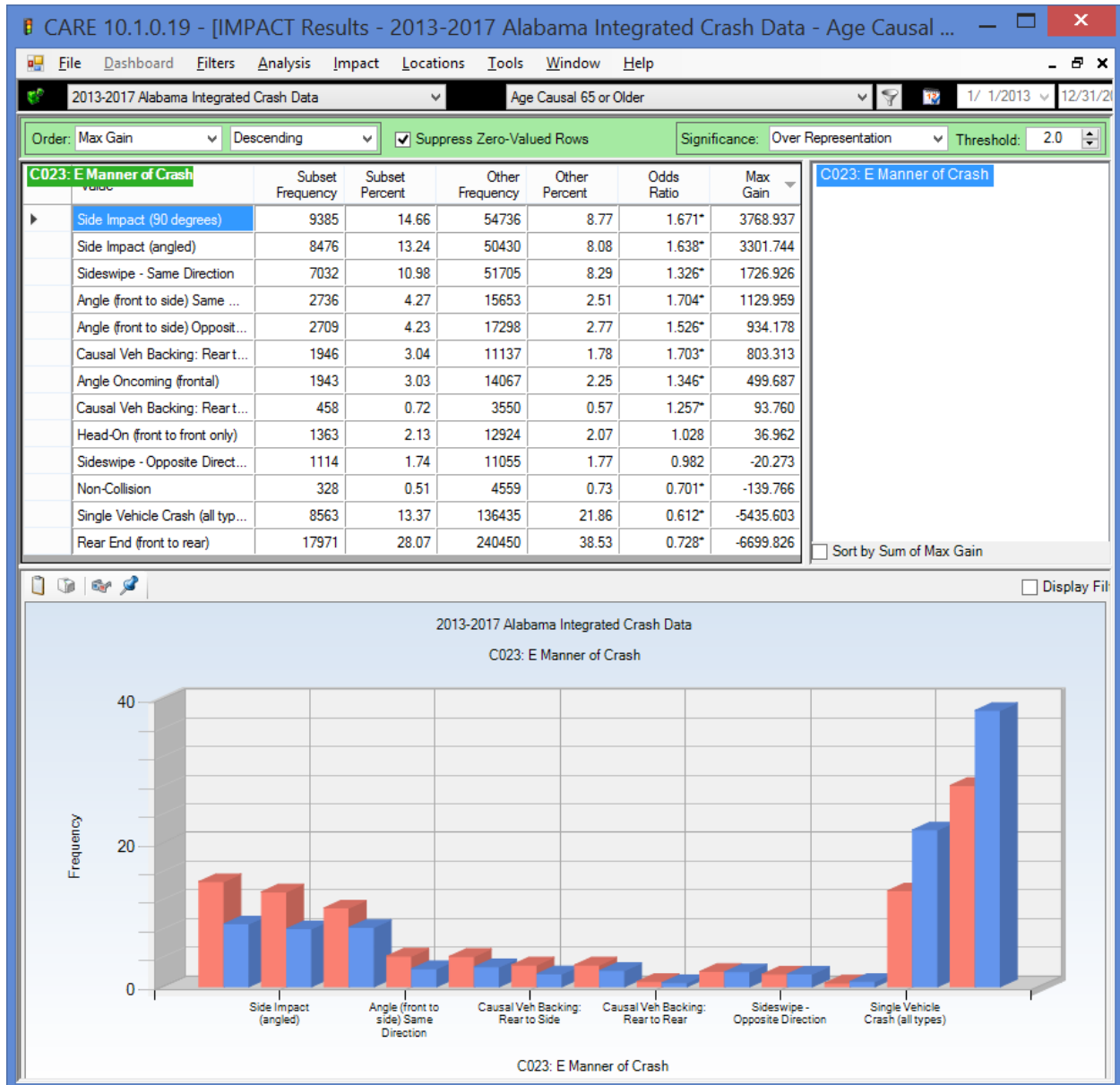
These results begin to show the difference between the senior driver and those that are under 65 years of age. The major difference is in those categories related to speed, impairment (DUI) and distractions. When risk avoidance is obviously the reason for superior senior driver performance, we will not repetitively comment on it. We ask the reader to be looking for this major aspect.

## C129 CU Vehicle Maneuvers

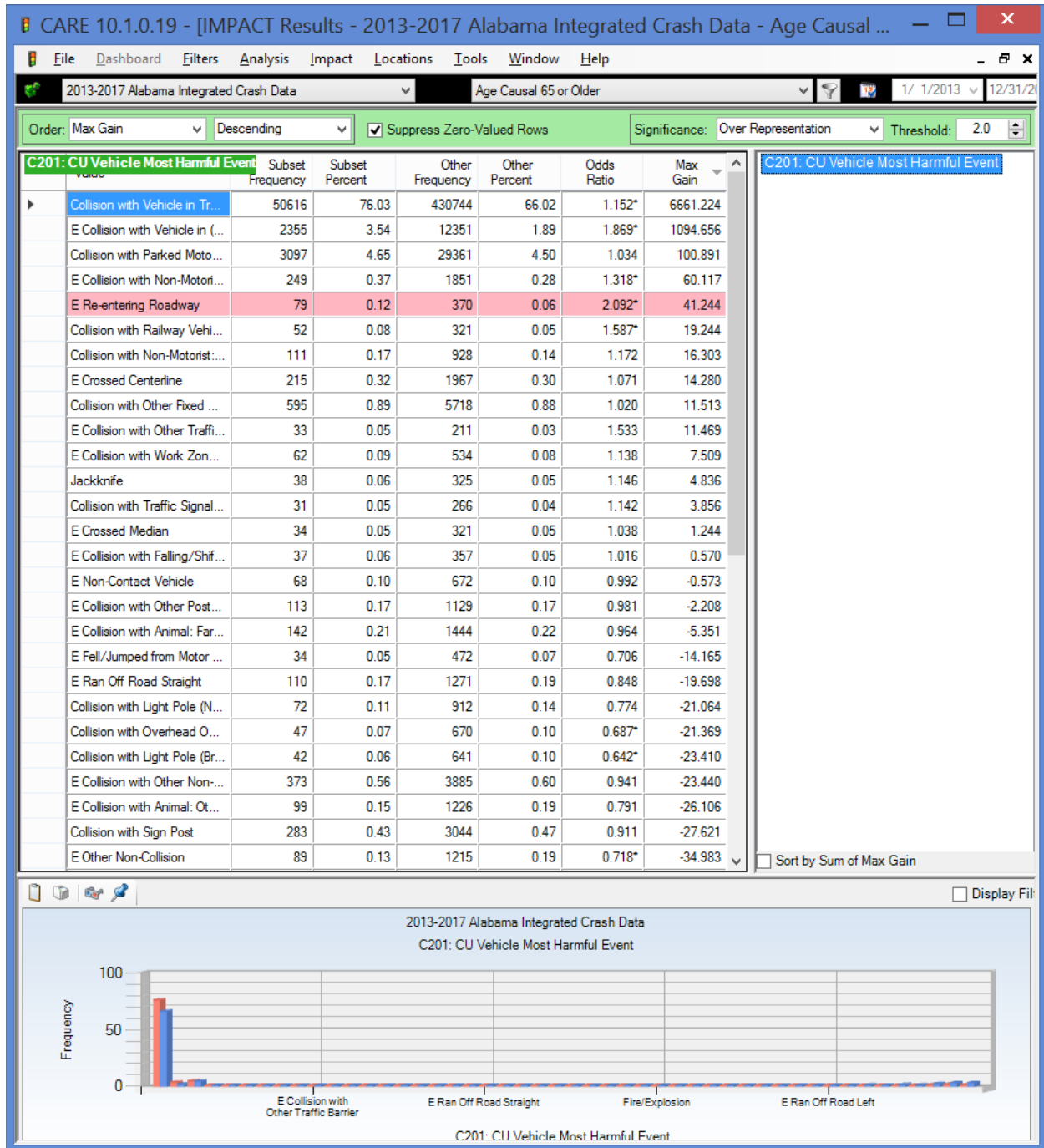


The above contains all categories for which senior drivers had more than 150 crashes. As expected, senior drivers have many more problems in situations where turns are involved, left turns being about three times the problem of right turns. However, negotiating curves was under-represented, probably because of their caution and reduction of speed in going into dangerous curves.

## C023 Manner of Crash

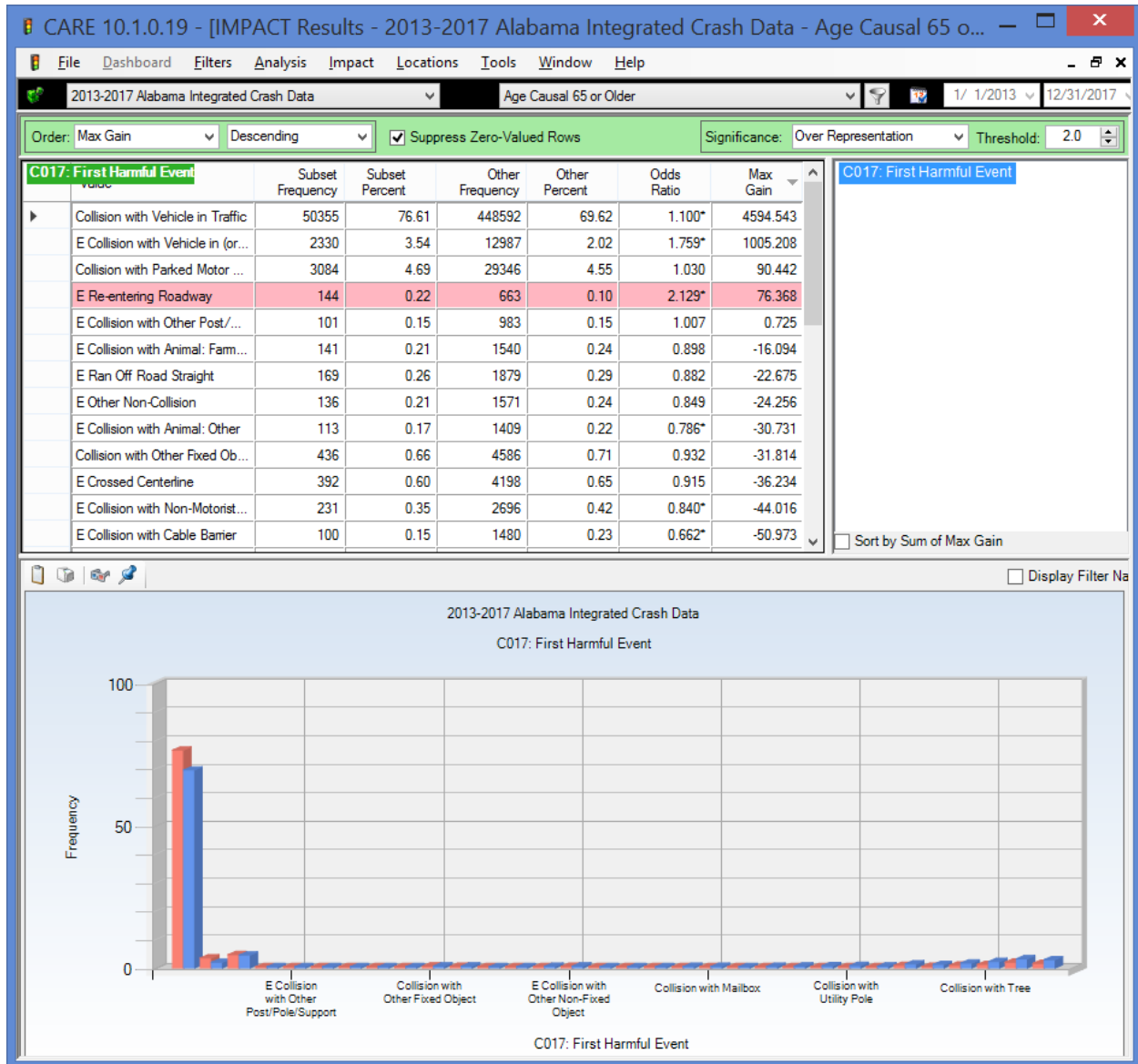


## C201 CU Vehicle Most Harmful Event



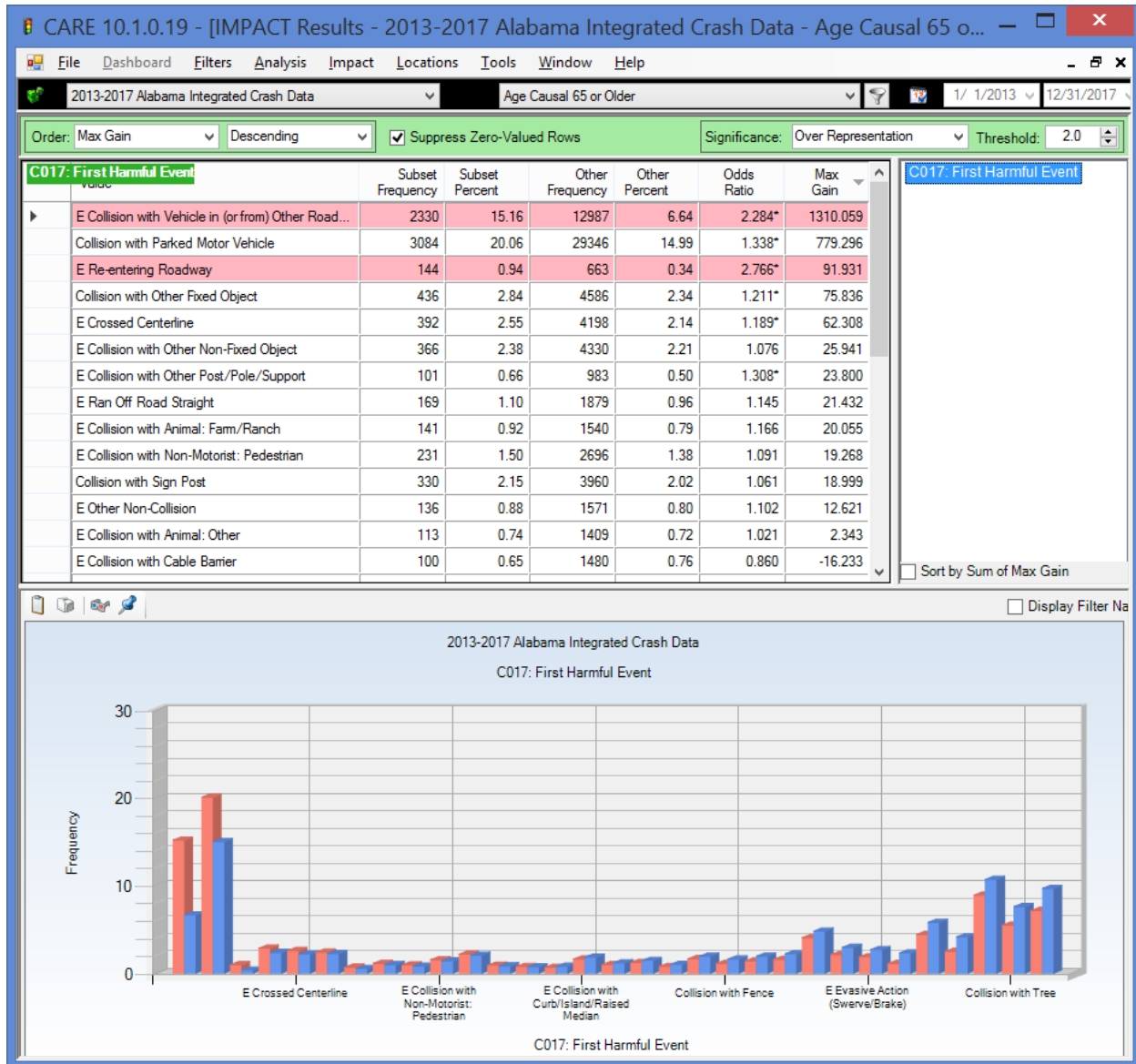
The above is for 30 or more senior driver crashes.

## C017 First Harmful Event – All Items



The above is for items with 100 or more senior driver caused crashes.

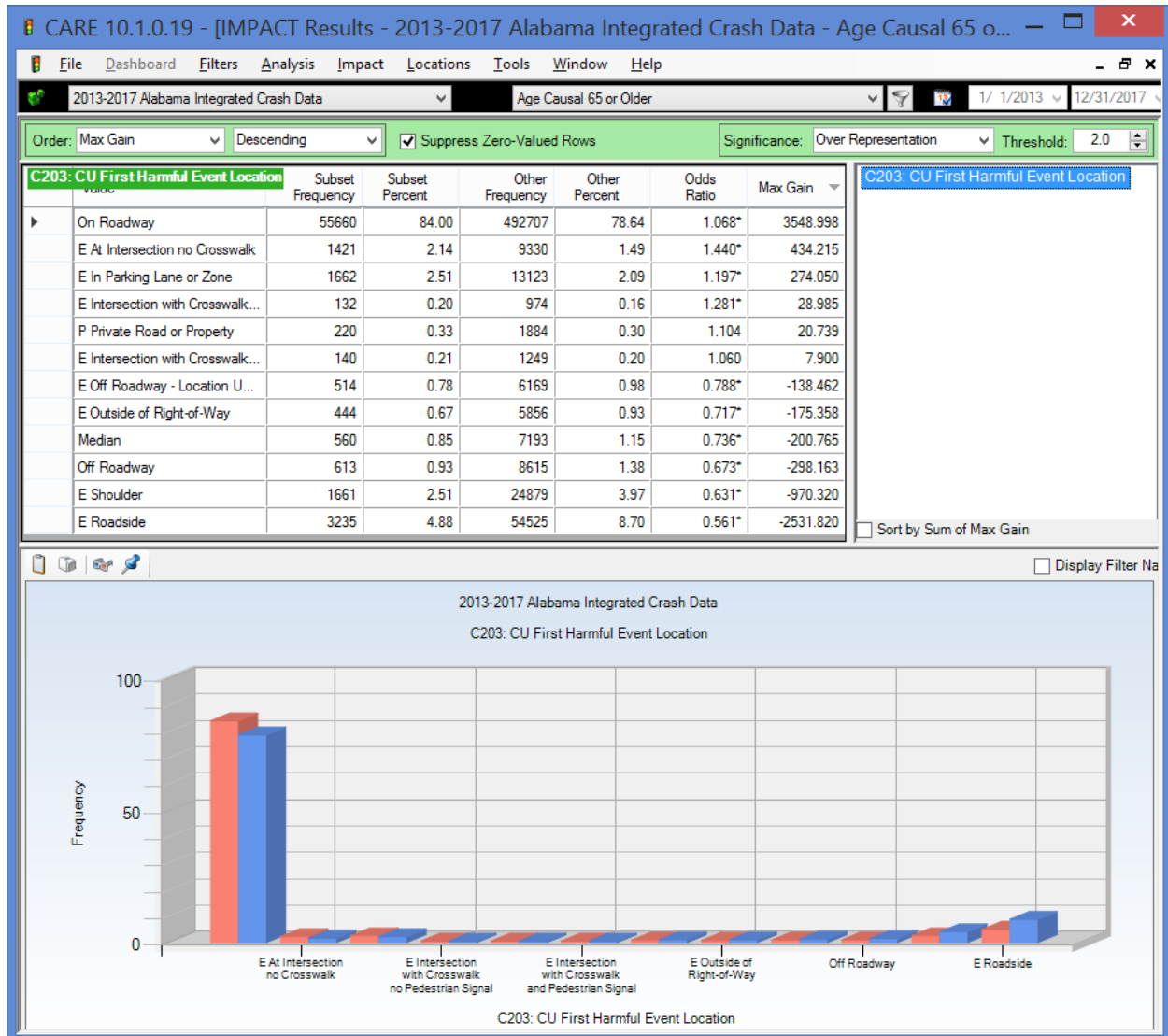
## C017 First Harmful Event – Single Vehicle



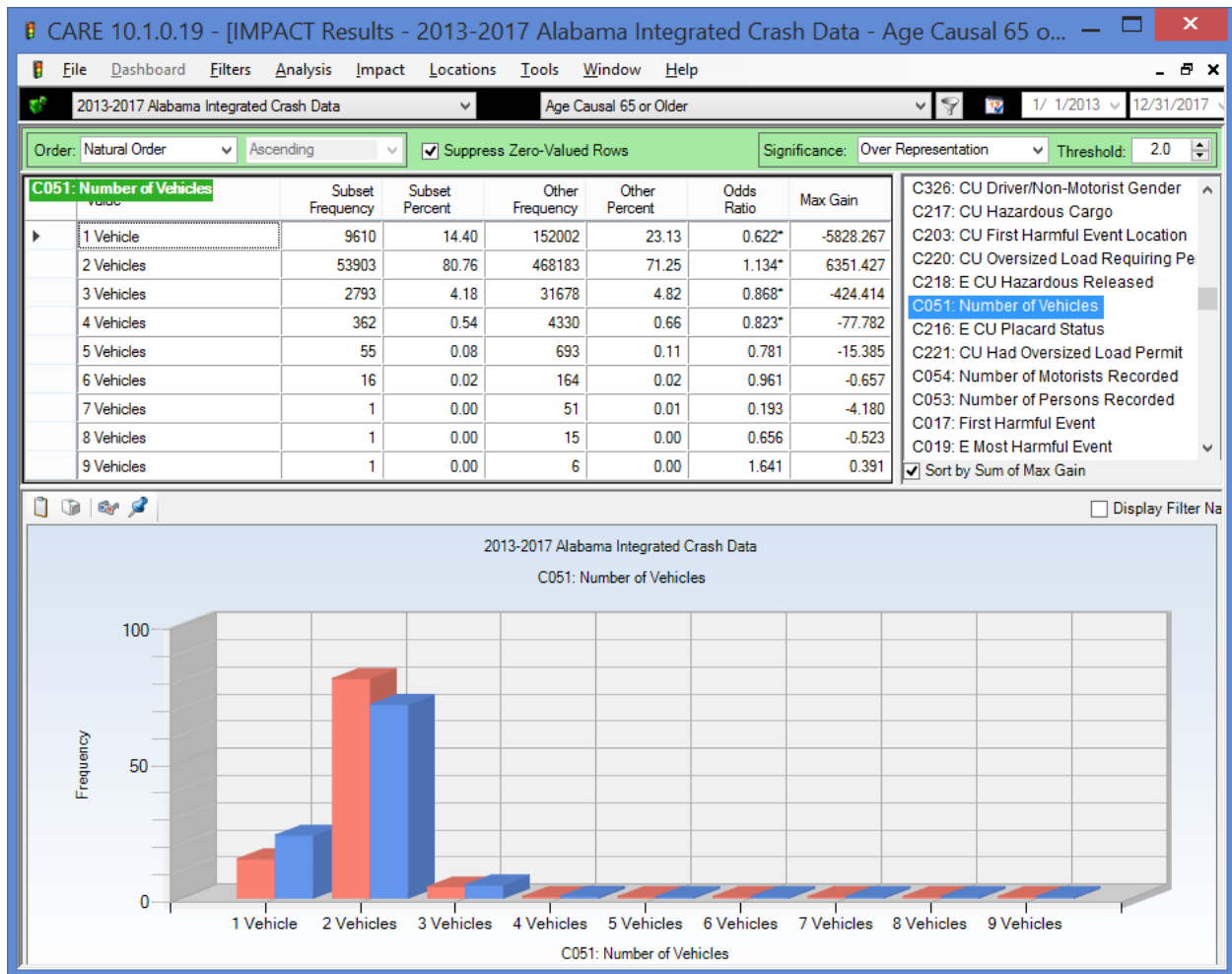
The above is for items with 100 or more crashes caused by senior drivers with the collision with vehicle in traffic removed, since it over-shadowed all other categories. This enables issues where senior drivers cause single vehicle crashes to be identified.



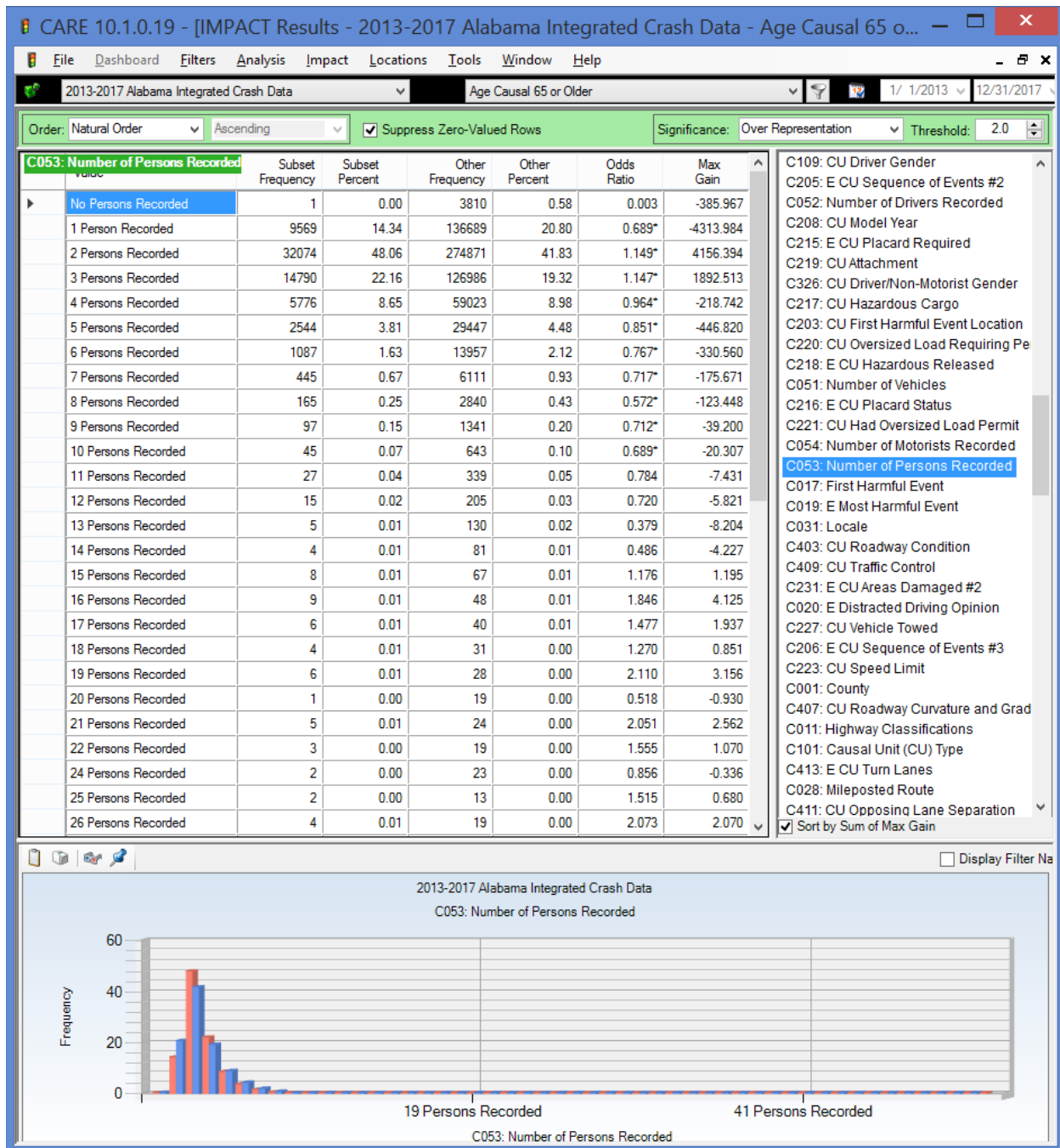
## C203 CU First Harmful Location



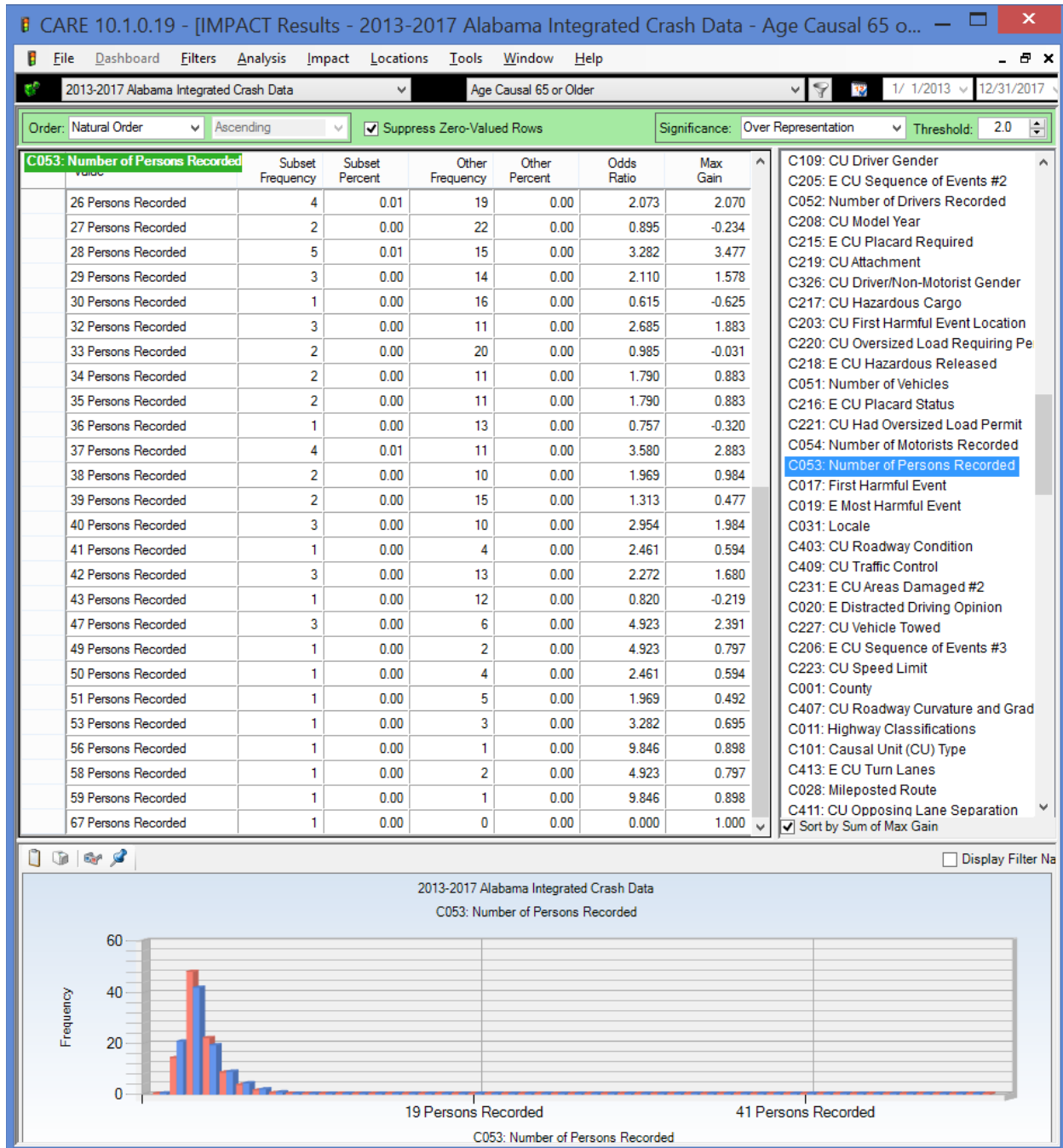
## C051 Number of Vehicles



## C053 Number of Persons Recorded - 1

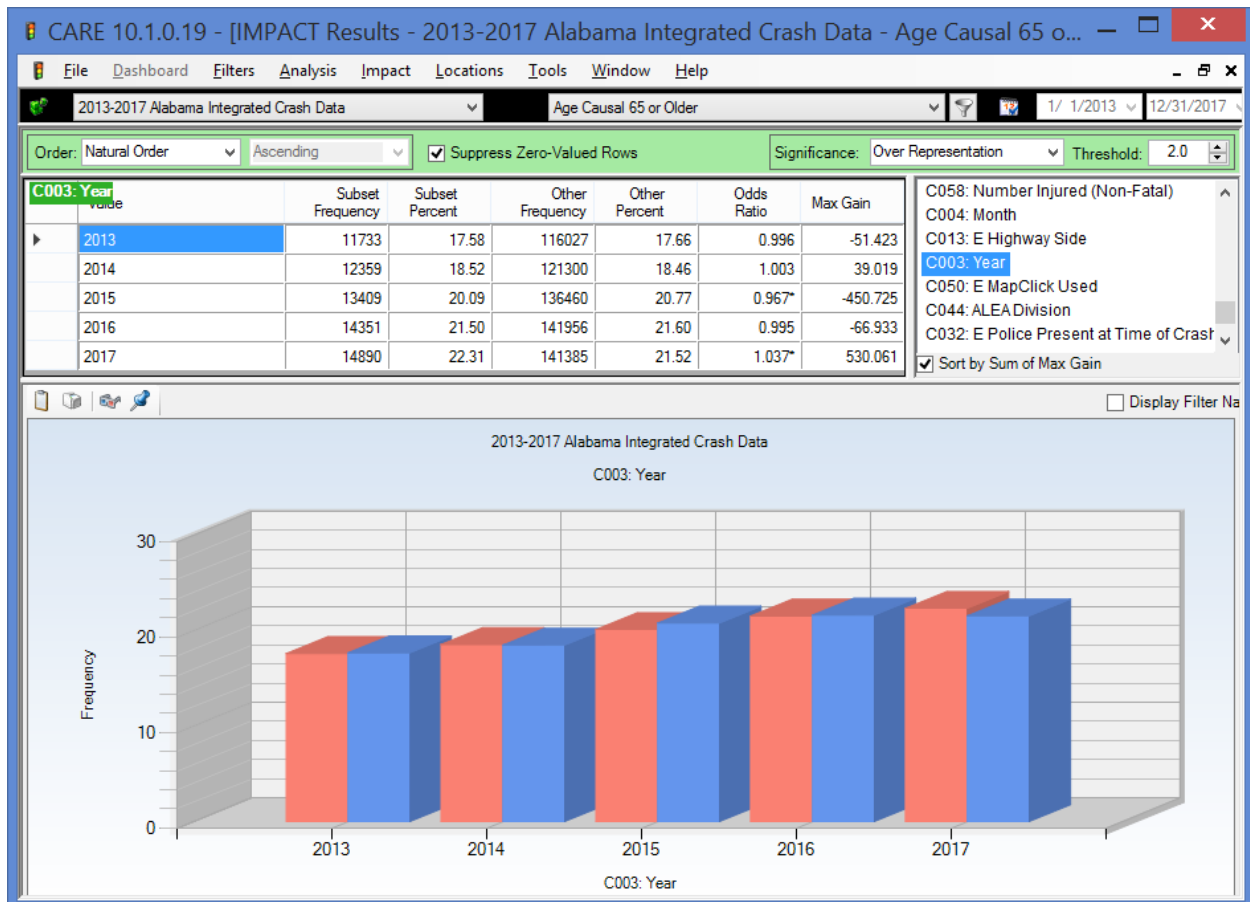


## C053 Number of Persons Recorded - 2

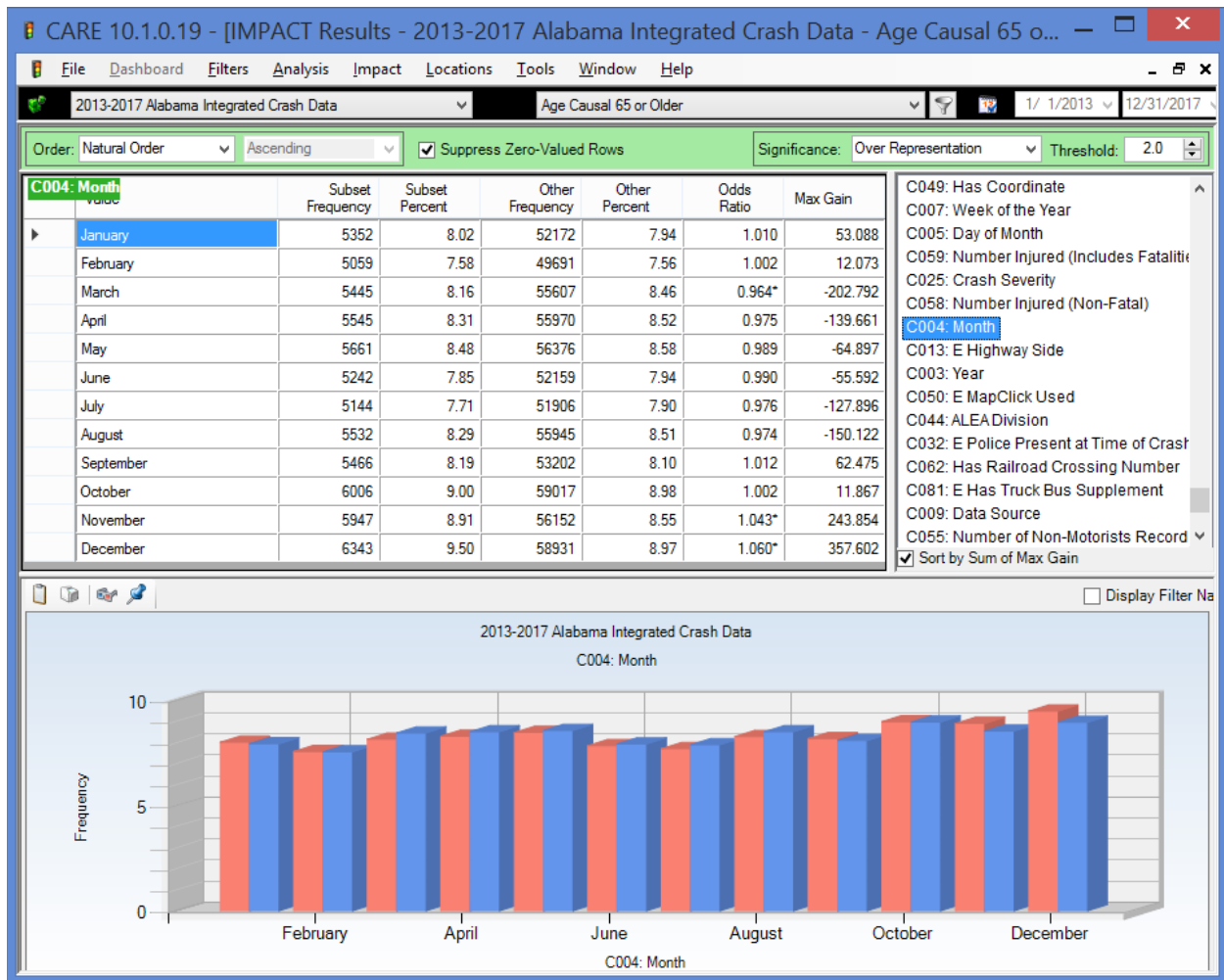


## Time Characteristics

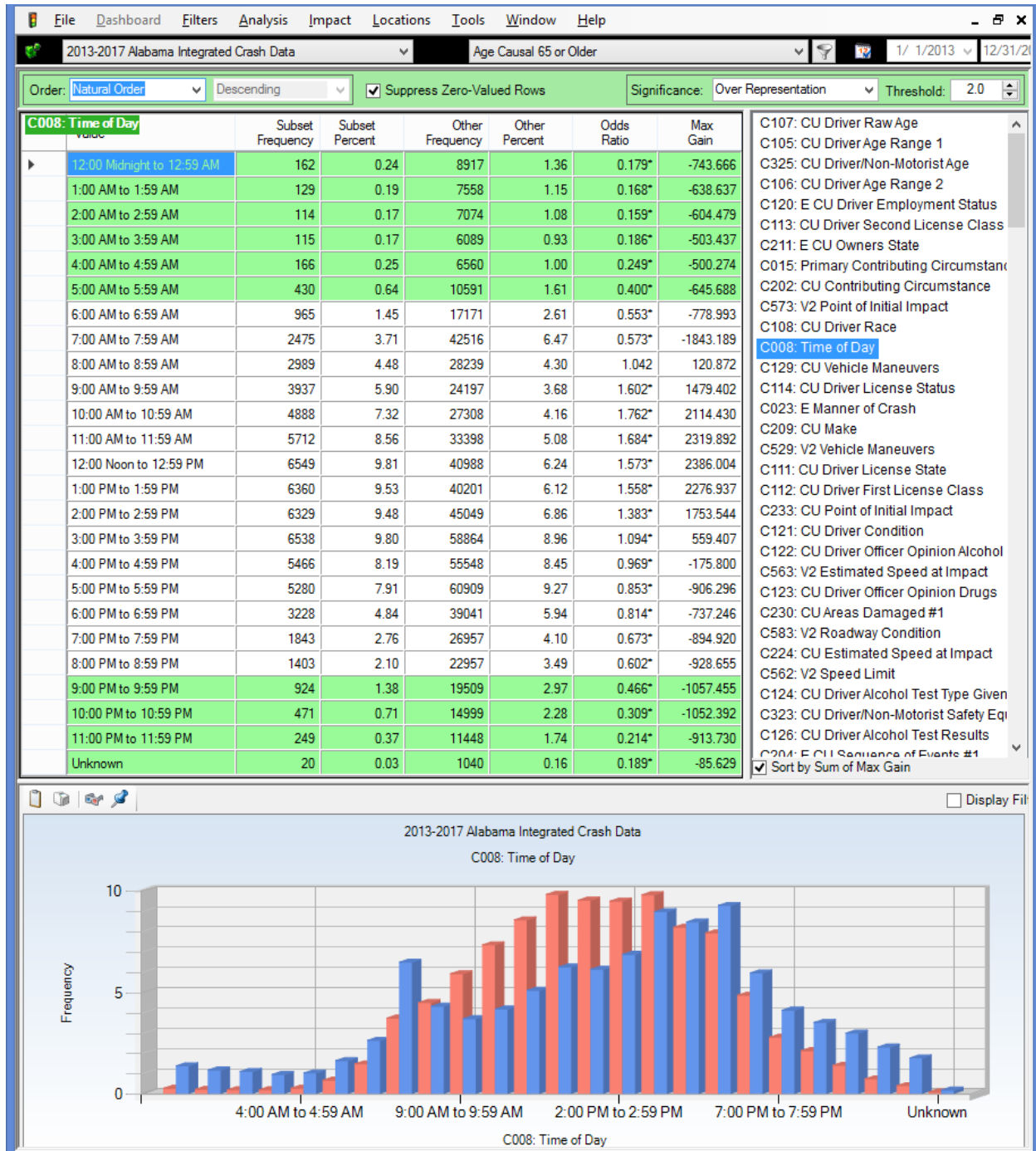
### C003 Year



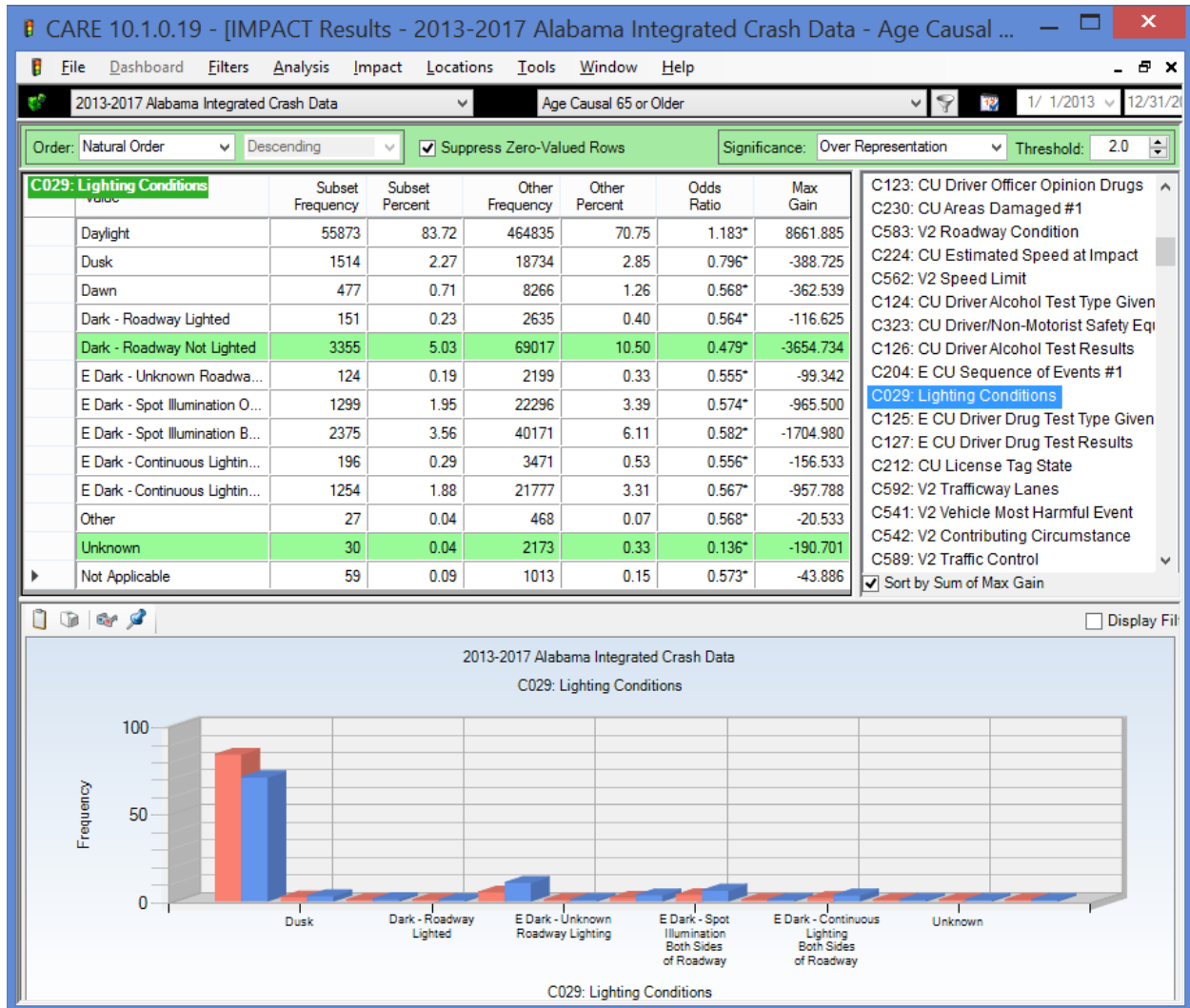
## C004 Month



## C008 Time of Day

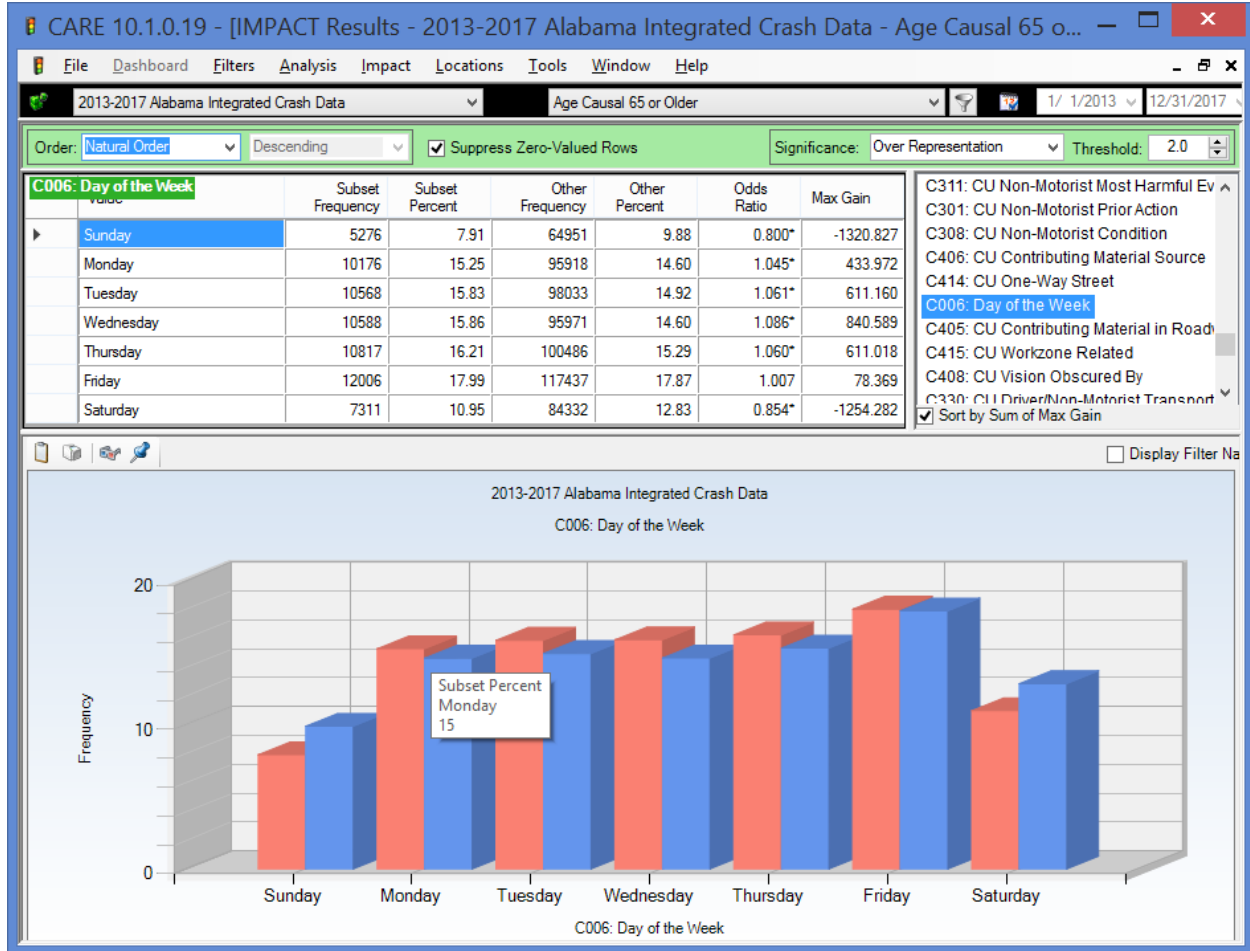


## C029 Lighting Conditions





## C006 Day of the Week

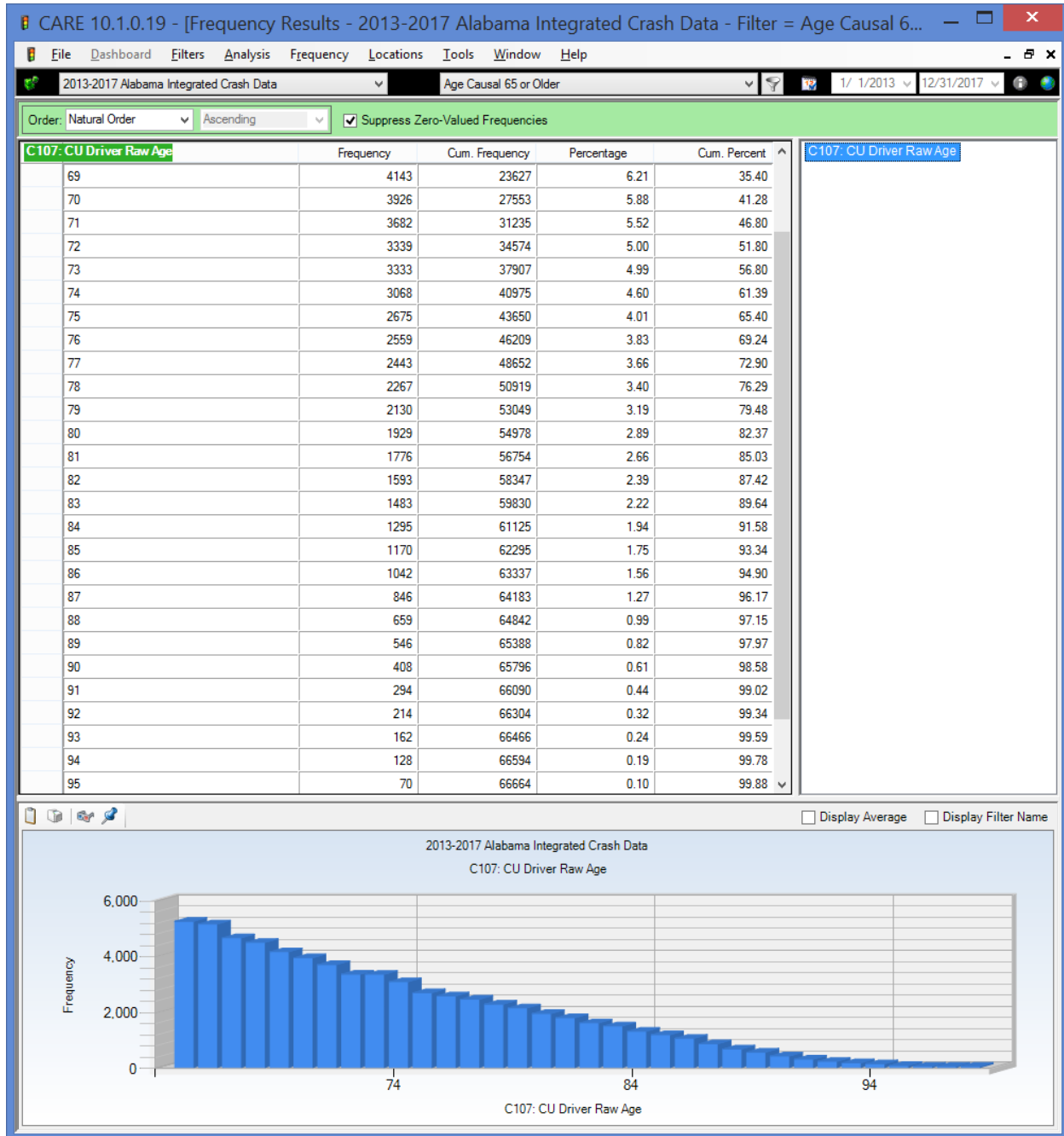


## Day of the Week by Time of Day

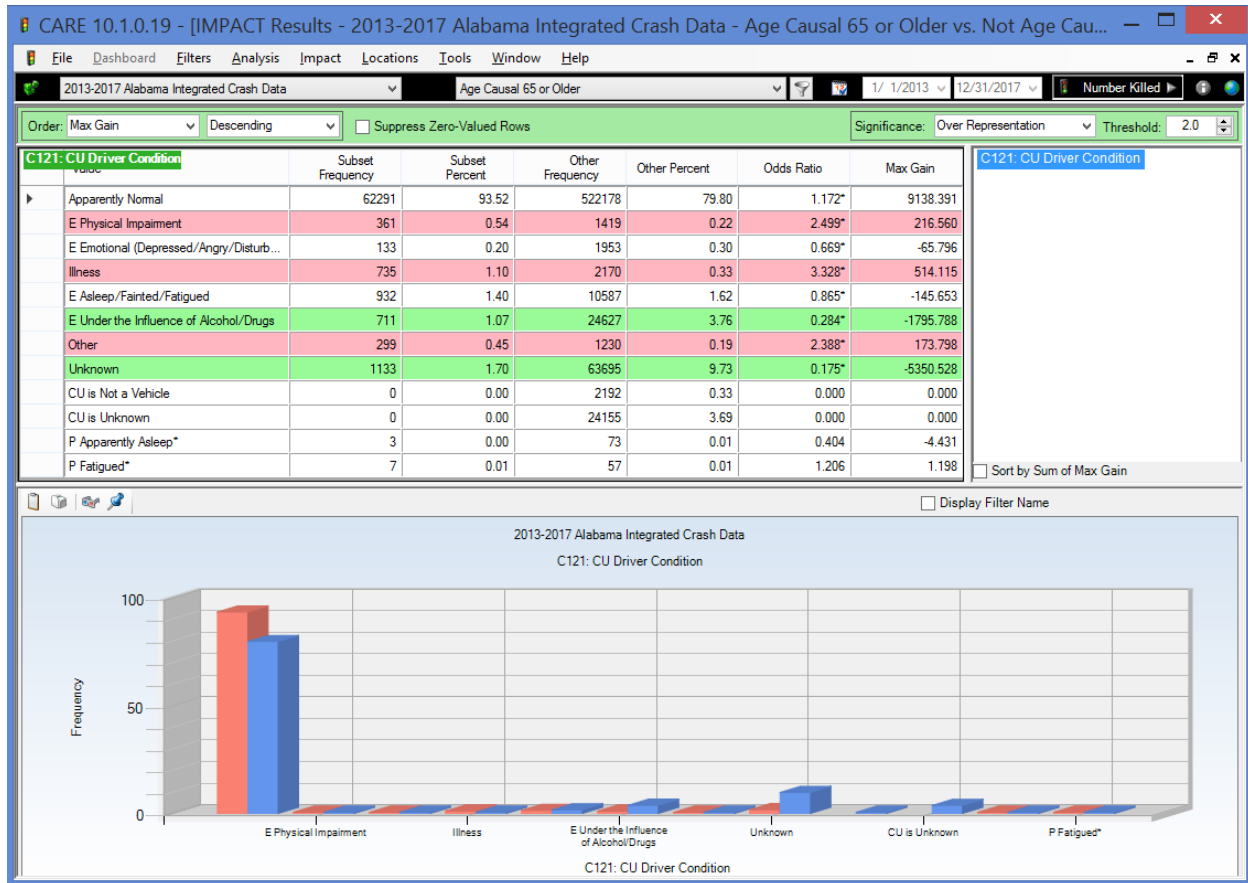
CARE 10.1.0.19 - [Crosstab Results - 2013-2017 Alabama Integrated Crash Data - Filter = Age Causal 65 ...								
File Dashboard Filters Analysis Crosstab Locations Tools Window Help								
2013-2017 Alabama Integrated Crash Data Age Causal 65 or Older 1/ 1/2013 12/31/2017								
Suppress Zero Values: Rows and Columns 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	30 0.57%	18 0.18%	24 0.23%	13 0.12%	16 0.15%	23 0.19%	38 0.52%	162 0.24%
1:00 AM to 1:59 AM	31 0.59%	13 0.13%	17 0.16%	16 0.15%	20 0.18%	21 0.17%	11 0.15%	129 0.19%
2:00 AM to 2:59 AM	16 0.30%	13 0.13%	13 0.12%	14 0.13%	22 0.20%	12 0.10%	24 0.33%	114 0.17%
3:00 AM to 3:59 AM	16 0.30%	12 0.12%	22 0.21%	17 0.16%	12 0.11%	20 0.17%	16 0.22%	115 0.17%
4:00 AM to 4:59 AM	10 0.19%	17 0.17%	30 0.28%	24 0.23%	20 0.18%	40 0.33%	25 0.34%	166 0.25%
5:00 AM to 5:59 AM	25 0.47%	67 0.66%	81 0.77%	74 0.70%	71 0.66%	63 0.52%	49 0.67%	430 0.64%
6:00 AM to 6:59 AM	45 0.85%	177 1.74%	165 1.56%	160 1.51%	185 1.71%	153 1.27%	80 1.09%	965 1.45%
7:00 AM to 7:59 AM	87 1.65%	464 4.56%	475 4.49%	471 4.45%	440 4.07%	375 3.12%	163 2.23%	2475 3.71%
8:00 AM to 8:59 AM	161 3.05%	508 4.99%	540 5.11%	544 5.14%	500 4.62%	483 4.02%	253 3.46%	2989 4.48%
9:00 AM to 9:59 AM	331 6.27%	605 5.95%	635 6.01%	634 5.99%	636 5.88%	609 5.07%	487 6.66%	3937 5.90%
10:00 AM to 10:59 AM	349 6.61%	795 7.81%	781 7.39%	699 6.60%	763 7.05%	873 7.27%	628 8.59%	4888 7.32%
11:00 AM to 11:59 AM	393 7.45%	858 8.43%	909 8.60%	898 8.48%	905 8.37%	1100 9.16%	649 8.88%	5712 8.56%
12:00 Noon to 12:59 PM	614 11.64%	988 9.71%	1010 9.56%	990 9.35%	1014 9.37%	1173 9.77%	760 10.40%	6549 9.81%
1:00 PM to 1:59 PM	596 11.30%	942 9.26%	968 9.16%	968 9.14%	985 9.11%	1195 9.95%	706 9.66%	6360 9.53%
2:00 PM to 2:59 PM	517 9.80%	954 9.38%	983 9.30%	1022 9.65%	1021 9.44%	1177 9.80%	655 8.96%	6329 9.48%
3:00 PM to 3:59 PM	419 7.94%	1029 10.11%	1062 10.05%	1084 10.24%	1098 10.15%	1267 10.55%	579 7.92%	6538 9.80%
4:00 PM to 4:59 PM	393 7.45%	843 8.28%	834 7.89%	873 8.25%	975 9.01%	1021 8.50%	527 7.21%	5466 8.19%
5:00 PM to 5:59 PM	398 7.54%	830 8.16%	905 8.56%	862 8.14%	910 8.41%	894 7.45%	481 6.58%	5280 7.91%
6:00 PM to 6:59 PM	312 5.91%	453 4.45%	491 4.65%	517 4.88%	477 4.41%	571 4.76%	407 5.57%	3228 4.84%
7:00 PM to 7:59 PM	229 4.34%	226 2.22%	213 2.02%	269 2.54%	273 2.52%	347 2.89%	286 3.91%	1843 2.76%
8:00 PM to 8:59 PM	137 2.60%	166 1.63%	195 1.85%	250 2.36%	217 2.01%	219 1.82%	219 3.00%	1403 2.10%
9:00 PM to 9:59 PM	92 1.74%	111 1.09%	129 1.22%	114 1.08%	143 1.32%	201 1.67%	134 1.83%	924 1.38%
10:00 PM to 10:59 PM	47 0.89%	50 0.49%	51 0.48%	46 0.43%	78 0.72%	106 0.88%	93 1.27%	471 0.71%
11:00 PM to 11:59 PM	27 0.51%	34 0.33%	30 0.28%	27 0.26%	32 0.30%	60 0.50%	39 0.53%	249 0.37%
Unknown	1 0.02%	3 0.03%	5 0.05%	2 0.02%	4 0.04%	3 0.02%	2 0.03%	20 0.03%
TOTAL	5276 7.91%	10176 15.25%	10568 15.83%	10588 15.86%	10817 16.21%	12006 17.99%	7311 10.95%	66742 100.00%

## Driver Characteristics

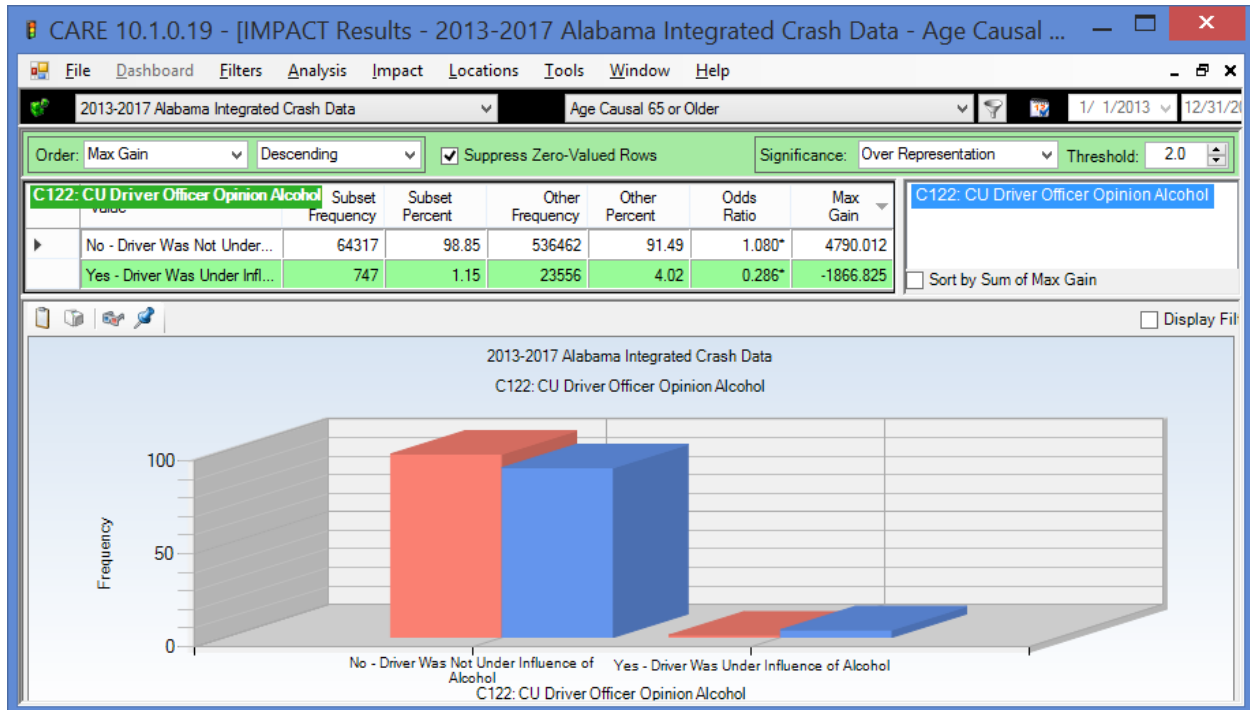
### C107 CU Driver Raw Age Frequency Distribution



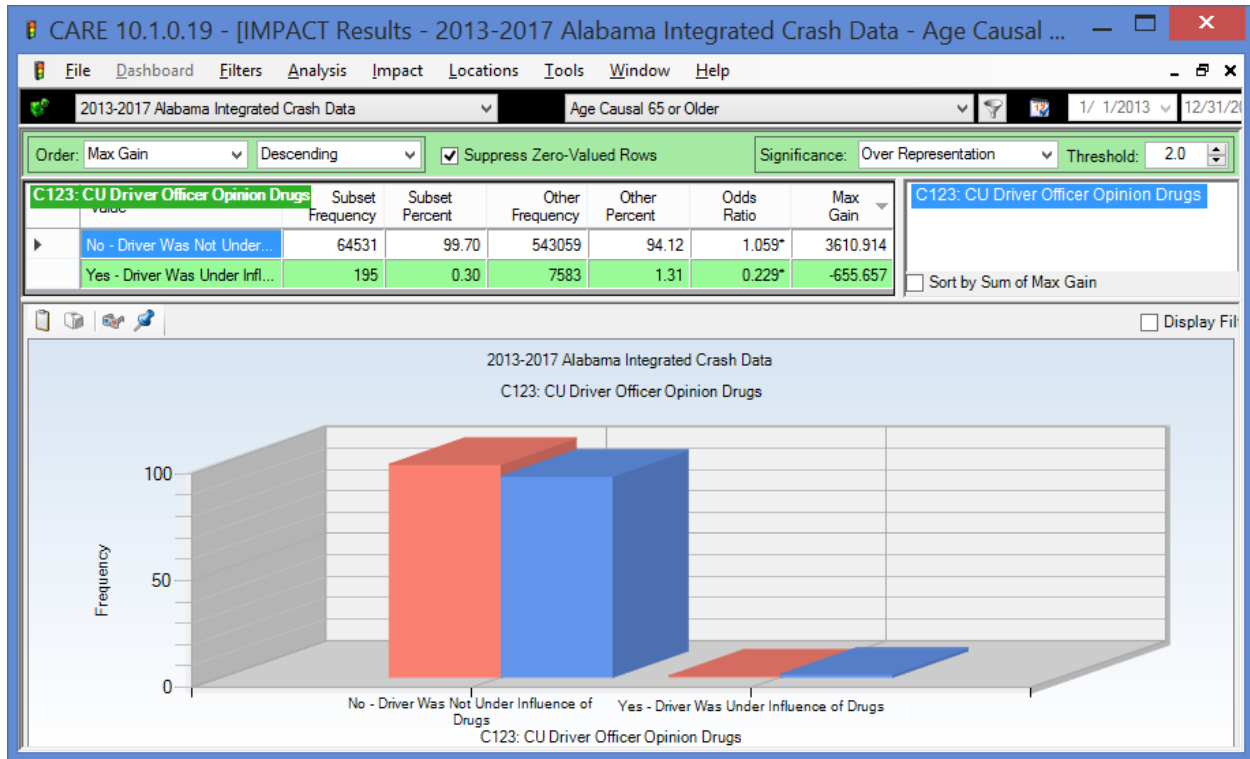
## C023 CU Driver Condition



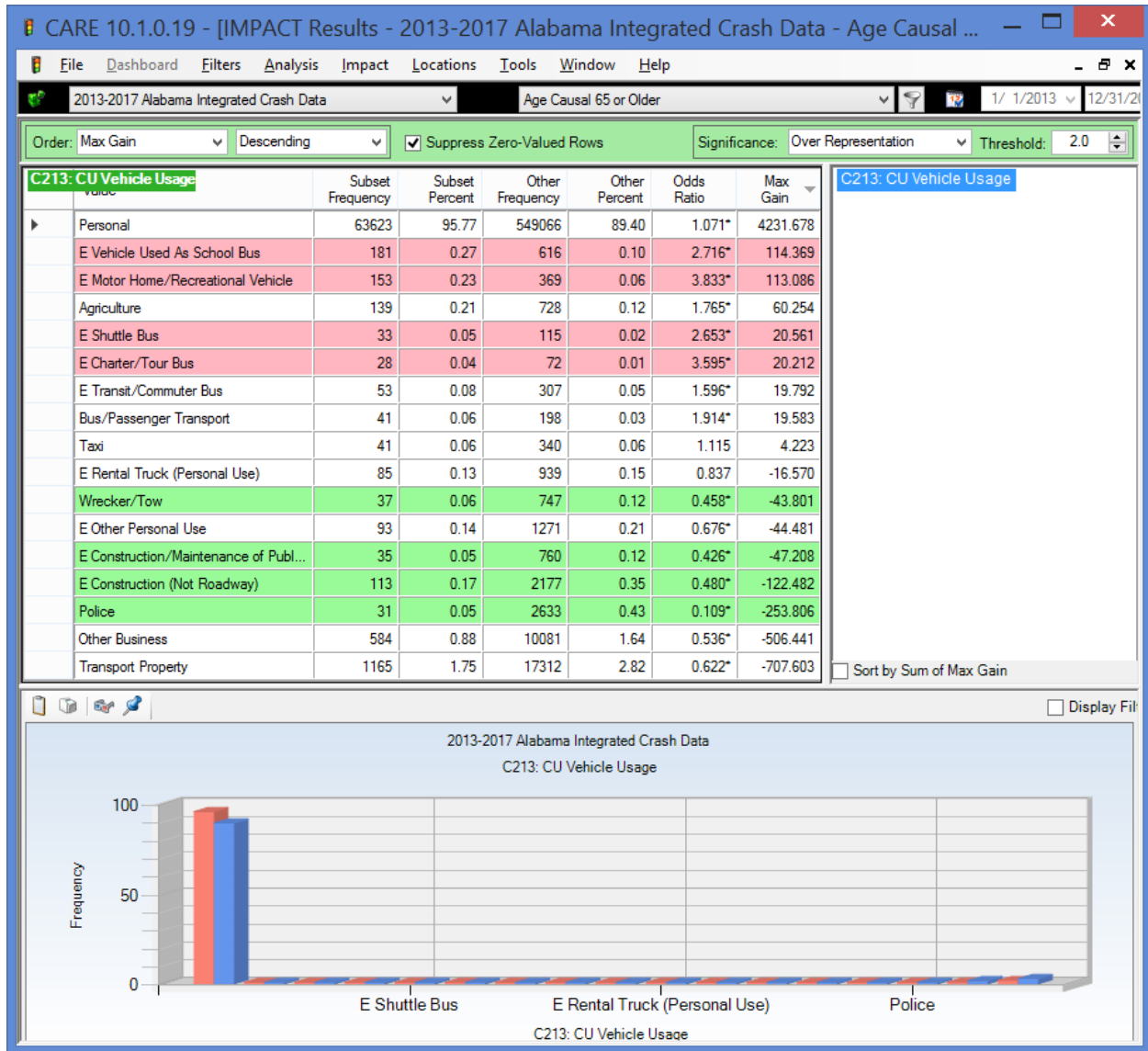
## C122 CU Driver Officer Opinion Alcohol



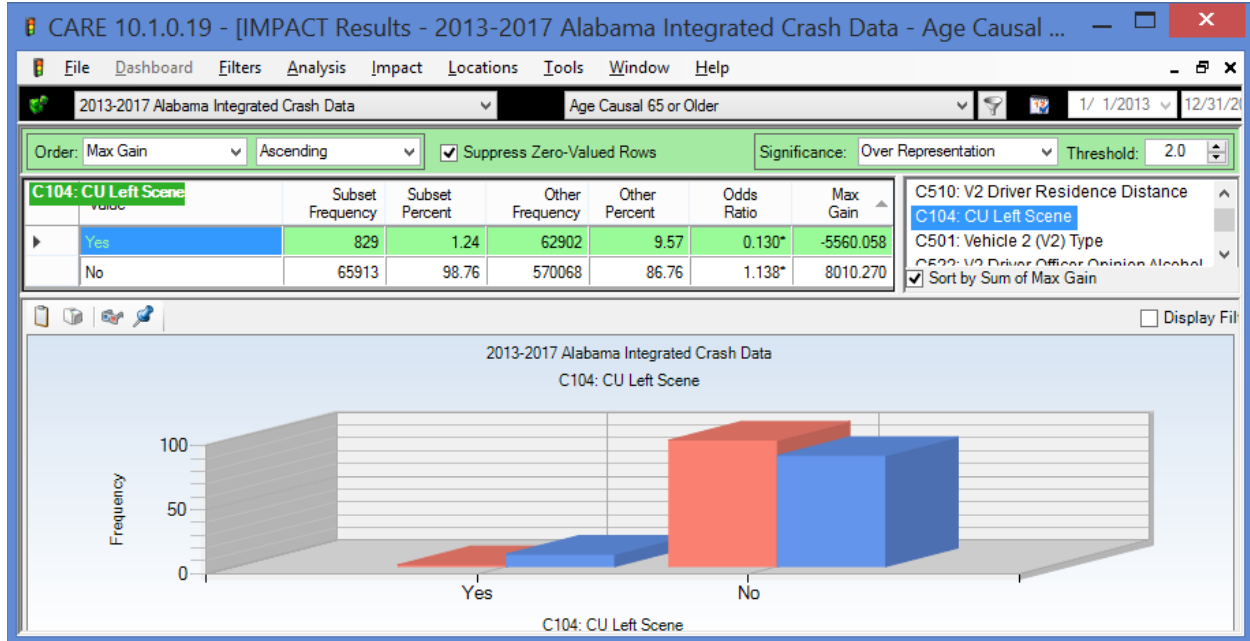
## C123 CU Driver Officer Opinion Drugs



## C213 CU Vehicle Usage

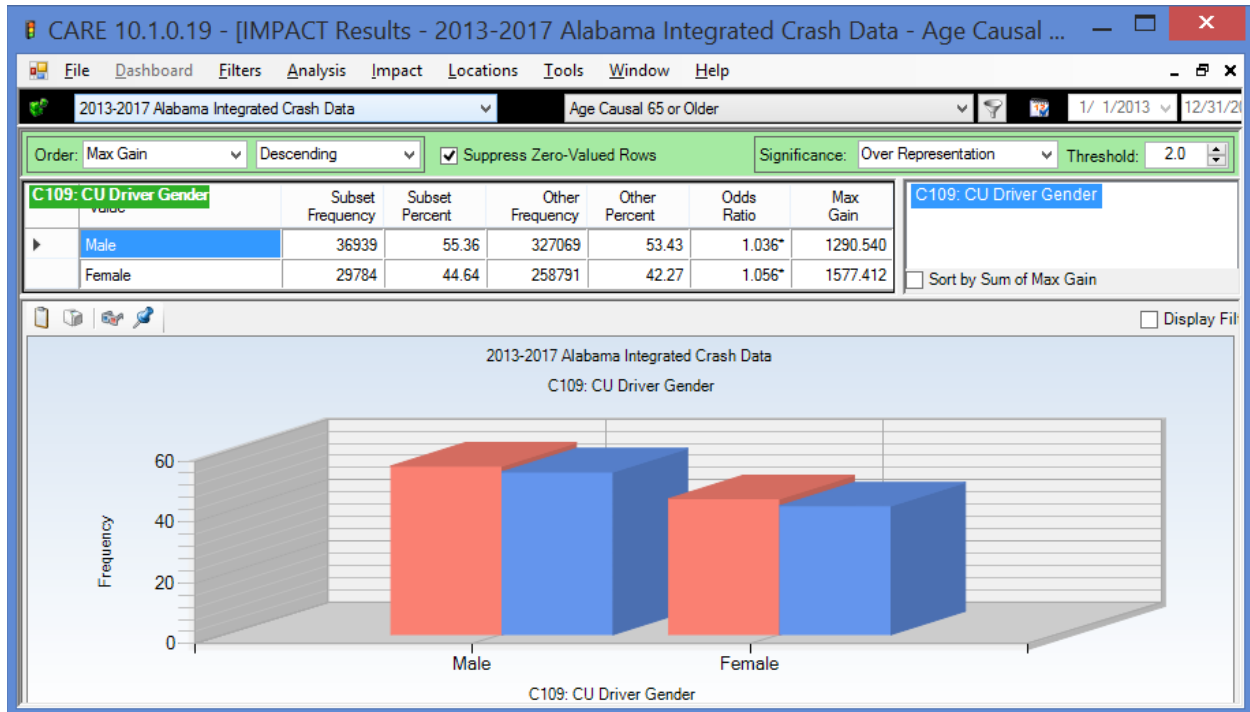


## C104 CU Left the Scene





## C109 CU Driver Gender



## Driver Gender by Severity

CARE 10.1.0.19 - [Crosstab Results - 2013-2017 Alabama Integrated Crash Data - Filter = Age...]

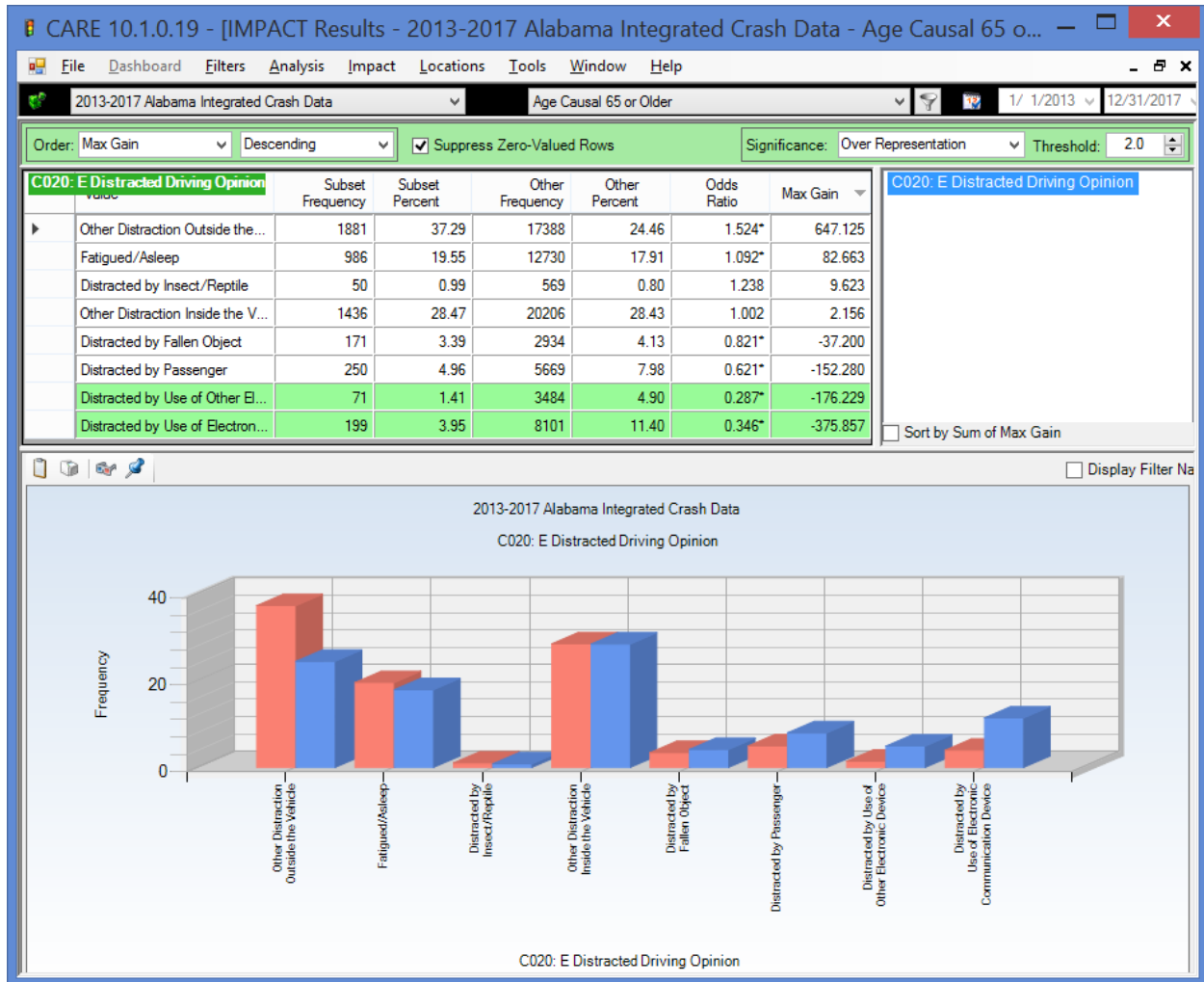
File Dashboard Filters Analysis Crosstab Locations Tools Window Help

2013-2017 Alabama Integrated Crash Data Age Causal 65 or Older 1/ 1/2013 12/31/2017

Suppress Zero Values: None Select Cells: Column: Crash Severity ; Row: CU Driver Gender

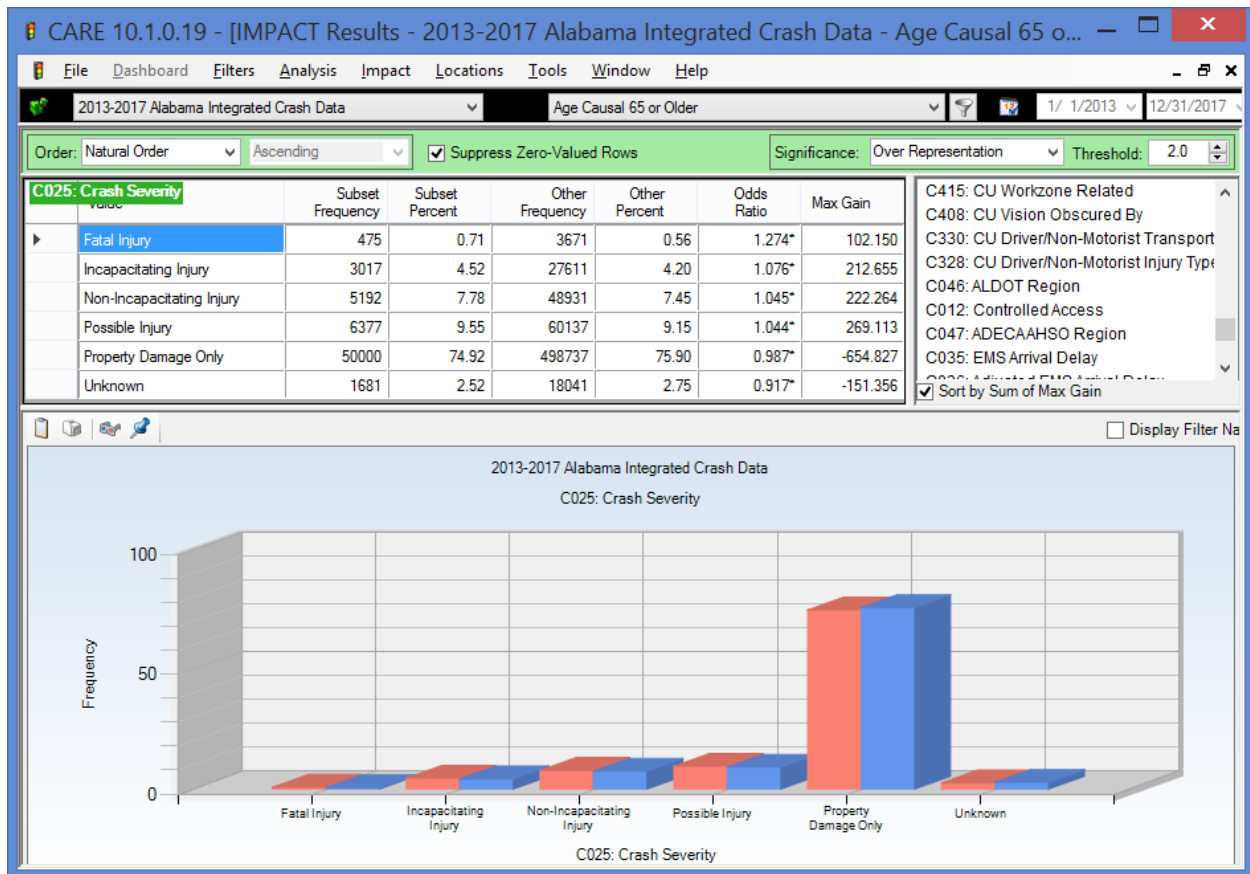
	Fatal Injury	Incapacitating Injury	Non-Incapacitating Inju	Possible Injury	Property Damage Only	Unknown	TOTAL
Male	333 70.11%	1697 56.25%	2940 56.63%	3346 52.47%	27714 55.43%	909 54.07%	36939 55.35%
Female	142 29.89%	1319 43.72%	2252 43.37%	3029 47.50%	22272 44.54%	770 45.81%	29784 44.63%
Unknown	0 0.00%	0 0.00%	0 0.00%	2 0.03%	9 0.02%	2 0.12%	13 0.02%
Not Applicable	0 0.00%	1 0.03%	0 0.00%	0 0.00%	5 0.01%	0 0.00%	6 0.01%
CU is Not a Vehicle	0 0.00%	0 0.00%	0 0.00%	0 0.00%	0 0.00%	0 0.00%	0 0.00%
CU is Unknown	0 0.00%	0 0.00%	0 0.00%	0 0.00%	0 0.00%	0 0.00%	0 0.00%
TOTAL	475 0.71%	3017 4.52%	5192 7.78%	6377 9.55%	50000 74.92%	1681 2.52%	66742 100.00%

## C020 E Distracted Driving Opinion

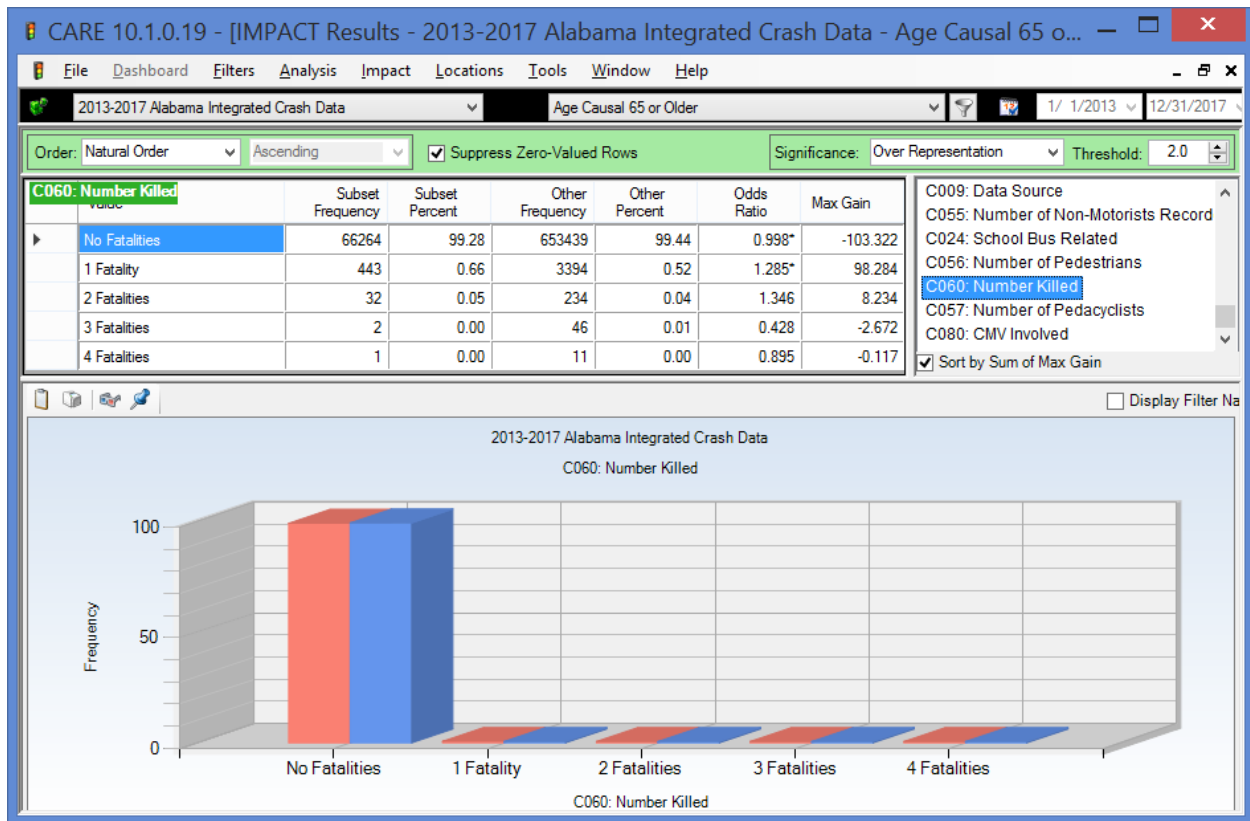


## Severity Characteristics

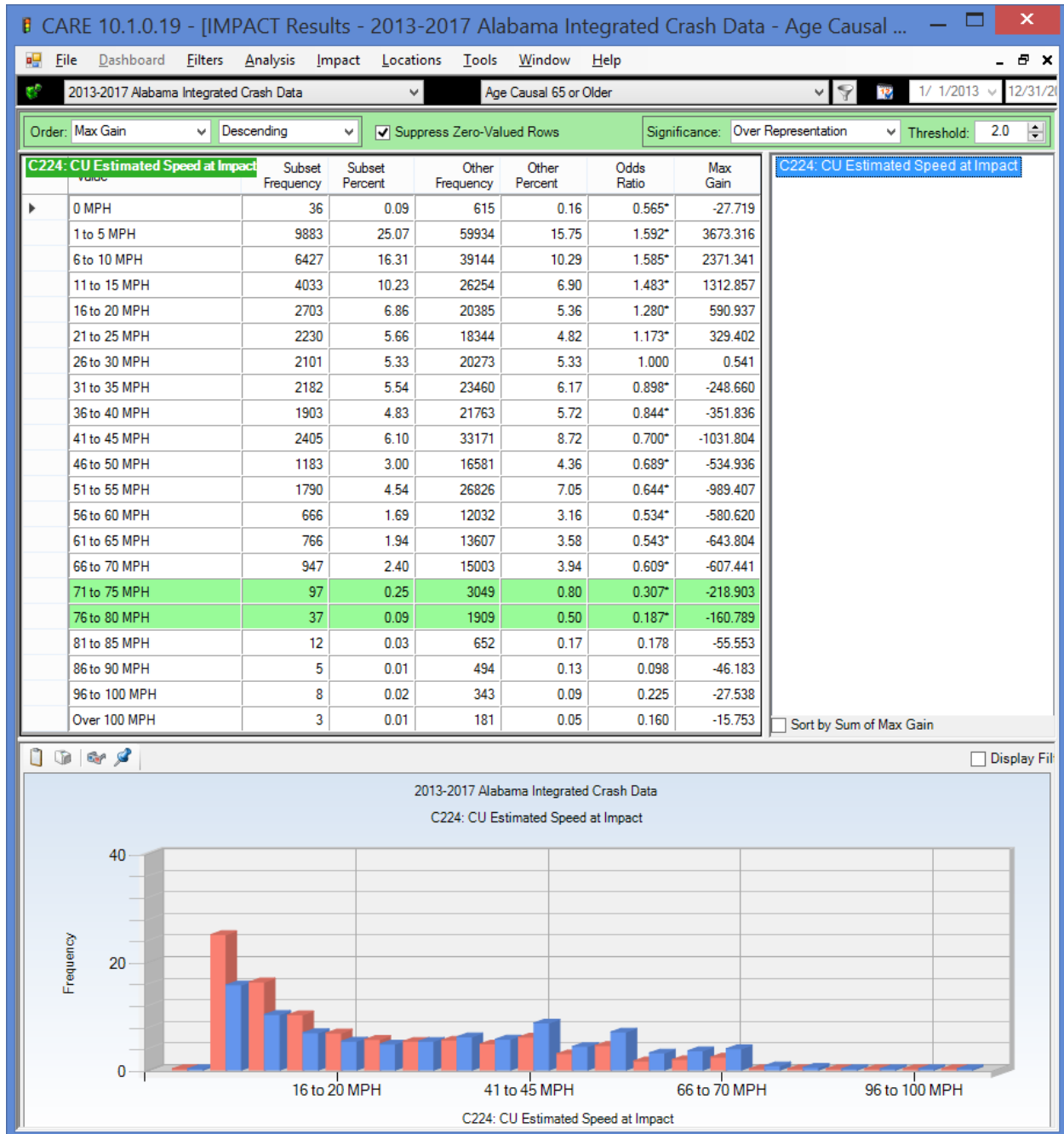
### C025 Crash Severity



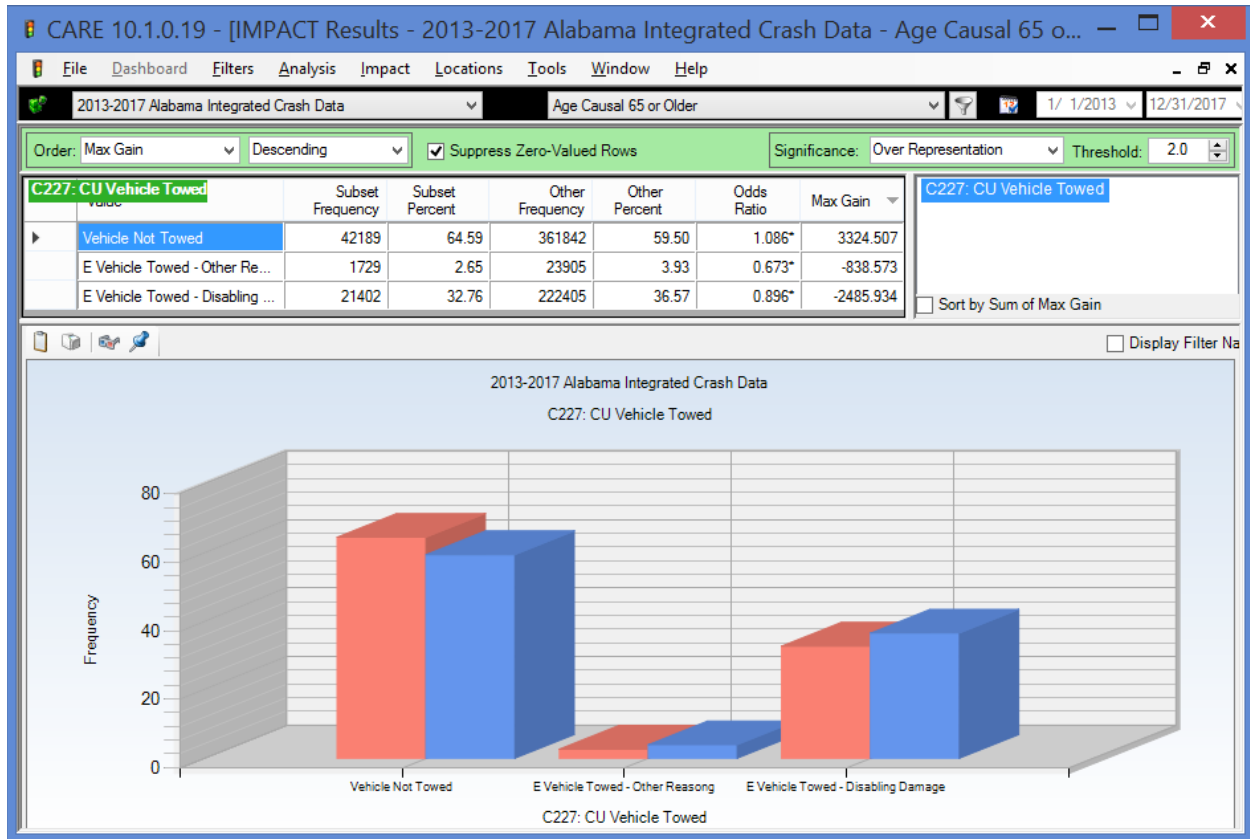
## C060 Number Killed



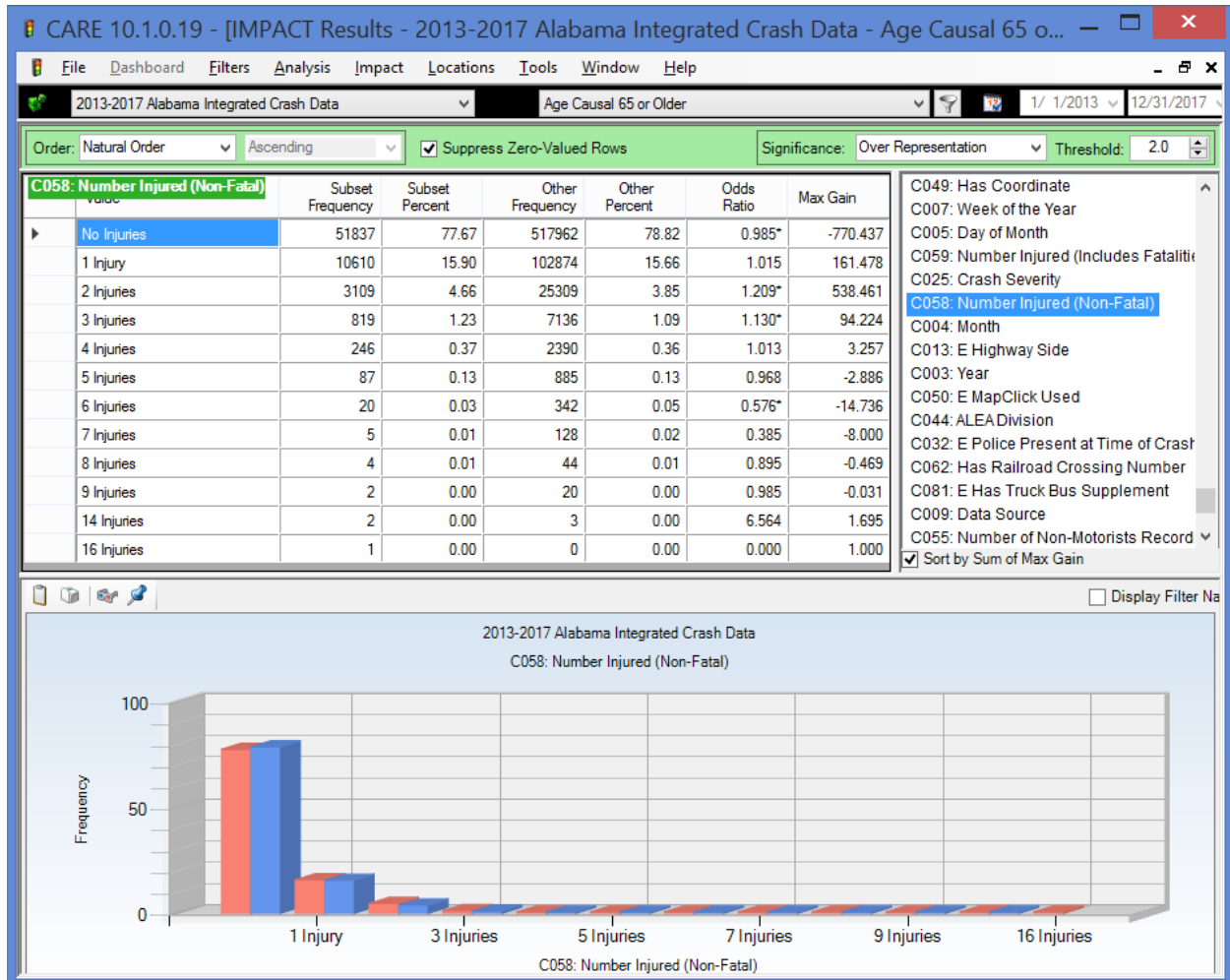
## C224 CU Estimated Speed at Impact



## C227 CU Vehicle Towed

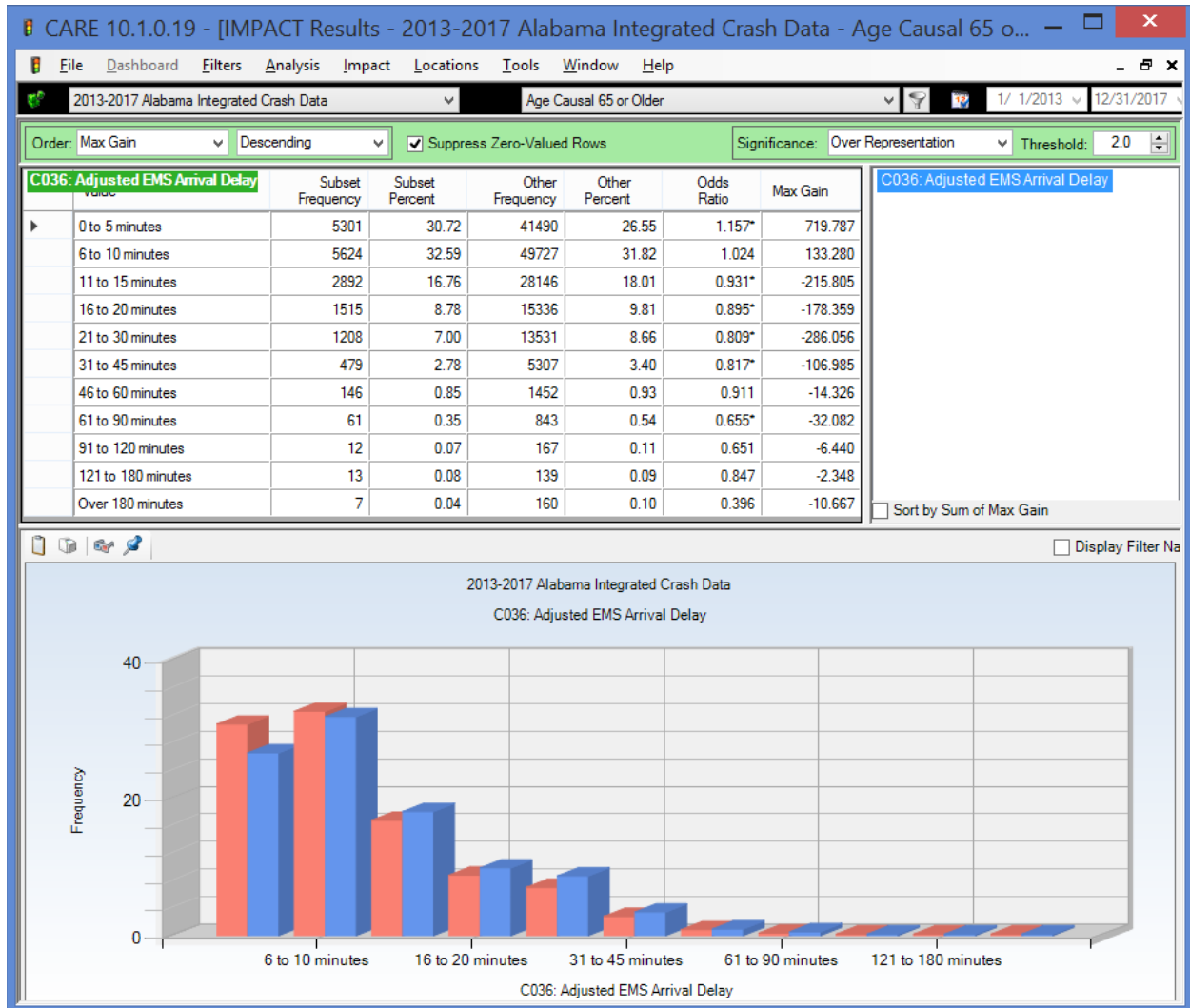


## C058 Number Injured (Non-Fatal)

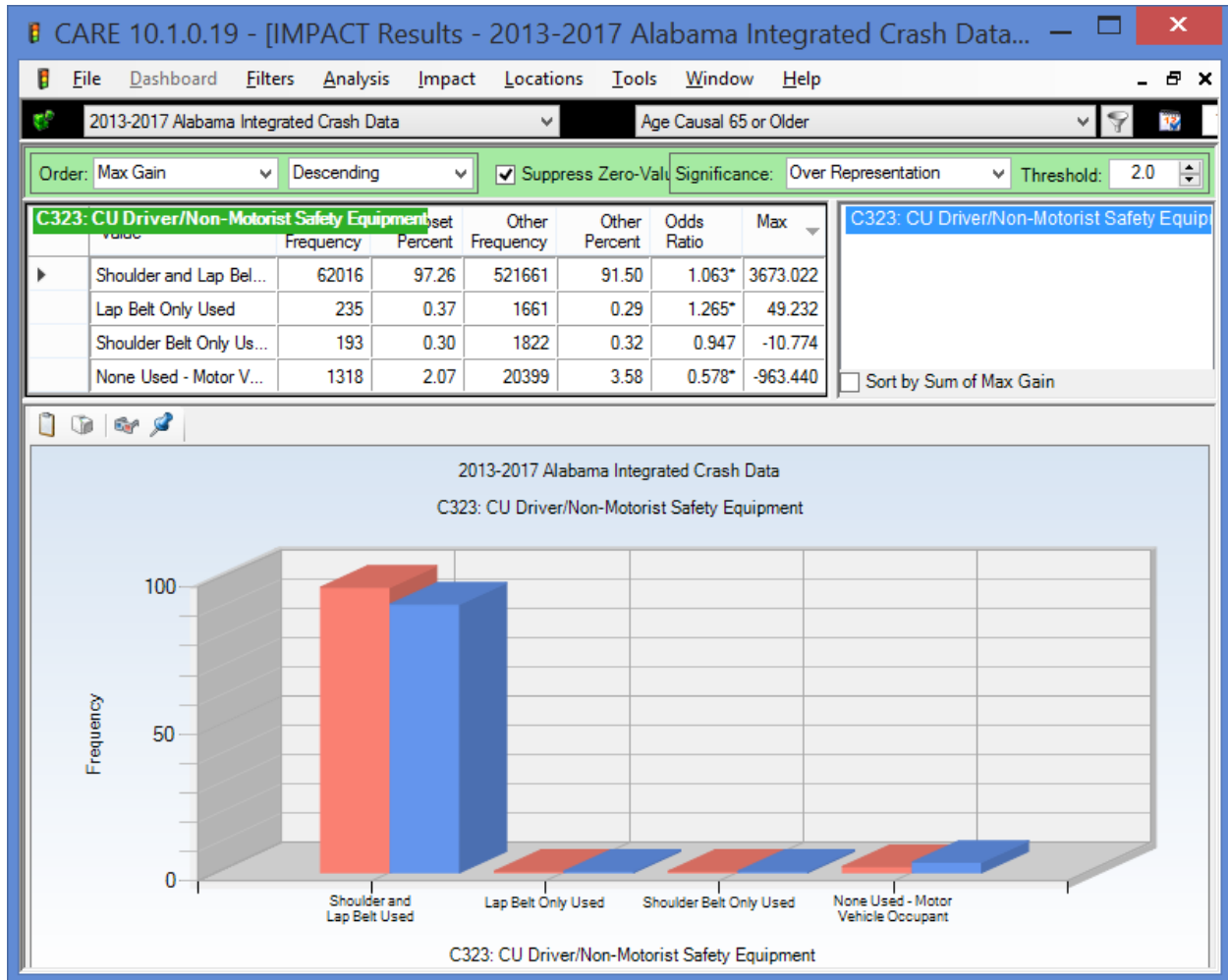




## C036 Adjusted EMS Arrival Delay



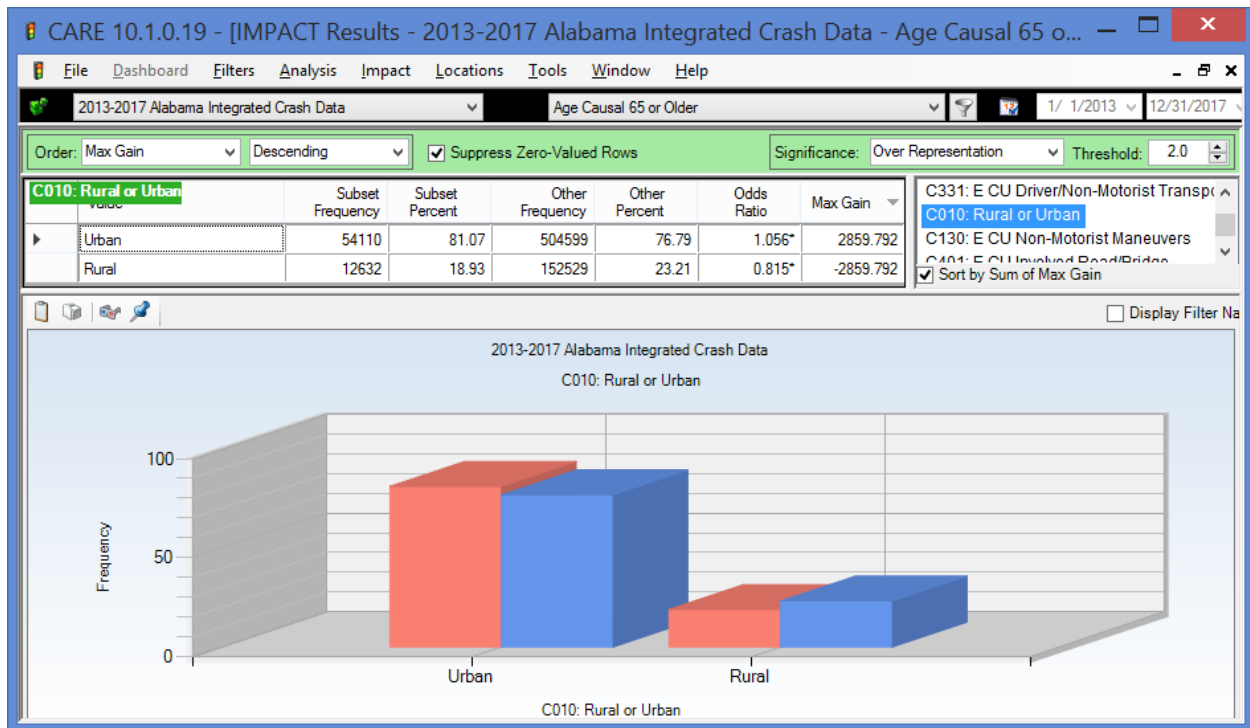
## C323 CU Driver Safety Equipment



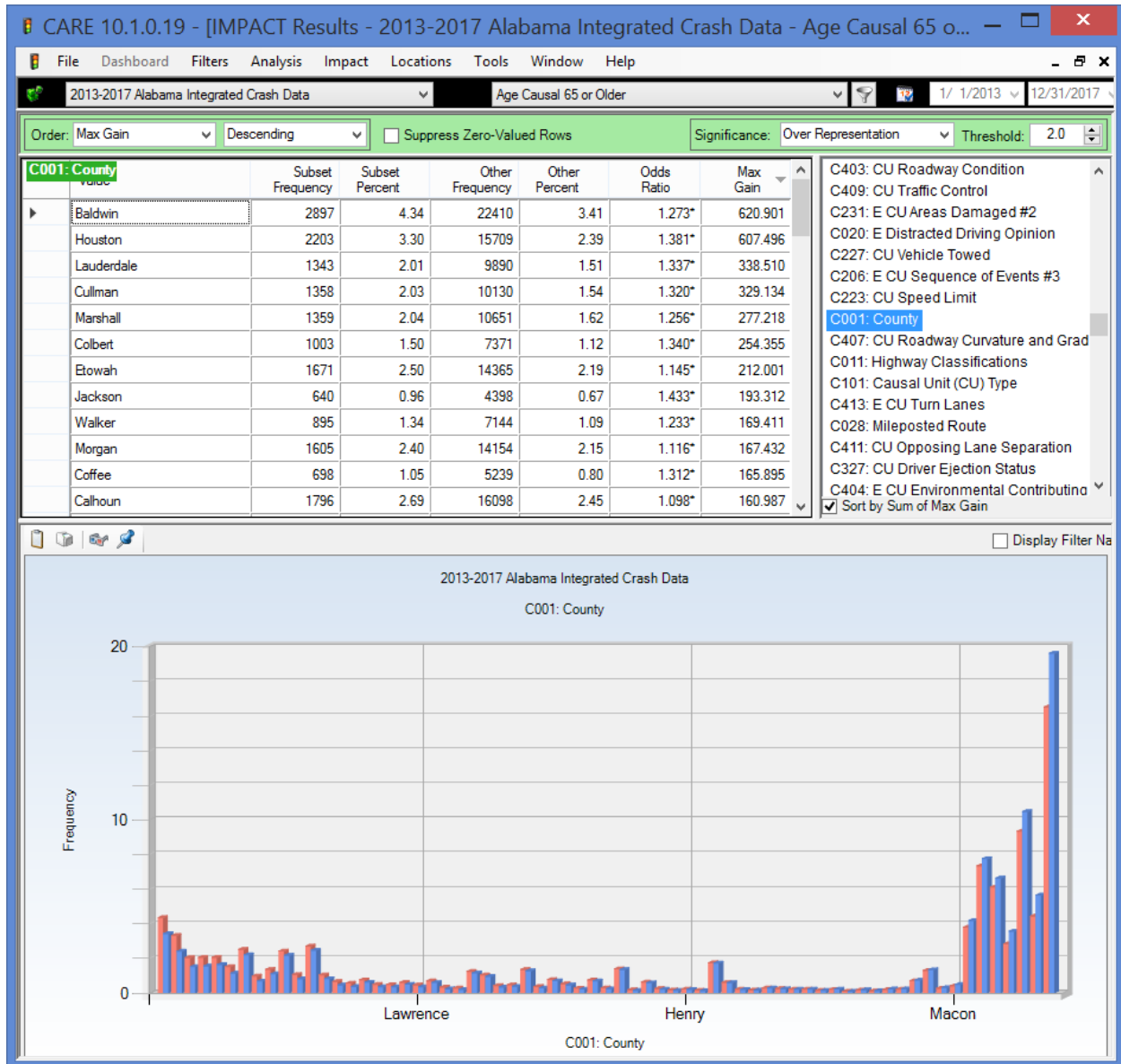
Senior drivers stack up favorably when it comes to seatbelt use.

## Geographical Characteristics

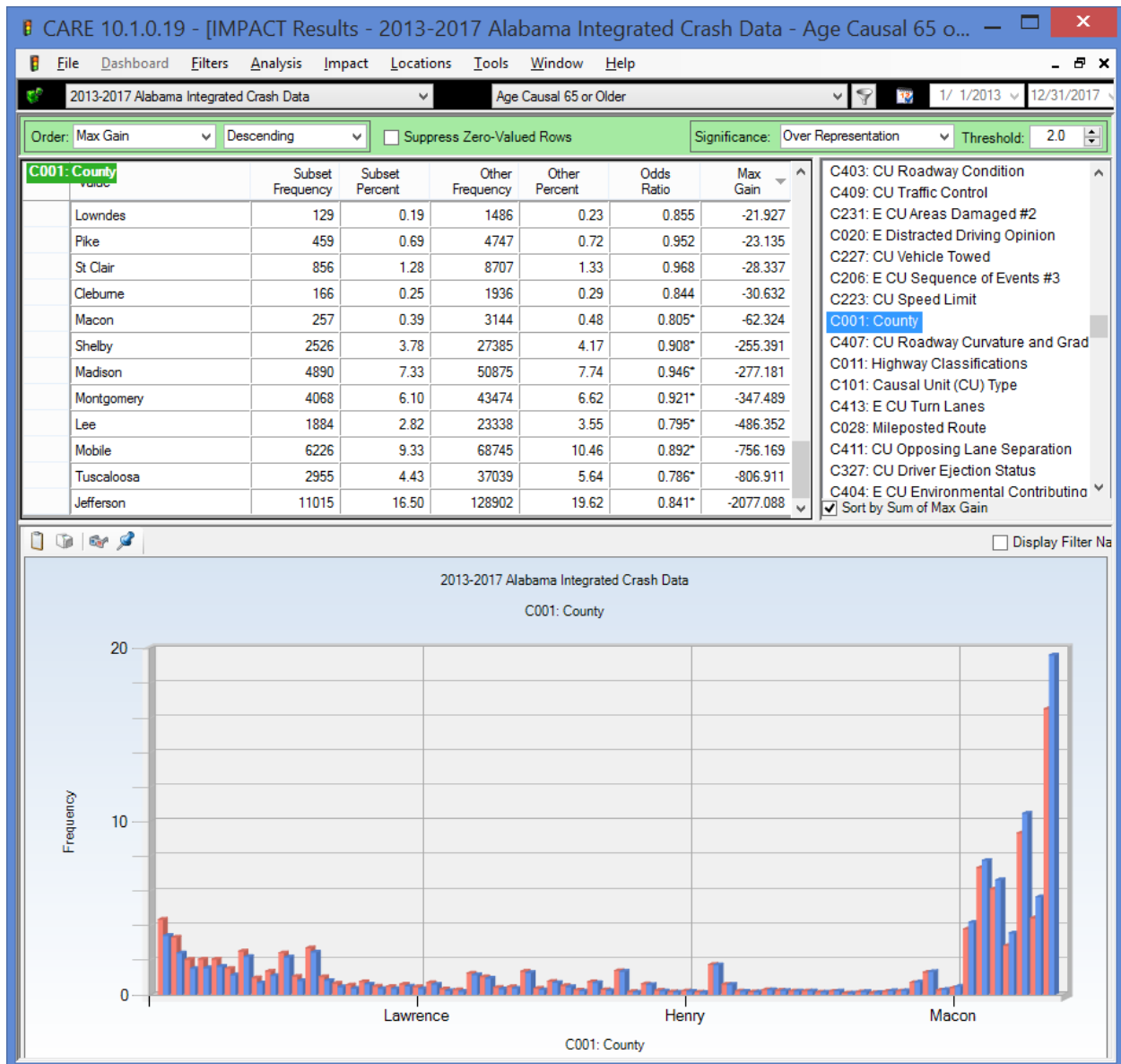
### C010 Rural or Urban



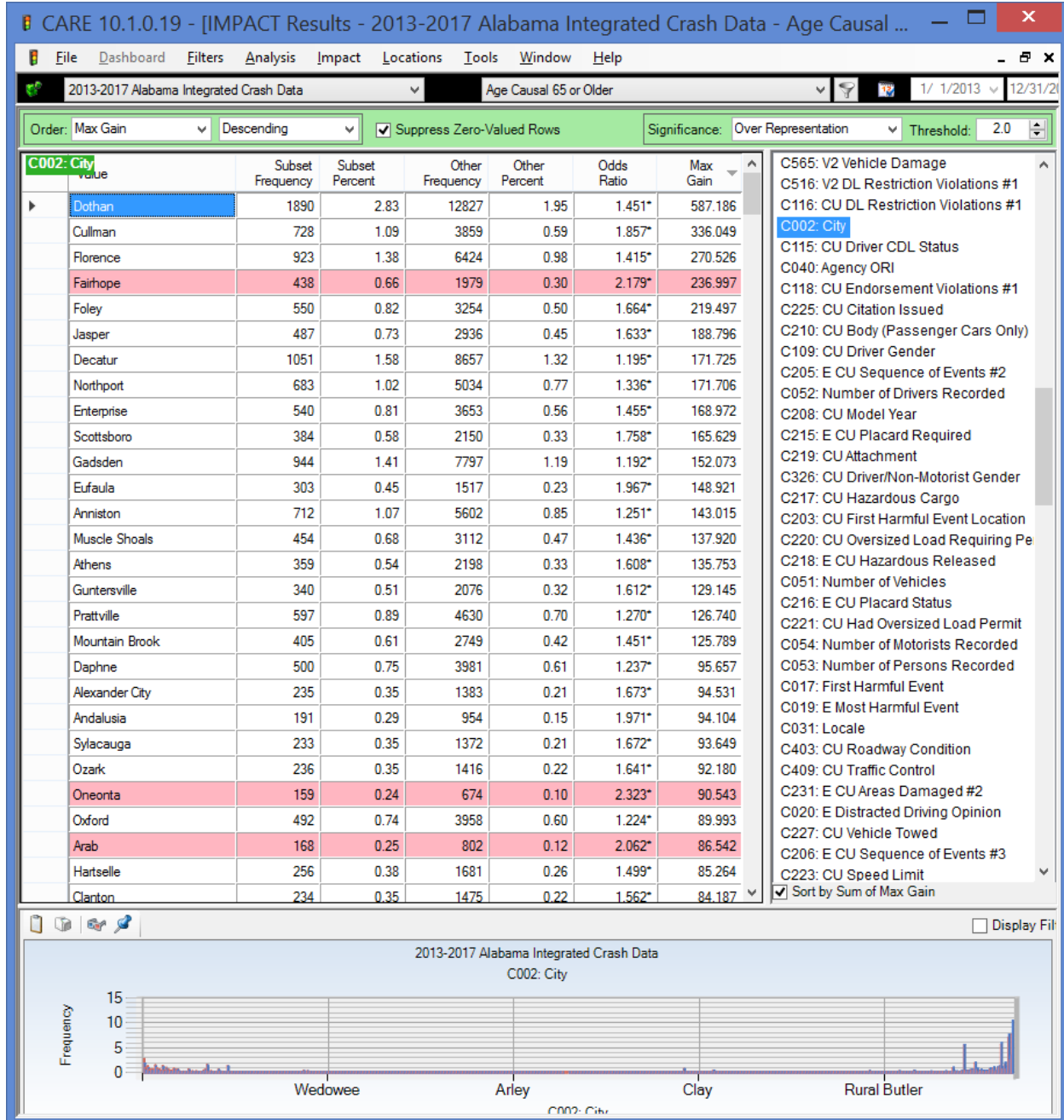
## C001 County – Over-Represented



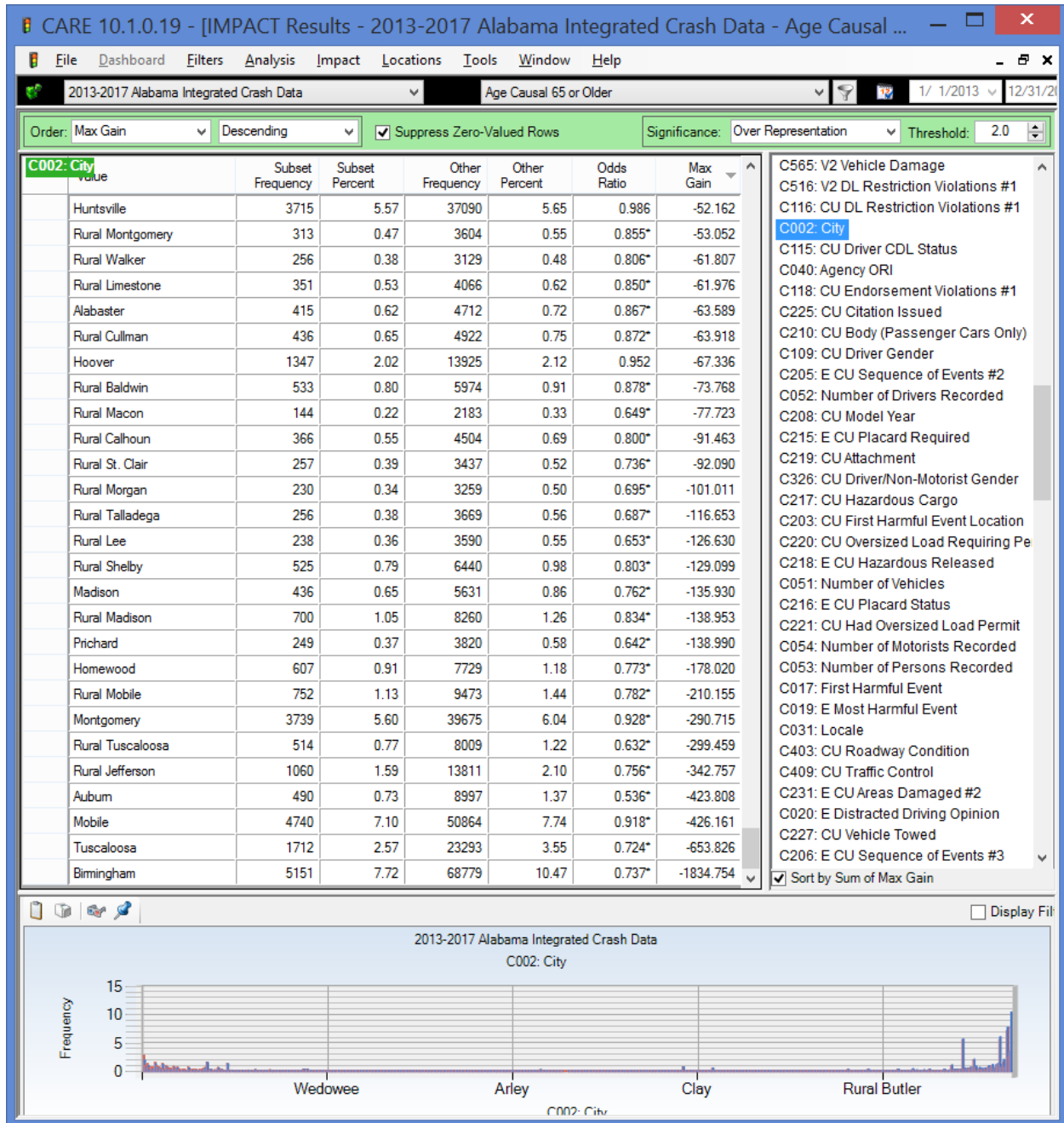
## C001 County – Under-Represented



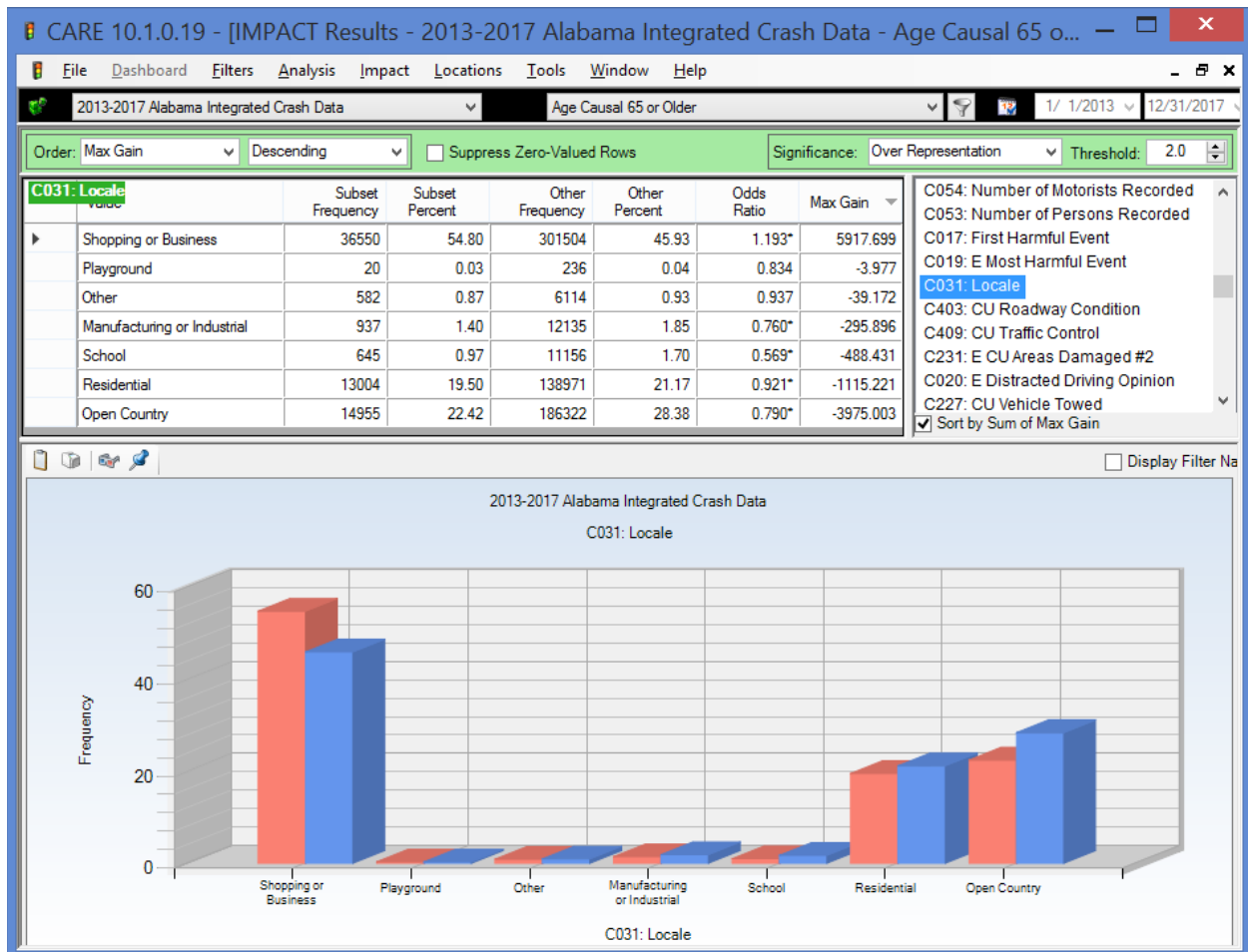
## C002 City Over-Represented



## C002 City Under-Represented

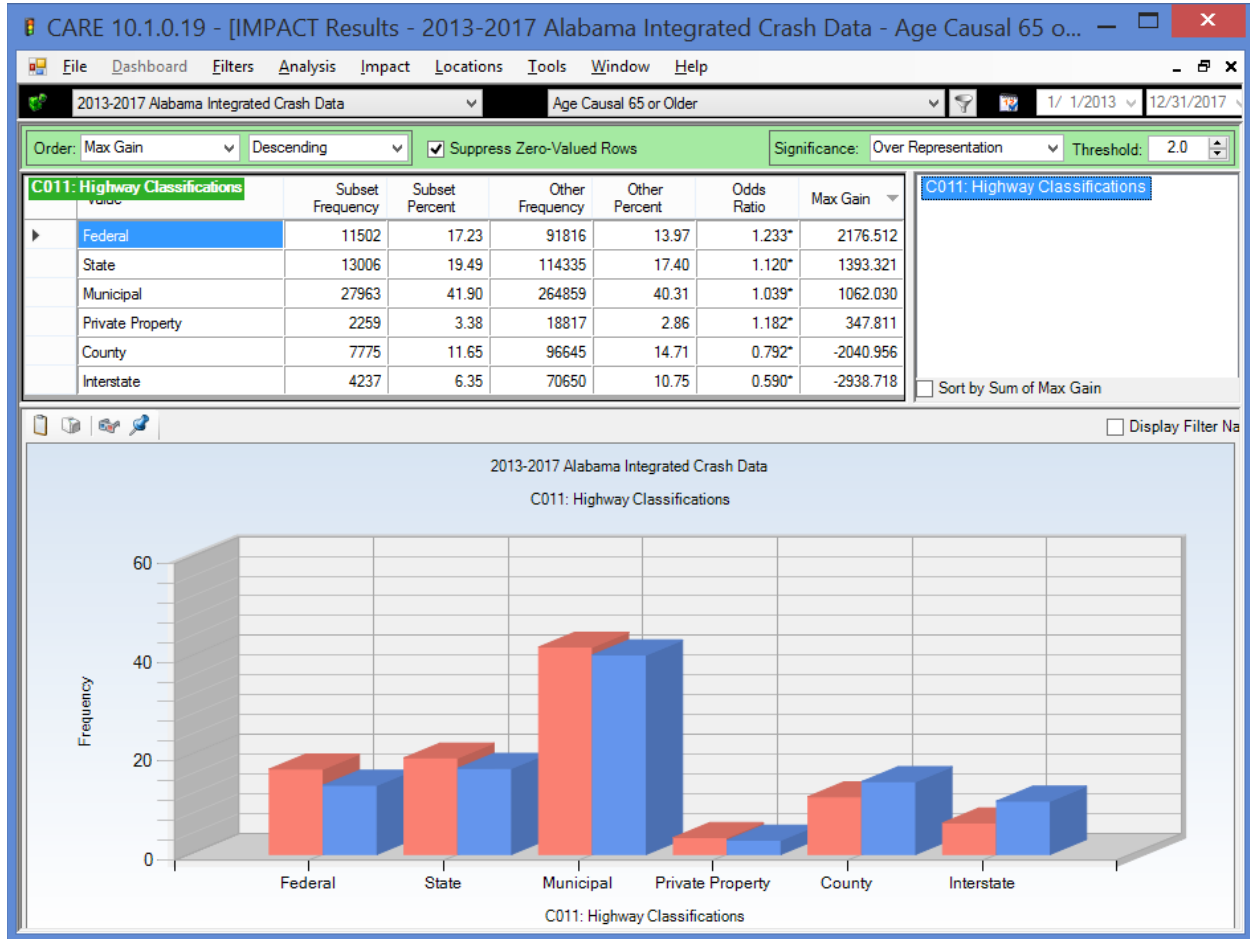


## C031 Locale

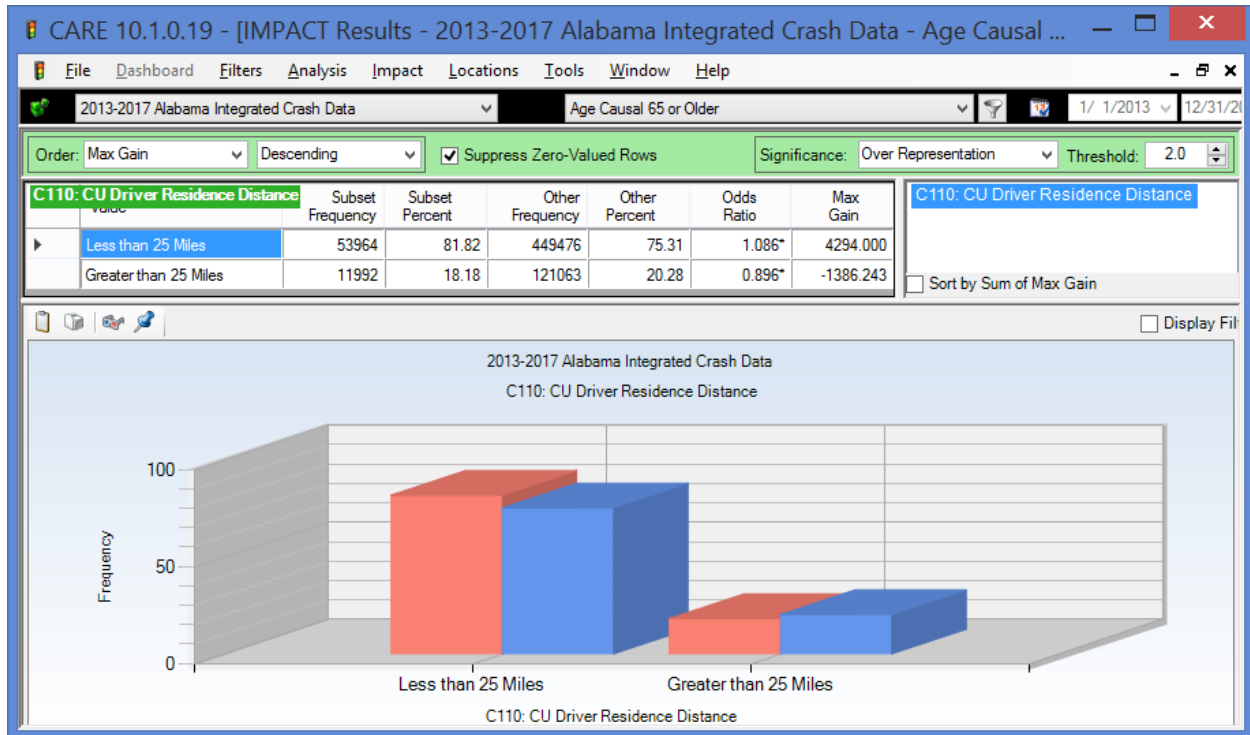




## C011 Highway Classifications

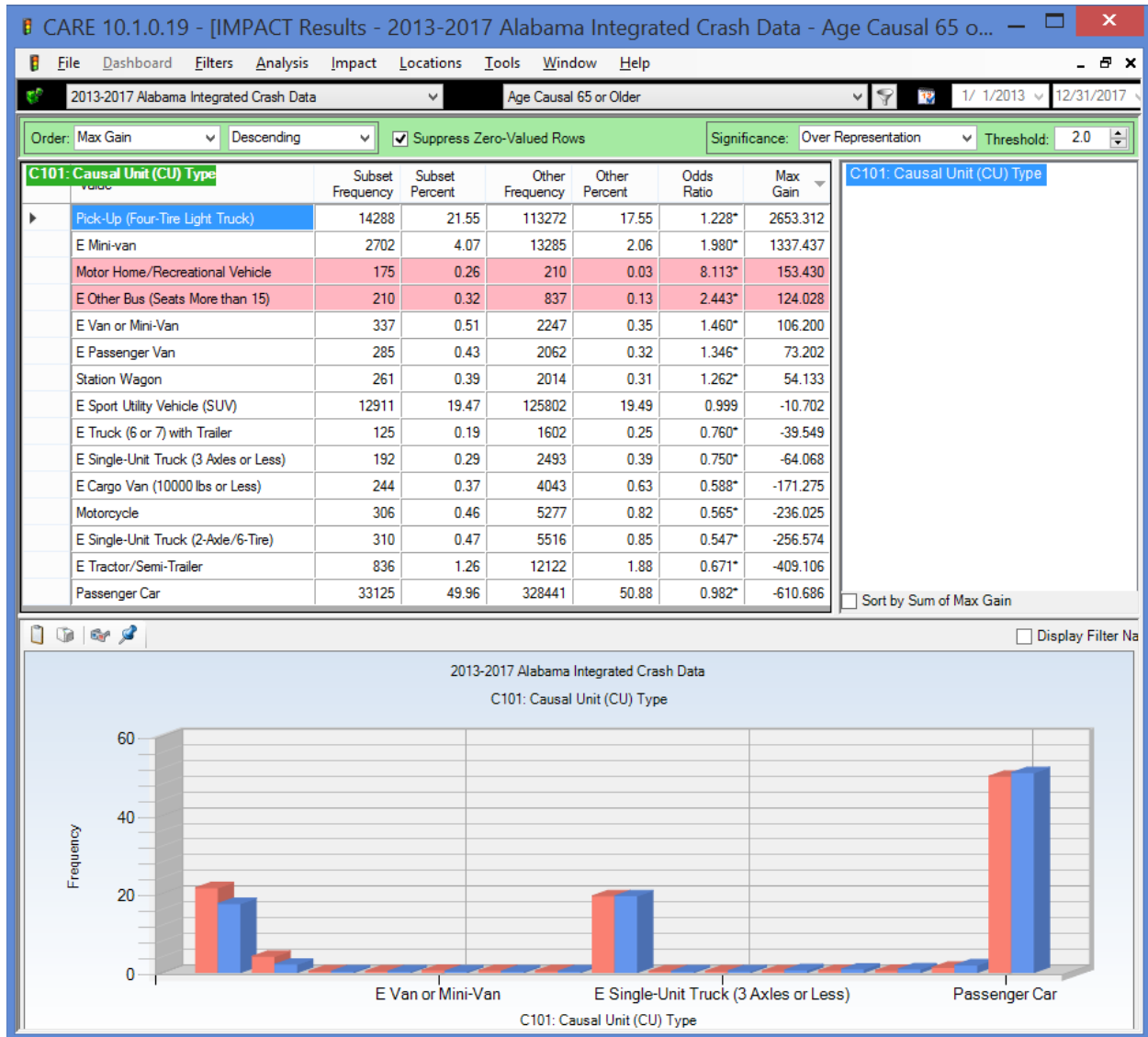


## C110 CU Driver Residence Distance

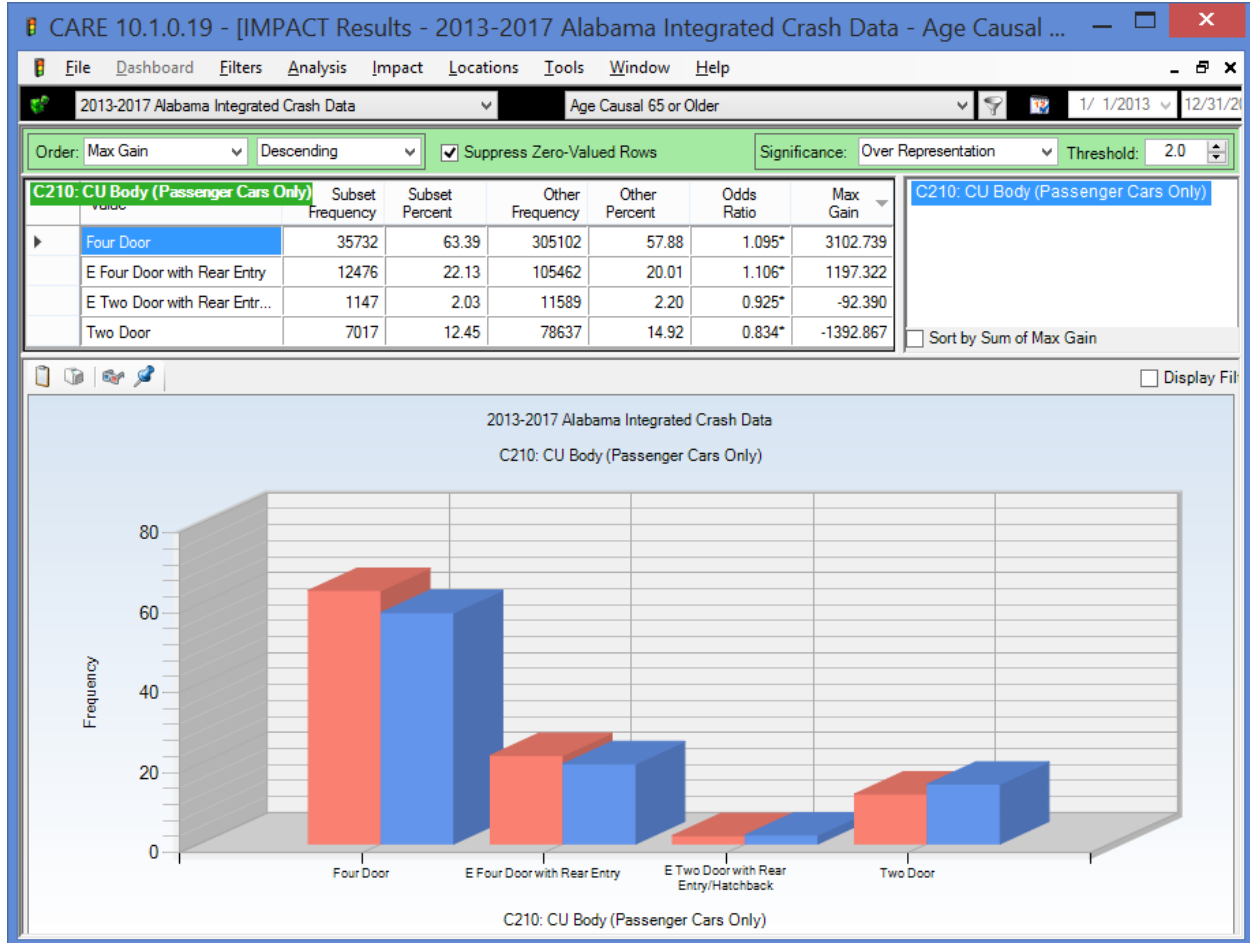


## Vehicle Characteristics

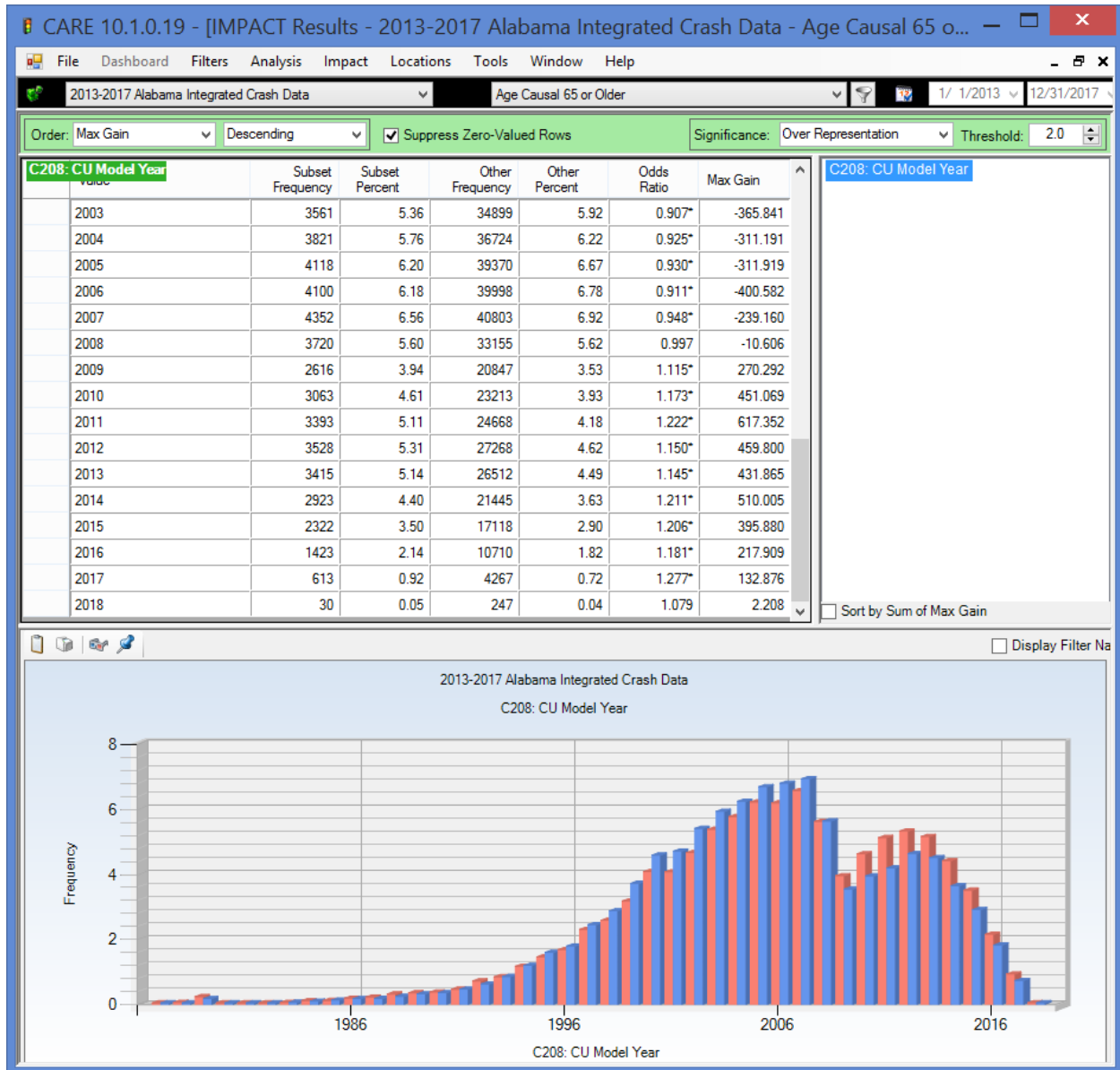
### C101 Causal Unit (CU) Type



## C201 CU Body (Passenger Cars Only)

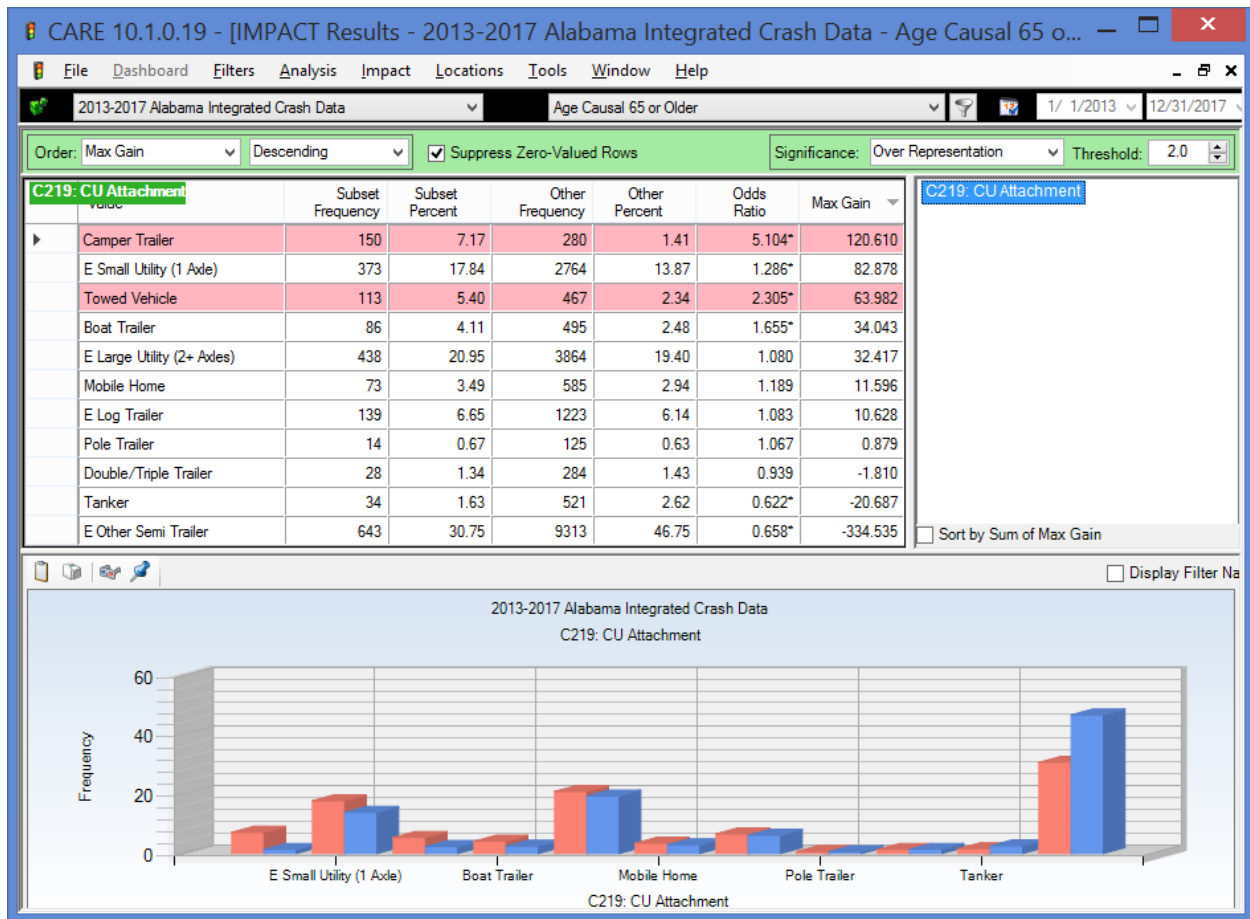


## C208 CU Model Year

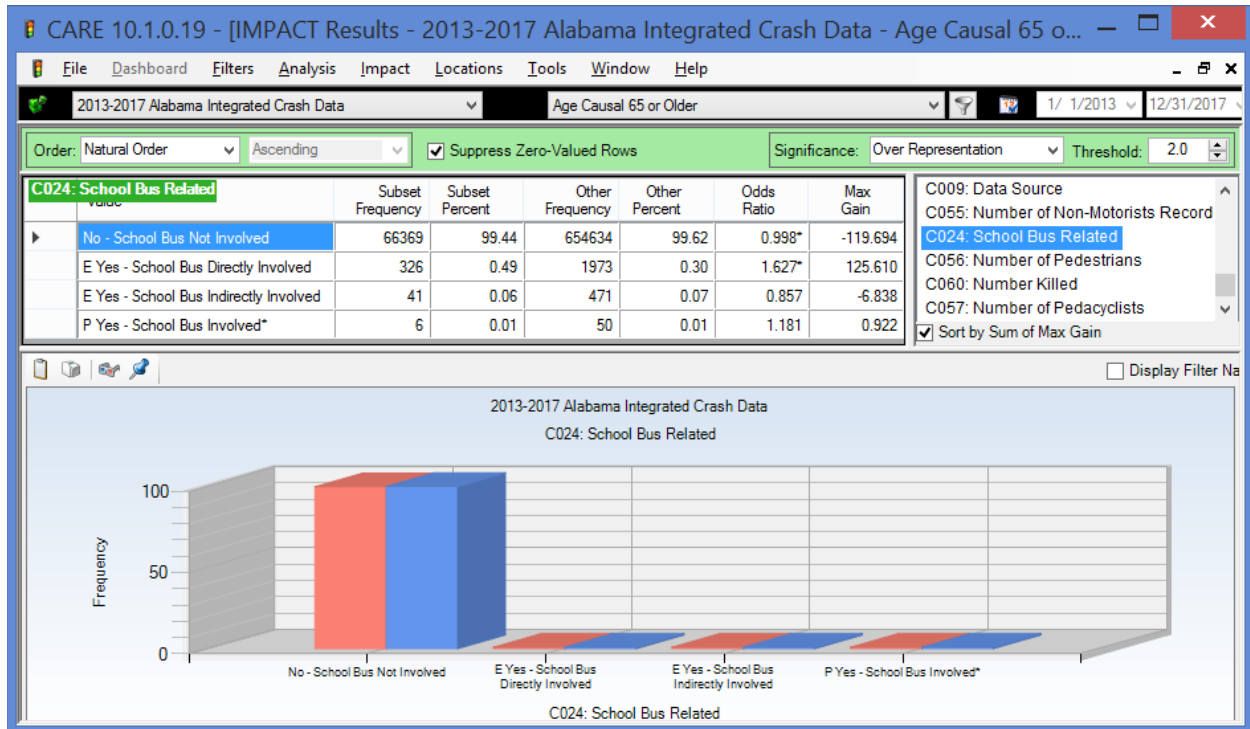


## C219 CU Attachments

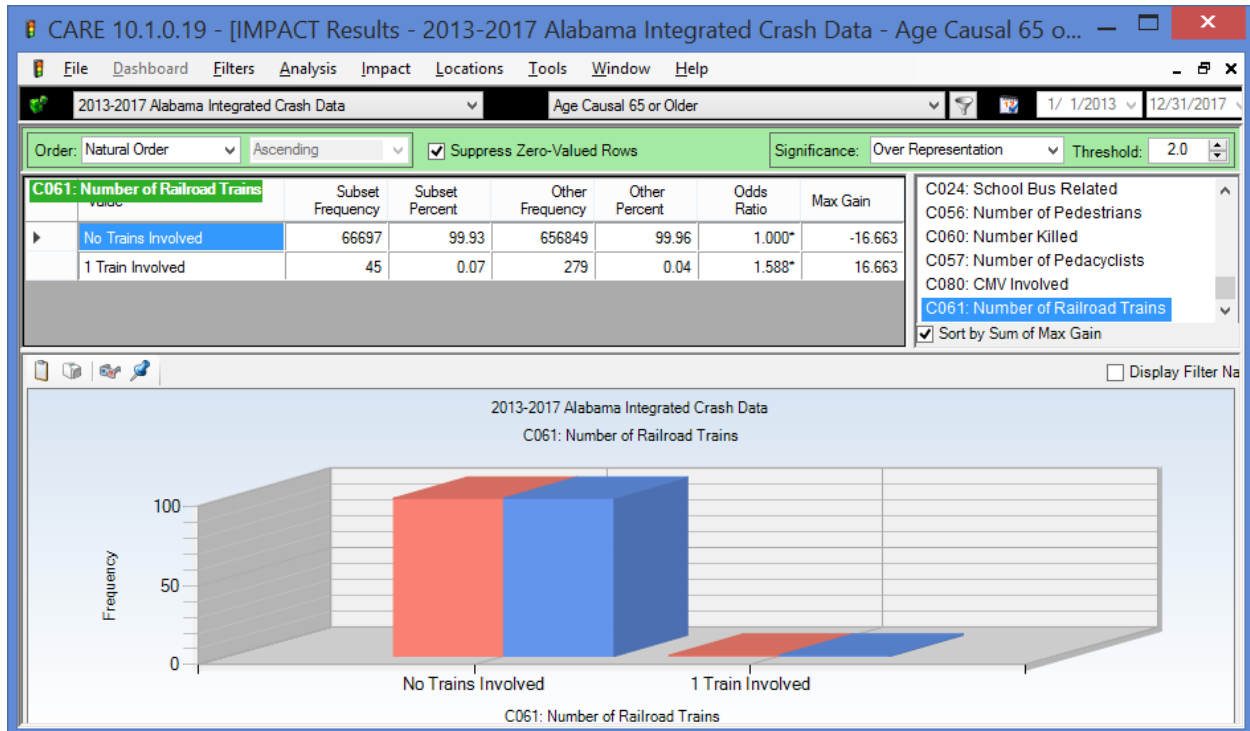
For crashes involving attachments



## C024 School Bus Related

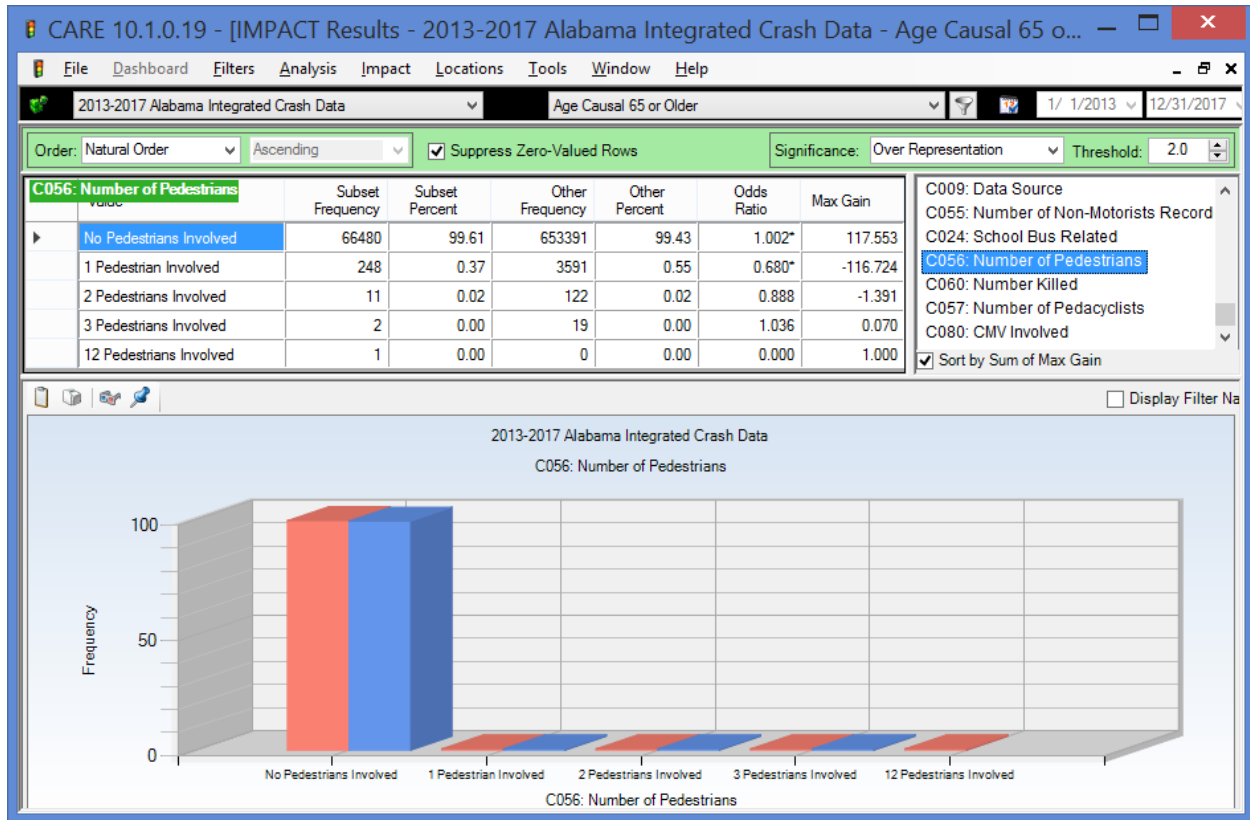


## C061 Train Involved



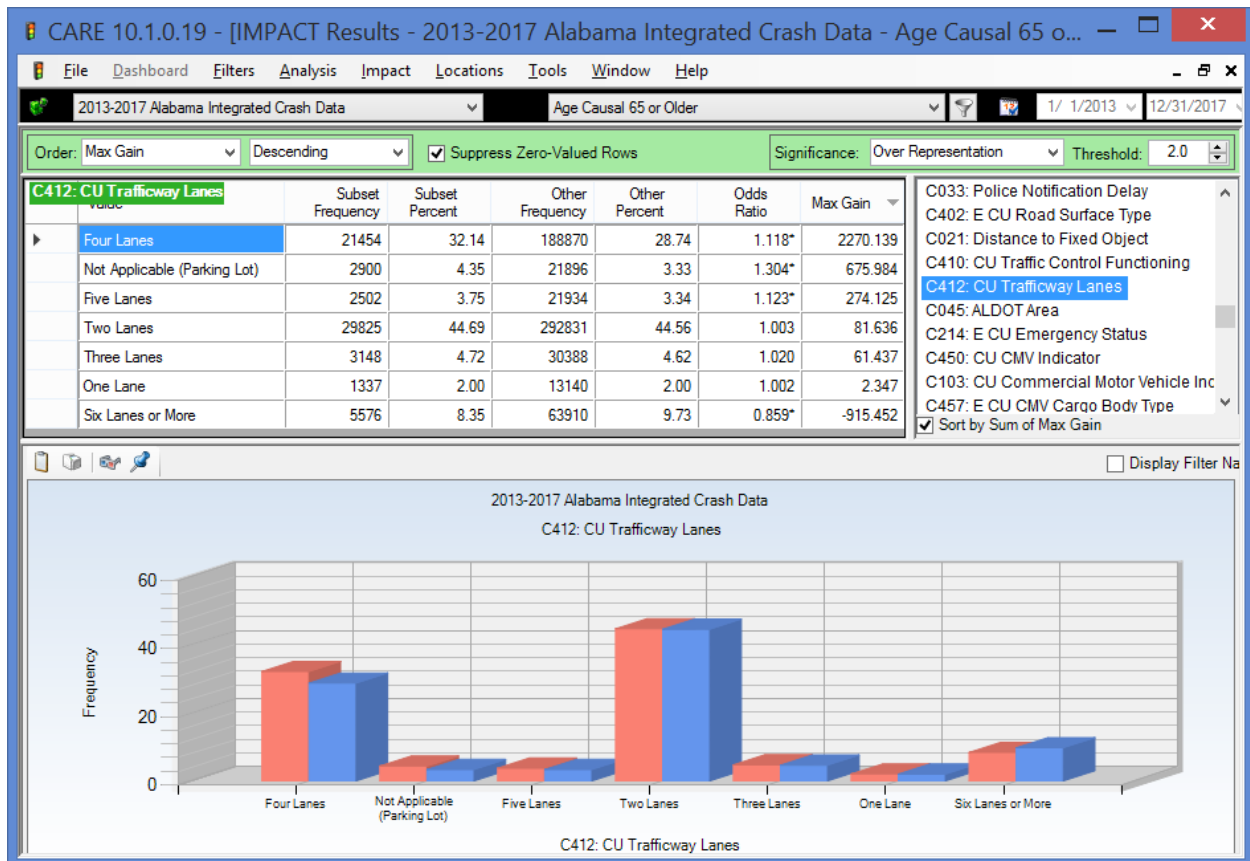


## C056 Number of Pedestrians

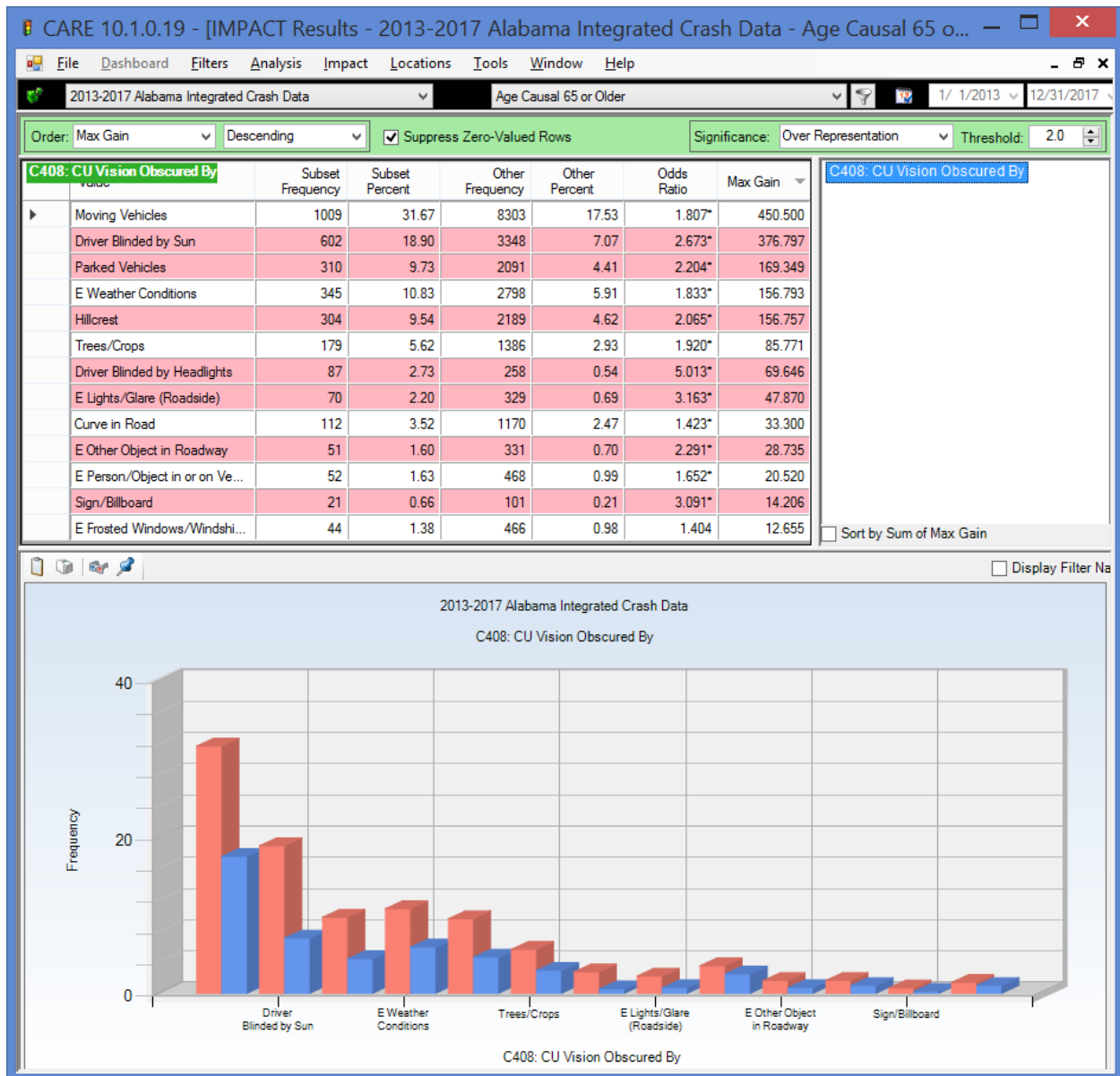


# Roadway Environment and Pavement Characteristics

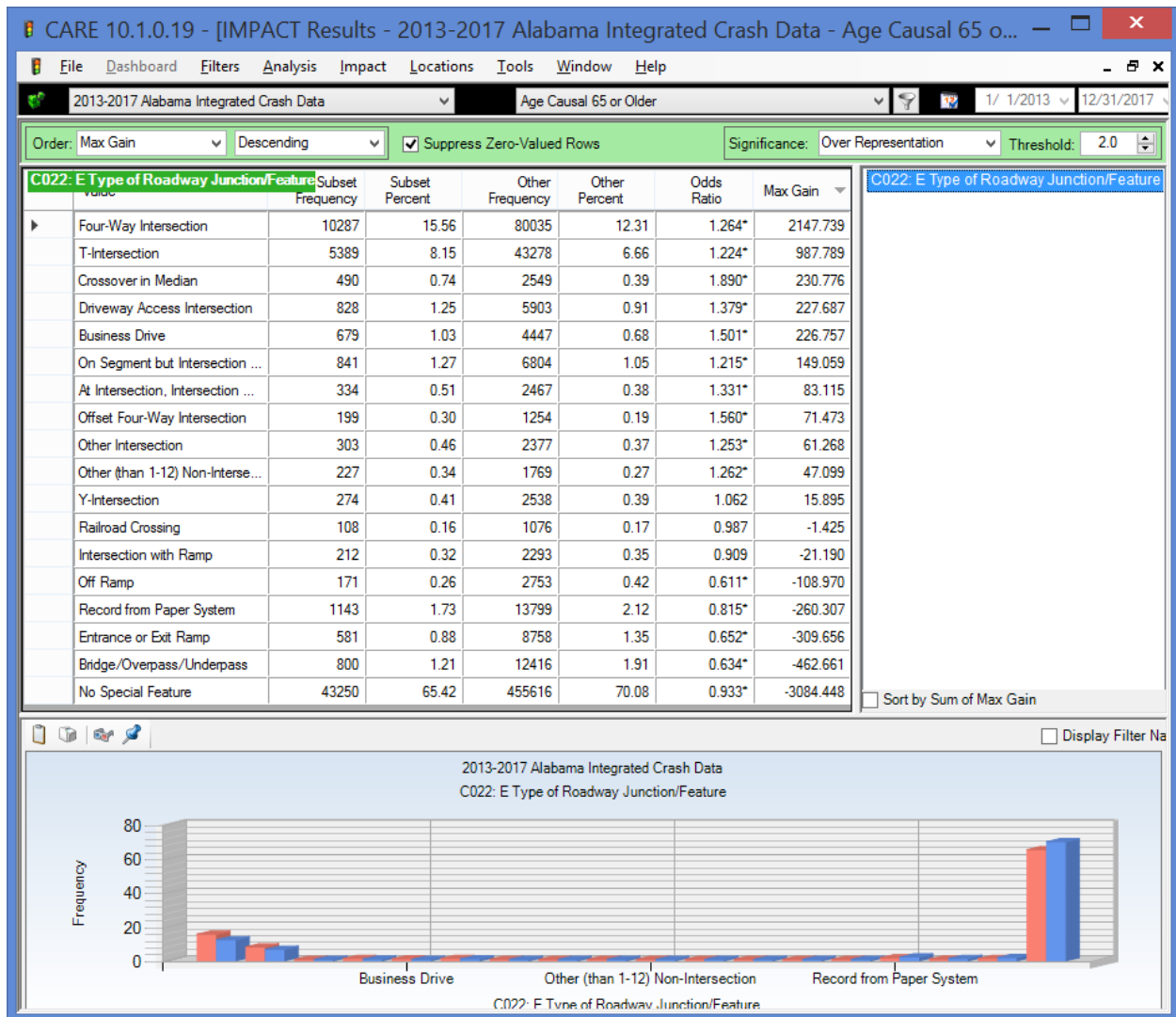
## C412 CU Traffic Lanes



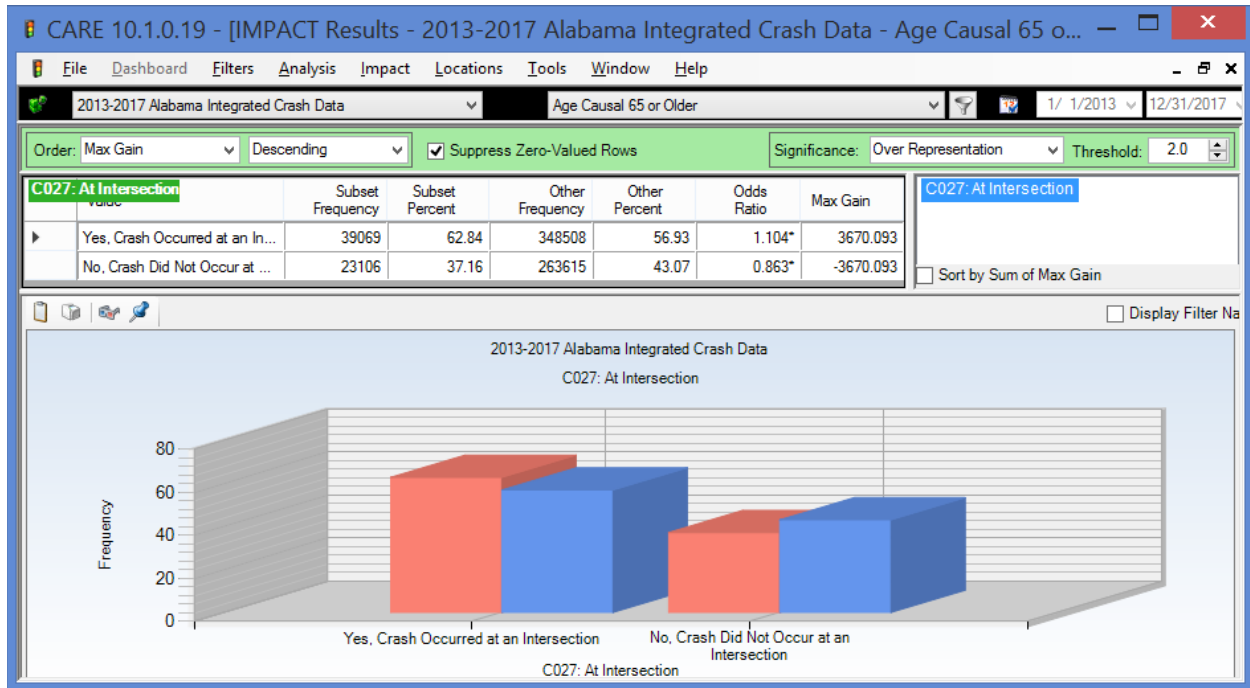
## C408 CU Vision Obscured By



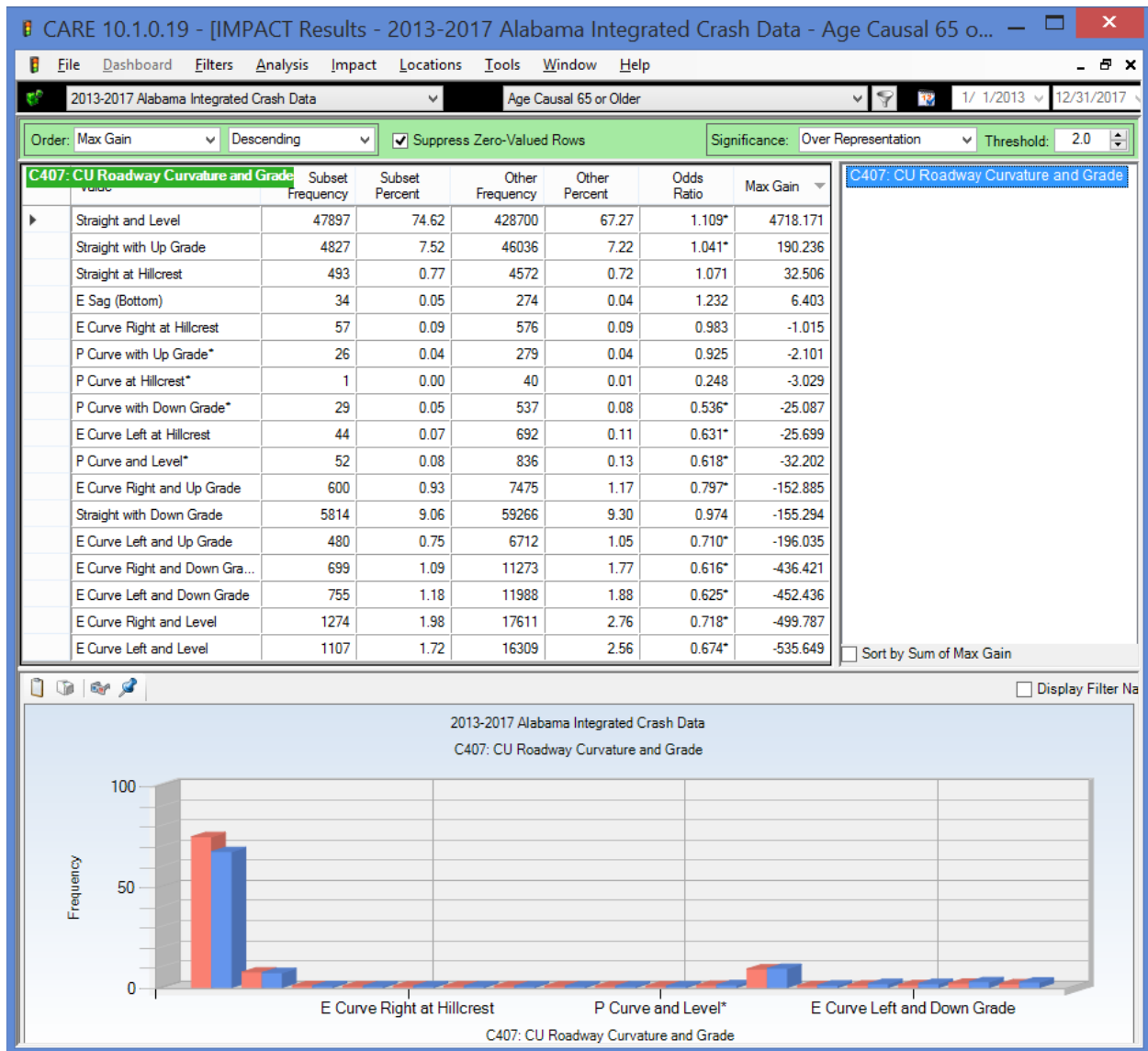
## C022 E Type of Roadway Junction Feature



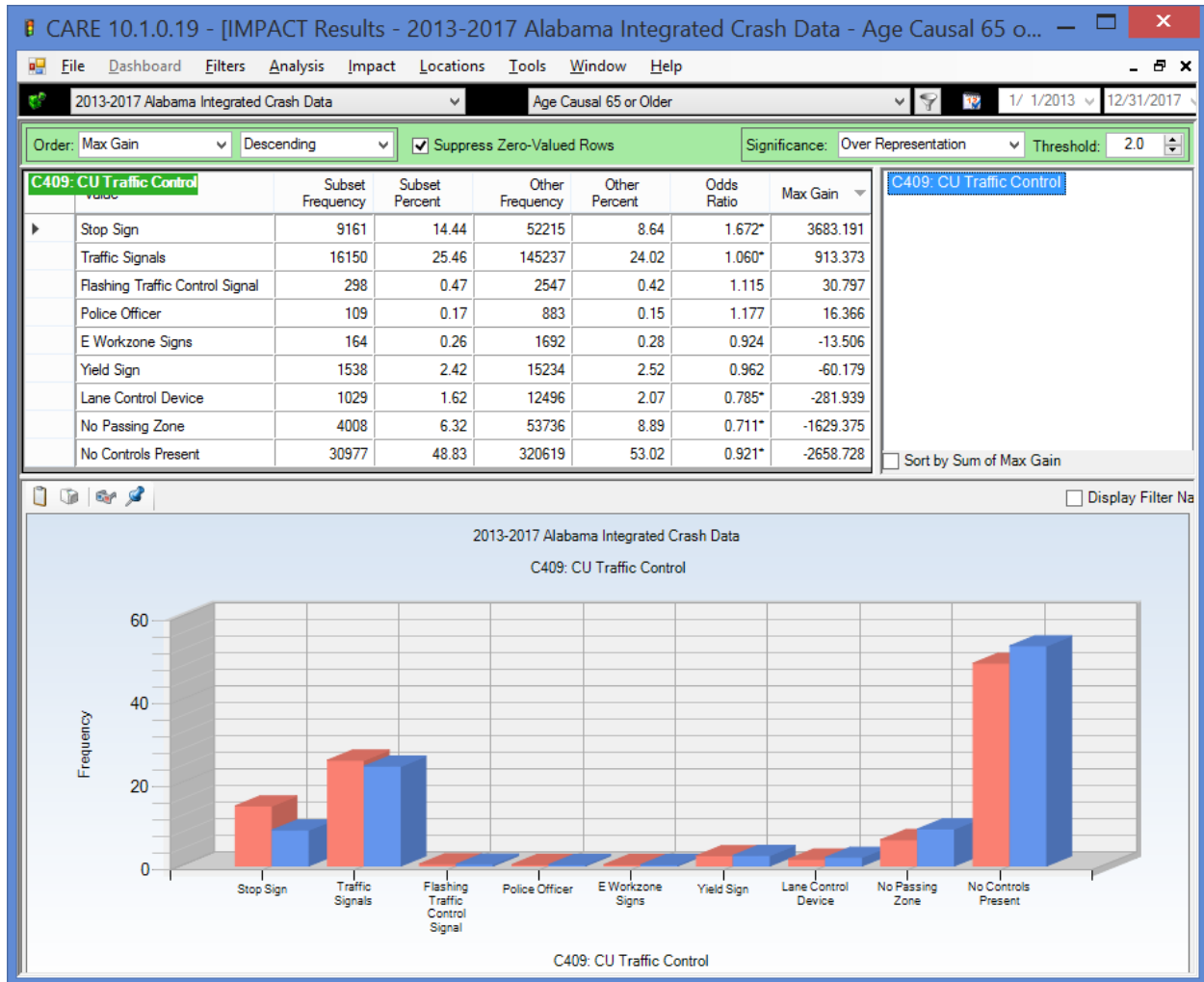
## C027 At Intersection



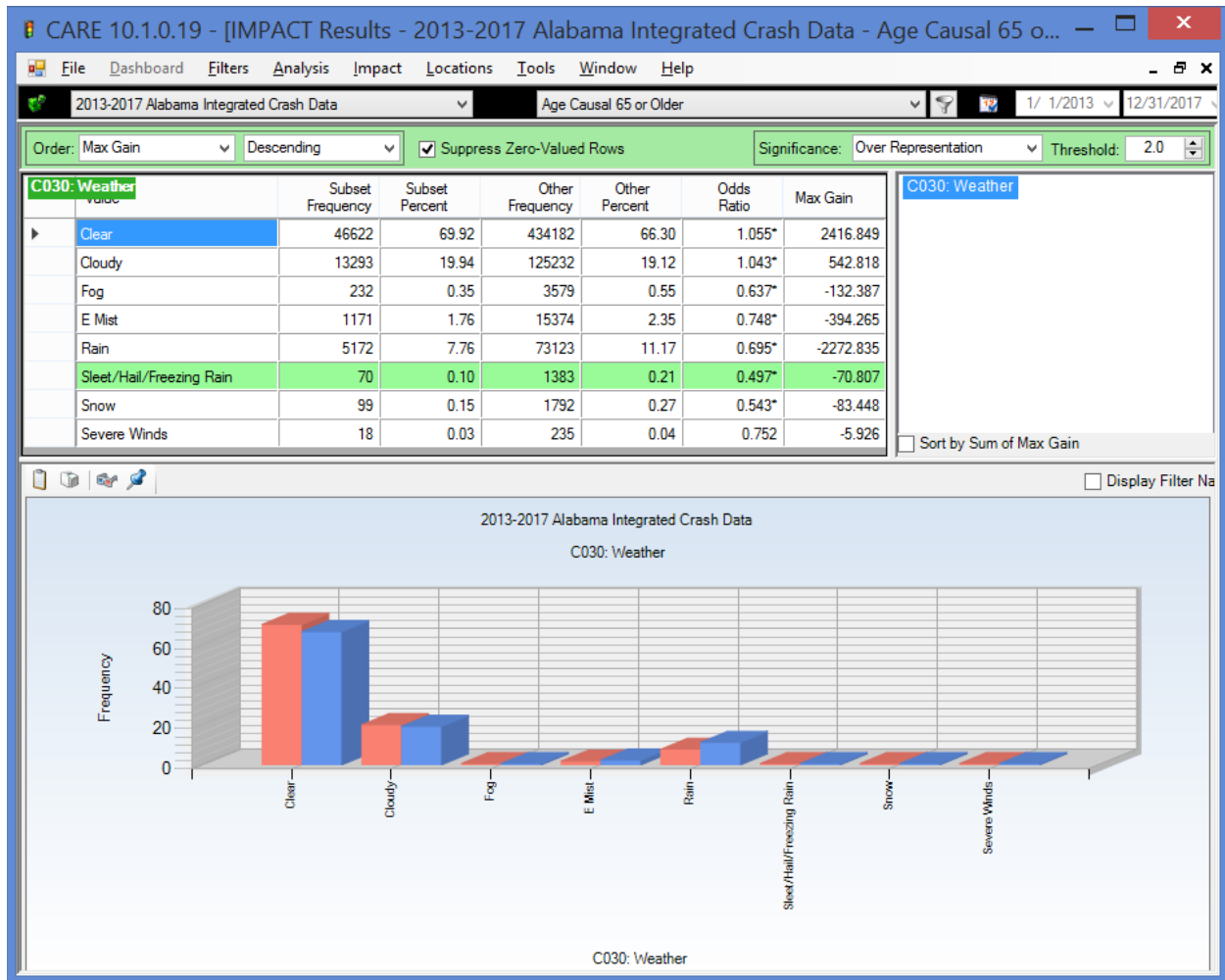
## C407 CU Roadway Curvature and Grade



## C409 CU Traffic Control

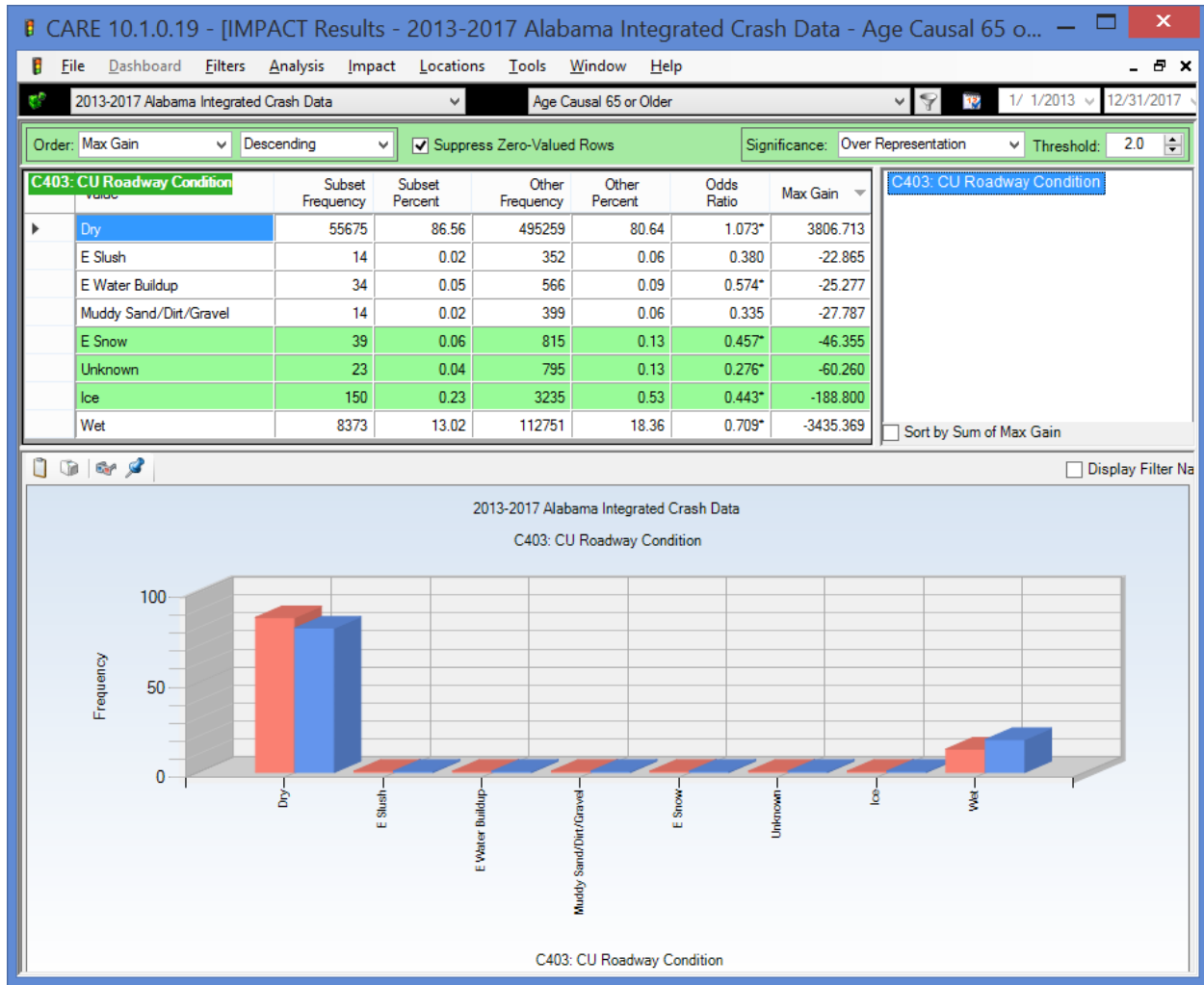


## C030 Weather

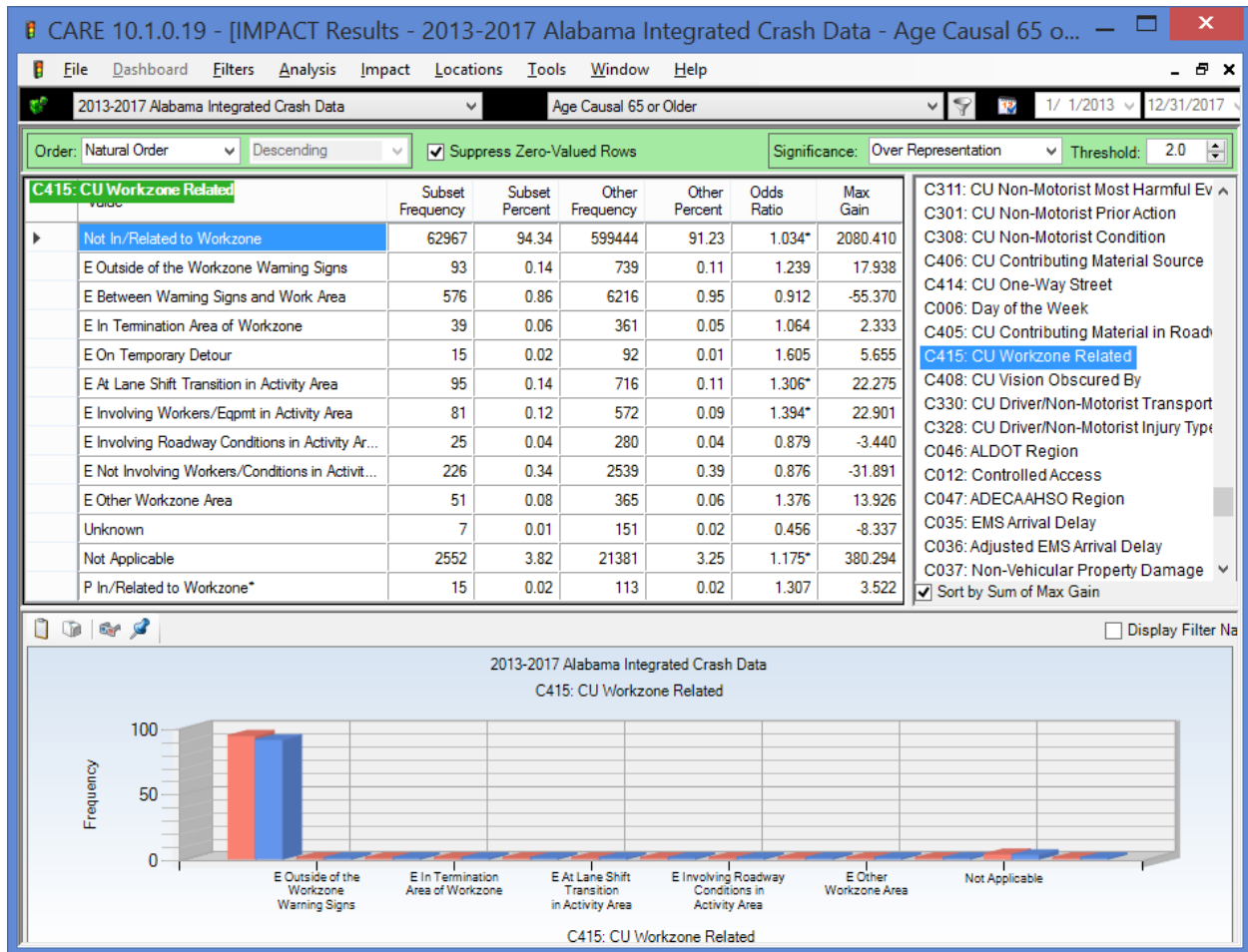




## C403 CU Roadway Condition

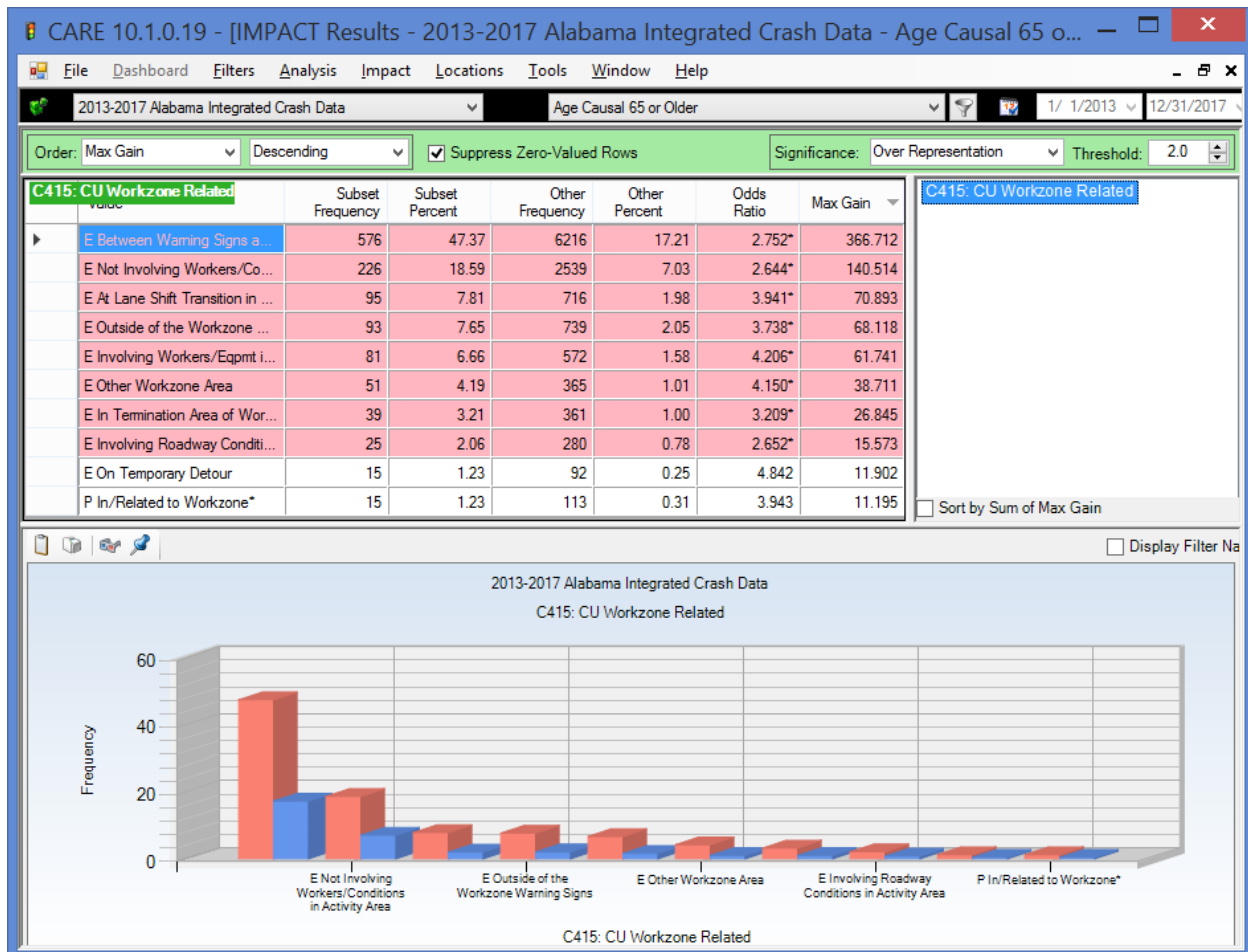


## C415 CU Workzone Related – All Items



## C415 CU Workzone Related – Workzone Items

Eliminating not in workzone



For general recommendations on senior drivers that have been made to the traffic safety community by NHTSA and others, please see the information on the senior driver page:

<http://www.safehomealabama.gov/tag/senior-drivers/>