

IMPACT Analysis of Motorcycle Caused (MC) Crashes CY2016-2020 Data

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For additional motorcycle information from NHTSA and other sources, see:
<http://www.safehomealabama.gov/tag/motorcycles/>

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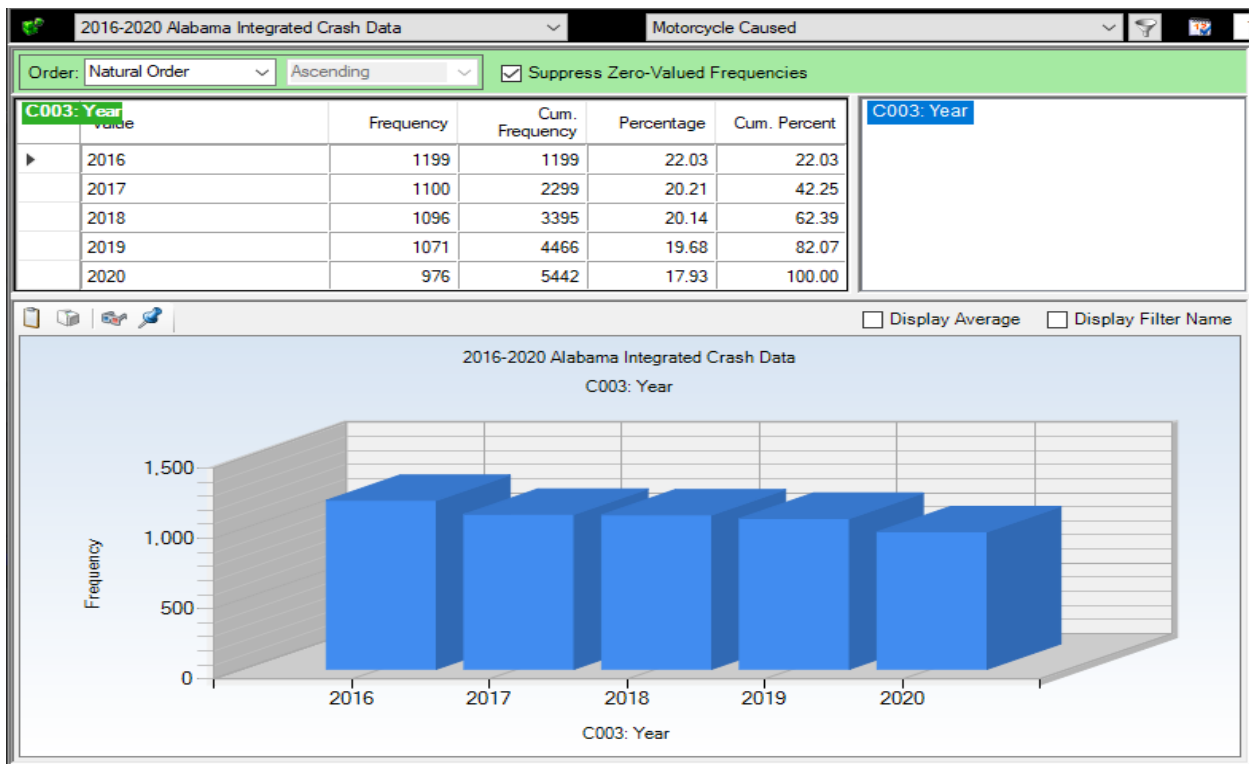
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Introduction

This report has the objective of presenting a problem identification that was done on Motorcycle Caused (MC) crashes, with the goal of establishing and improving countermeasures for reducing these crash frequencies and severities in the future. The IMPACT displays show comparisons of two subsets, both restricted to the 2016 to 2020 (inclusive) time frame. In the first subset (called “Subset”) the motorcycle was the cause of the crash as entered on the crash report form. The second (called “Other”) consisted of all other crashes, i.e., where the vehicles causing the crashes were not motorcycles. This second subset included motorcycle crashes where the motorcycle was not indicated to be the causal vehicle.

The following display gives the frequency distribution for the overall 5,442 MC crashes by year. There is no major trend to be inferred here, since the 2020 year was largely influenced by a reduction in travel caused by COVID-19. The 2016 year was recognized as a high year for all crashes, and the motorcycle caused crashes seemed to be largely carried over into 2017.



The display at the top of the next page is a further breakdown of the above by severity. The various severities reflect the total amounts during the years for the most parts. Year 2016 is generally higher, and year 2020 is generally lower for all severities.

MC Crashes per Year by Severity

CARE 10.2.1.3 - [Crosstab Results - 2016-2020 Alabama Integrated Crash Data - Filter = Motorcycle Caused]

File Dashboard Filters Analysis Crosstab Locations Tools Window Help

2016-2020 Alabama Integrated Crash Data Motorcycle Caused 1/ 1/20

Suppress Zero Values: None Select Cells: Column: Crash Severity ; Row: Year

	Fatal Injury	Suspected Serious Injury	Suspected Minor Injury	Possible Injury	Property Damage Only	Unknown	TOTAL
2016	72 24.74%	335 23.96%	396 22.40%	80 16.03%	292 22.19%	24 14.12%	1199 22.03%
2017	59 20.27%	284 20.31%	350 19.80%	84 16.83%	278 21.12%	45 26.47%	1100 20.21%
2018	59 20.27%	278 19.89%	368 20.81%	105 21.04%	251 19.07%	35 20.59%	1096 20.14%
2019	58 19.93%	250 17.88%	341 19.29%	124 24.85%	266 20.21%	32 18.82%	1071 19.68%
2020	43 14.78%	251 17.95%	313 17.70%	106 21.24%	229 17.40%	34 20.00%	976 17.93%
TOTAL	291 5.35%	1398 25.69%	1768 32.49%	499 9.17%	1316 24.18%	170 3.12%	5442 100.00%

IMPACT Outputs for Motorcycle Caused (MC) vs. Non-MC Crashes

Interpretation of IMPACT displays. The following sections present a number of IMPACT runs that surface some of the major characteristics of crashes in which MC were involved as compared to all of the rest of the crash records (non-MC). For information regarding the interpretation of IMPACT outputs, see:

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

and scroll down to the bottom of the page for the IMPACT tutorial. In the charts below the **red bars represented MC crash proportions** while the **blue bars represent the non-MC crash proportions**. Proportions are calculated as the fraction of the number for a specific item divided by the total crashes in the respective column. Proportions are used for comparison since the item frequencies in the Subset and Other columns cannot be compared directly.

Output pruning. Most of the output displays in the following sections were “pruned” using an extremely valuable CARE tool that can dynamically change the filter on the subset being viewed to eliminate “noise” from IMPACT and Frequency output displays. In many cases the following were summarily eliminated as not contributing information to the outputs: Unknown, CU is Unknown, CU is Not a Vehicle, Other, Not Applicable. Important to recognize is that even if we did not have these categories, we would still be making inferences from subsets of the total reality of 100% complete and accurate reporting. In cases where outputs were pruned the result forms an estimate of reality (that is, in most cases), the results were more accurate in the relative distribution sense than if these categories were left in. Their presence would also result in distractions from the important results. In situations where more than the items noted above were pruned, a note is made under the display.

Code interpretations. In some cases, a code or an entire variable (attribute) will be preceded by an E. This indicates that the attribute value was obtained exclusively from eCrash (E). If this does not appear then there was no change made in this item when eCrash was implemented. CU = Causal Unit – the unit (and driver) indicated by the reporting officer to be the most probable cause of the crash.

Summary of output results by general IMPACT category. In most of the IMPACT displays, items with the highest Max Gain are listed at the top, and these correlate well with those with the highest Odds Ratios. The Max Gain is the number of crashes that would be reduced if the Subset item under consideration had the same proportion as the Other proportion, i.e., there was no over- or under-representation and the Odds Ratio for that item would be 1.000. Statistical significance of the Subset and Other proportional difference is indicated by the asterisk (*) after the Odds Ratio. The Odds Ratio is the item Subset proportion divided by the Other proportion. Cells with Odds Ratios greater than 2 are given with a red background; those with 0.5 or less are given with a green background.

The following gives a brief summary of the IMPACT display findings that follow:

- **Geographical Attributes**

- C001 County (MC over-represented) – counties with less than a Max Gain of 10 were excluded from consideration in this display. It is clear that the over-represented counties are those that are rural.
- C001 County (non-MC over-represented) – this contains the bottom of the IMPACT output listing, which gives the areas where the MCs are under-represented. Looking at it another way, this would also be the areas where the non-MC crashes have their highest over-representation. The greatest non-MC over-representation is at the bottom of the table, with Mobile, Jefferson and Tuscaloosa being the least apt to have MC crashes. This shows that counties containing the largest cities are the highest under-representations for MC crashes.
- C002 City (MC over-represented) – clearly the rural areas of the counties (which are documented in CARE as virtual cities) show a pattern of the highest over-representation in MC crashes.
- C002 City (non-MC over-represented) – with but few exceptions the counties characterized by urban area concentrations have proportions that are over-represented in non-MC crashes. This is reasonable because of the greater traffic counts in the urban areas.
- C010 Rural or Urban – it comes as no surprise after seeing the results above that the rural areas are over-represented in MC crashes, while the urban areas are over-represented in those caused by non-motorcycle vehicles. One reason for this is that the lower speeds in urban areas make MC crashes less likely. The close concentration of vehicles makes low-severity crashes of a higher relative frequency. Motorcyclists appear to be more alert in these areas as well.
- C010 Locale – This further confirms that MC crashes occur more often in Open Country and Residential area as opposed to those in Shopping or Business areas. It should be noted that some cities have a considerable amount of Open Country.
- C110 Residence Distance – Consistent with the above findings, MC crashes tend to occur more when the motorcycles are traveling Greater than 25 Miles from the driver's residence. Generally, this would put them in a rural area.

- **Time Factors**

- C003 Year – Comparing MC to non-MC crashes over the years shows that, other than 2016, the MC crashes effectively had the same proportions as the non-MC crashes. No trend can be inferred because of the lower traffic volume in 2020 due to COVID-19.
- C004 Month – it seems reasonable that the number of overall MC crashes would diminish during the winter months (in this case is it quite visible for November, December, January and February. What is not intuitive is the degree to which the number of crashes drop off in these months. Clearly the total numbers of MC crashes are

well under half, and some as much as less than a third of the other months. Further analyses of these months compared to the others showed no major cause for this decline during the winter other than the fewer miles driven by motorcycle riders. The dramatic decline is probably leveraged by the fact that those who do venture out in the winter are the more proficient and experienced motorcycle drivers who know how to evade crashes.

- C006 Day of the Week – Saturday is the worst day for MC crashes. This could be due to these drivers on average being less experienced casual recreational motorcycle riders leveraged by the lack of experience and skill. The Saturday effect spills over to both Friday and Sunday, while Monday through Thursday are significantly under-represented. These times are highly correlated with DUI (alcohol and drugs) times.
- C008 Time of Day – these over-represented times are also highly correlate with DUI crash times, and this will be given more detailed consideration in the analysis of C122 and C123.
- C031 Lighting Conditions – This corresponds to the early and late night time over-representations, but it also gives an indication of location. Three Lighting Conditions are significantly over-represented: Dark – Roadway Not Lighted (796), Dusk (210), and Dark – Roadway Lighted (26).

- **Roadway Characteristics**

- C011 – Highway Classification – while it was expected from the results above (that MC crashes are significantly over-represented in the rural areas), the degree to which the MC crashes were over-represented on County roads by an odds ratio of 2.322 was not expected. This should be considered in enforcement policies on County roads, and to a much lesser extent on State roads. Further analysis on county roads is needed to determine what the issues on these roadways are that might be remediated by roadway modifications.
- C026 – Intersection Related – because intersections are more associated with urban roadways, these significant results were expected.
- C407 – CU Roadway Curvature and Grade – The first six categories show a pattern of all types of curves causing significant over-representation in MC crashes. Slopes seem to have little effect on MC crashes. The following show the preponderance of curves (highest Max Gain first): Curve Left and Level, Curve Left and Down Grade, Curve Right and Level, Curve Left and Up Grade, Curve Right and Down Grade, and Curve Right and Up Grade.

- **Driver Factors**

- C015 – Primary Contributing Circumstance – by excluding those values with number of MC crashes less than 20, the major PCCs can be seen in the one table. This item is probably the most important IMPACT output to be considered in countermeasure development and improvement since it relates most closely to the cause of the crash. The cells at the top show some very strong and significant over-representations for MC crashes – virtually all of the items in the top half of the table are quite high with

significant over-representations. The following had significant over-representations with Max Gains > 20:

1. Aggressive Operation
2. Over Speed Limit
3. Swerved to Avoid Vehicle
4. Ran off Road
5. Driving too Fast for Conditions
6. Swerved to Avoid Animal
7. Over Correcting/Over Steering
8. Defective Equipment
9. Improper Passing
10. Other Improper Action
11. DUI
12. Roadway/Sign/Signal Defect

Of these the following reflects on the attitude of the driver: 1, 2, 5, 9, 11. This is most of them, and it certainly includes the worst of them. Some are very likely to be a by-product of excessive speed: 4, 7. Others put the motorcycle in the role of a victim: 3, 6, and 12. Working from the bottom of the table up illustrates the converse – those crash PCCs that are indicative of non-MC causes. Note that all of the Unseen Object and Failure to Yield categories indicate a relatively increased visual perception problem on the part of the non-motorcycle drivers (or perhaps an improved capability on their part). While not the fault of the MC, defensive driving on their part should certainly take this factor into account. All of these factors provide the basis for motorcyclist information programs.

- C017 – First Harmful Event – When we consider motorcycle operations the reason for the highly over-represented items becomes apparent (those with the red background have an Odds Ratio > 2). For most other types of crashes this attribute gives us “what was hit.” This is true for the lower frequency items on this list, but the ones on the top reflect motorcycle vulnerabilities. The following is an ordered list of all items with greater than 90 Max Gain (all significantly over-represented by an Odds Ratios greater than 2): Overturn/Rollover, Evasive Action (Swerve/Brake), Collision with Ditch, Ran Off Road Right, Other Non-Collision, Fell/Jumped from Motor Vehicle, Collision with Other Fixed Object, Collision with Curb/Island/Raised Median, Collision with Animal: Other, and Ran Off Road Left.
- C023 – Manner of Crash – The top two over-represented items, which are highly significant, are reasonable for motorcycles. These include Single Vehicle Crash (all types) and Non-Collision. Most of the common Manner of Crash types for 4-wheeled vehicles are under-represented for motorcycles.
- C105 – Left Scene – MC crashes are less likely to be hit-and-run than are those caused by non-MC vehicles. The reason for this is probably that it is impossible in a relatively larger number of cases for the motorcycle to leave the scene after the crash.
- C107 – CU Driver Raw Age – Except for ages 14 and 15, the younger ages are under-represented up to ages 28 and 33. The major over-represented grouping is from 39 to 61.

- C600 – CU Driver Age Range (five year increments) – The over-representation in the 11 to 15 year-old category is alarming, and requires additional investigation. Perhaps it reflects the early motorcycle licensing of 14 and 15 year olds. The major over-representation is in the 41 to 60 year-old categories.
 - C109 – CU Driver Gender – clearly males are predominant by a factor of about 20 to one. Countermeasures should be directed almost exclusively toward males.
 - C122 – CU Driver Officer Opinion Alcohol – Alcohol was a factor in almost 70% more than expected compared to the non-MC crashes. While the number of DUI crashes is not reported to be high, the relative values are more important here since it is well known and accepted that alcohol and drugs are under-reported. Many officers will not mark this item positive unless they know they can prove it in court even though that was not the objective of this attribute.
 - C123 – CU Driver Officer Opinion Drugs – The officer opinion here has indicated a smaller problem than that found with alcohol. In this case the reported results indicate that the drug over-representation was not statistically significant.
 - C129 – CU Vehicle Maneuver – As was seen in variable C407 above, Curves are the major problem for motorcycles. This also shows Overtaking and Passing to be a potential problem, but it consists of only 197 crashes in the five years as opposed to 1,155 for Negotiating a Curve. Both had over-representations that were very highly significant.
 - C224 – CU Estimated Speed at Impact – the bar chart is quite explicit – MC crashes are typically at much higher speeds than non-MC crashes.
 - Cross-tabulation of Injury Severity vs Impact Speed – this display makes the relationship between speed and fatal crashes quite clear.
 - C226 – CU Vehicle Damage – “Major and Disabled” was the only over-represented value, having a proportion that is over 60% higher than the non-MC crashes.
- **Severity Factors**
 - C026 – Crash Severity – The fatality rate proportion for MC crashes is close to ten (9.860) times what it is for non-MC crashes. Suspected Serious Injury is close to this with an Odds Ratio of 8.496. All of the three more severe injury categories were highly significantly over-represented.
 - C038 – Adjusted EMS Arrival Delay – as indicated above, the timing and rural nature of MC crashes clearly causes them to have longer EMS arrival delays, which accounts for some of the MC crashes being fatal.
 - C060 – Number Injured (Includes Fatalities) – the multiple injury numbers provide additional information above the crash severity data given above. Each MC injury crash accounted for 1.11 injured persons.
 - C061 Number Killed – Only 6 of the 292 fatal MC crashes involve two fatalities.

Recommendations from IMPACT Results Summarized Above

Recommendations will be presented in the same order as the IMPACT findings given above:

- **Geographical Attributes**
 - C001, C002, C033 and C110. Motorcycle countermeasures, either enforcement of PI&E, should focus on rural areas of the state.
- **Time Factors**
 - C004 Month – Motorcycle countermeasures should become more intense during the milder and summer months (March through October) as opposed to the winter months.
 - C006 and C008. Time of day and day of the week correlate strongly with DUI, and thus consideration should be given to enlarge selective enforcement for DUI to consider MC crashes. This could be a combined PI&E effort as opposed to just targeting of motorcycles in selective enforcement. DUI PI&E should never exclude the considerations for motorcycles.
- **Roadway Characteristics**
 - C011 – County roads should be given the highest priority for MC crash reduction. A distant second to that would be State routes. Recommended is more detailed analysis including MC hotspots. Further analysis is required to determine if there are issues on county roads that are causing or increasing the severity of motorcycle crashes, e.g., obstacles at curves.
 - C407 and C129 – Hands on motorcycle training should concentrate more on the negotiation of all types of curves, and if possible include hands on over difficult curvature terrain.
- **Driver Factors**
 - C015, C017, C023, C224 – The top two Primary Contributing Circumstances, Aggressive Operation and Over Speed Limit, are closely linked to each other, and they show an attitude on the part of the driver. This is true of some of the others, including Driving Too Fast for Conditions, Improper Passing, and DUI. To the extent possible, these should be pointed out in motorcycle training programs. Many of the others show the motorcyclist as a victim, e.g., Swerved to Avoid Vehicle, and Swerved to Avoid Animal. These are summarized below:
 - . The following had significant over-representations with Max Gains > 20:
 1. Aggressive Operation
 2. Over Speed Limit
 3. Swerved to Avoid Vehicle
 4. Ran off Road
 5. Driving too Fast for Conditions
 6. Swerved to Avoid Animal
 7. Over Correcting/Over Steering
 8. Defective Equipment
 9. Improper Passing
 10. Other Improper Action

11. DUI

12. Roadway/Sign/Signal Defect

Of these the following reflects on the attitude of the driver: 1, 2, 5, 9, 11. This includes the worst of them. Some are very likely to be a by-product of excessive speed: 4, 7. Others put the motorcycle in the role of a victim: 3, 6, and 12. This information should be worked into the training programs. This training should also highlight the dangers of the following:

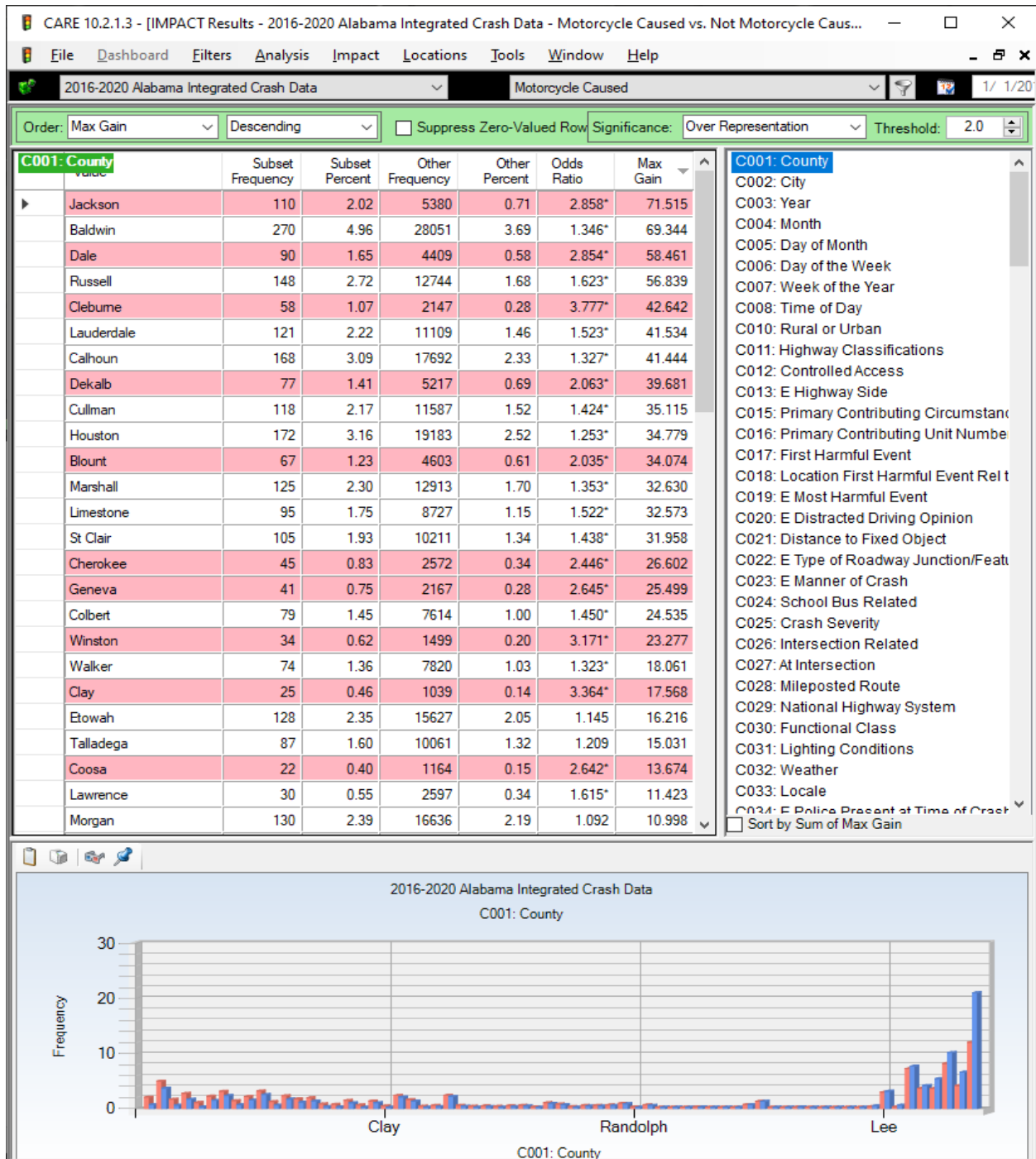
- Overturn/Rollover
- Evasive Action (Swerve/Brake)
- Collision with Ditch
- Ran Off Road Right
- Other Non-Collision
- Fell/Jumped from Motor Vehicle
- Collision with Other Fixed Object
- Collision with Curb/Island/Raised Median
- Collision with Animal
- Ran Off Road Left

These would provide the basis for motorcyclist information to prepare them to be more aware of the most common hazards. They should also be made aware of the large number of single-vehicle motorcycle crashes. A remedial course should be developed that specifically selects motorcycle drivers who have consistently shown poor attitudes either in crash causation or citations. After the course, they should be required to pass a test that indicates their recognition of the problems both on the roadway and in their own attitudes, especially toward speed.

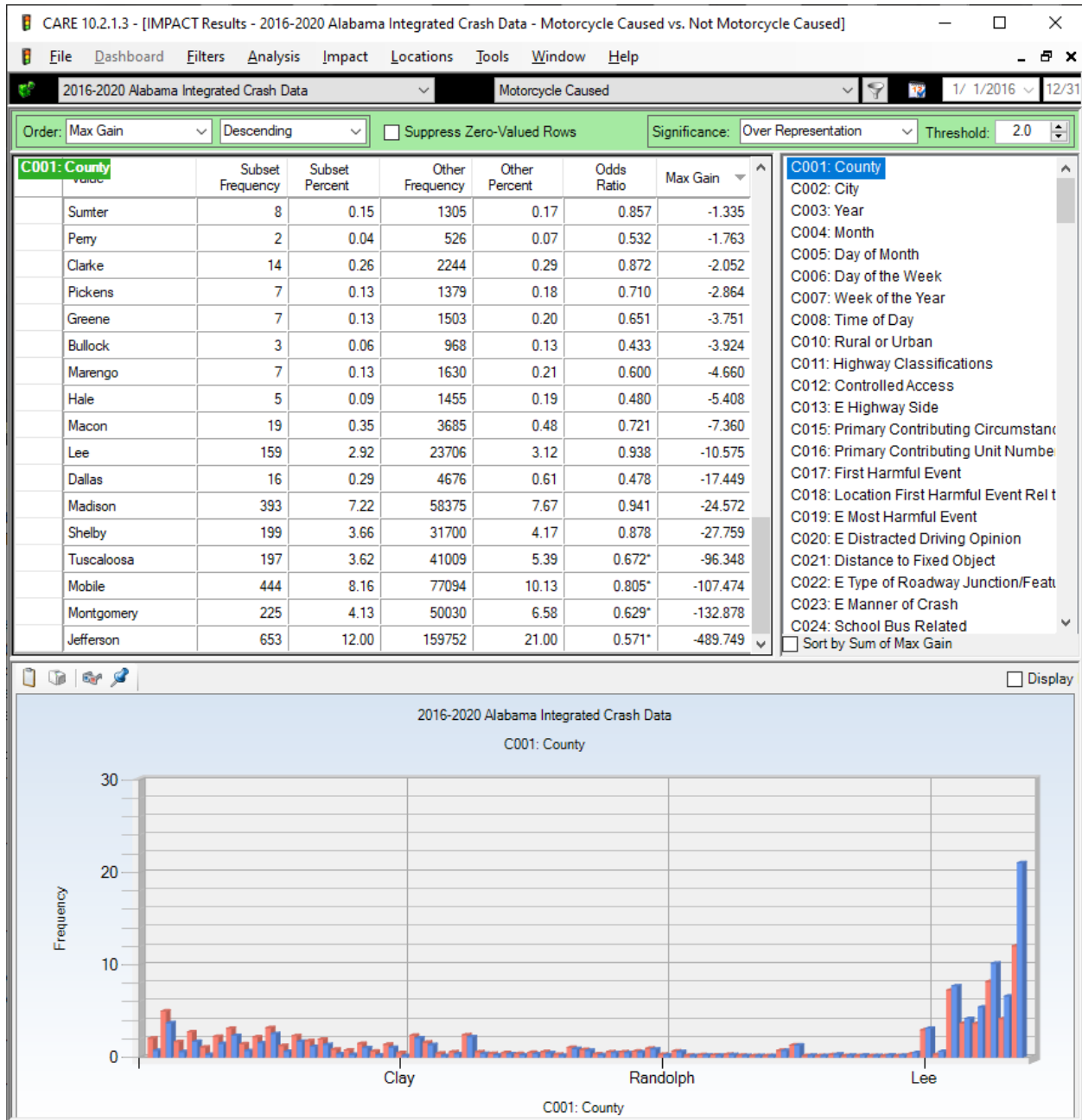
- C107 and C600 – while it is obviously much easier to administer training to the novice drivers, it should be recognized that the over-represented problems found have not been in these younger drivers but in those who obviously have some experience and are depending on that to overcome the risks that they are taking. The most over-represented age groups were in the 41 to 60 year-old categories.
- C122 and C123 – CU Driver Officer Opinion Alcohol – Alcohol was a factor in almost 70% more than expected for non-MC crashes. While the number of DUI crashes is not reported to be high, the relative values are more important here since it is well known and accepted that alcohol is under-reported. The excellent programs to counter DUI in Alabama are sufficient, but they need additional funding to employ more specialists to make them more effective. For a review of these countermeasures see Section one of http://www.safehomealabama.gov/wpcontent/uploads/2021/09/15100_Countermeasures10th_080621_v5_tag.pdf . This document also recommends other countermeasures for the items given above.
- C129 – CU Vehicle Maneuver – As was seen in variable C407 above, Curves are the major problem for motorcycles. This also shows Overtaking and Passing to be a potential problem, but it has only 197 crashes in the five years as opposed to 1,155 for Negotiating a Curve.

Geographical Attributes

C001: County (MC over-represented; excluding Max Gain < 10)

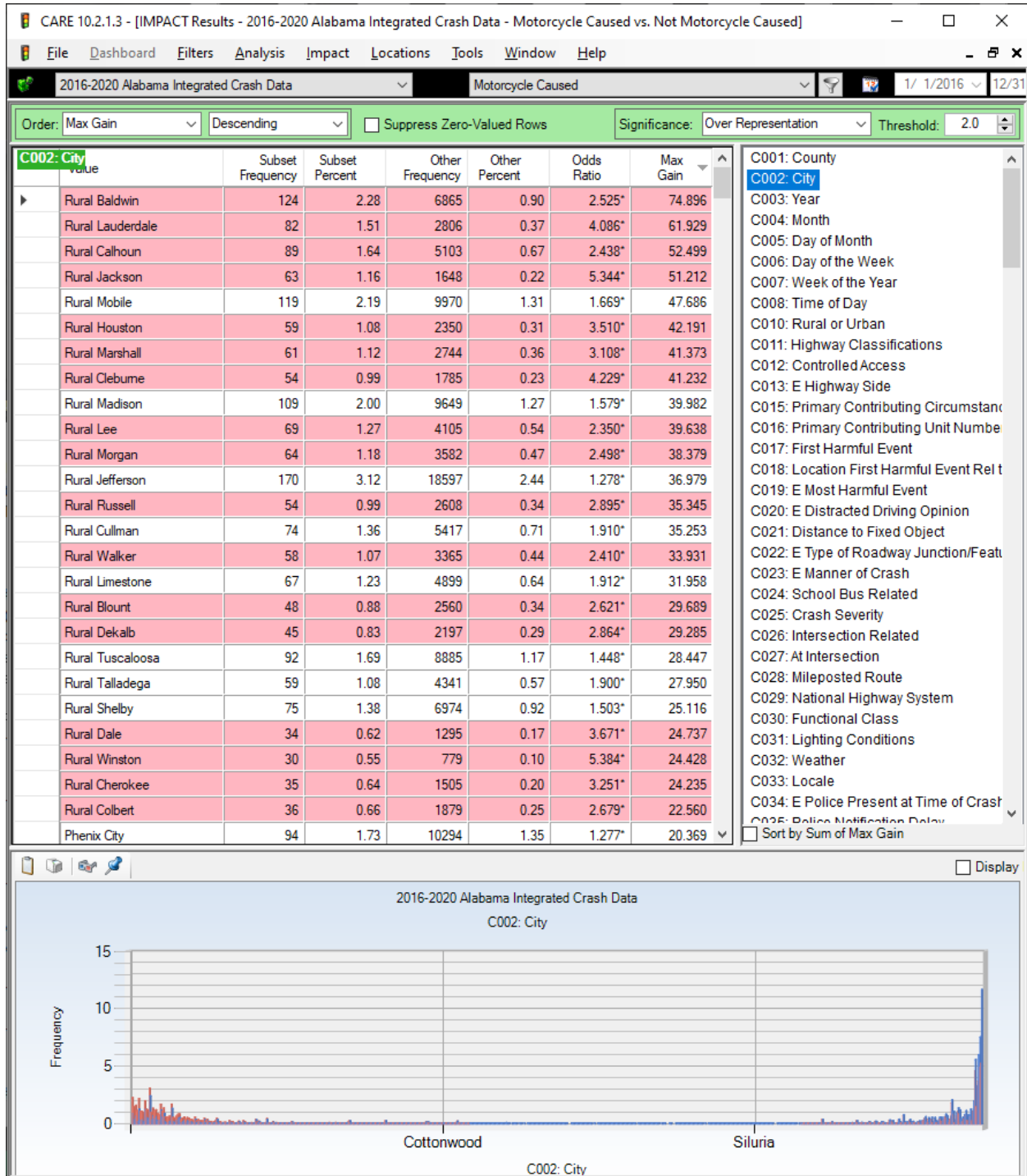


C001 County (MC under-represented counties – negative Max Gain)



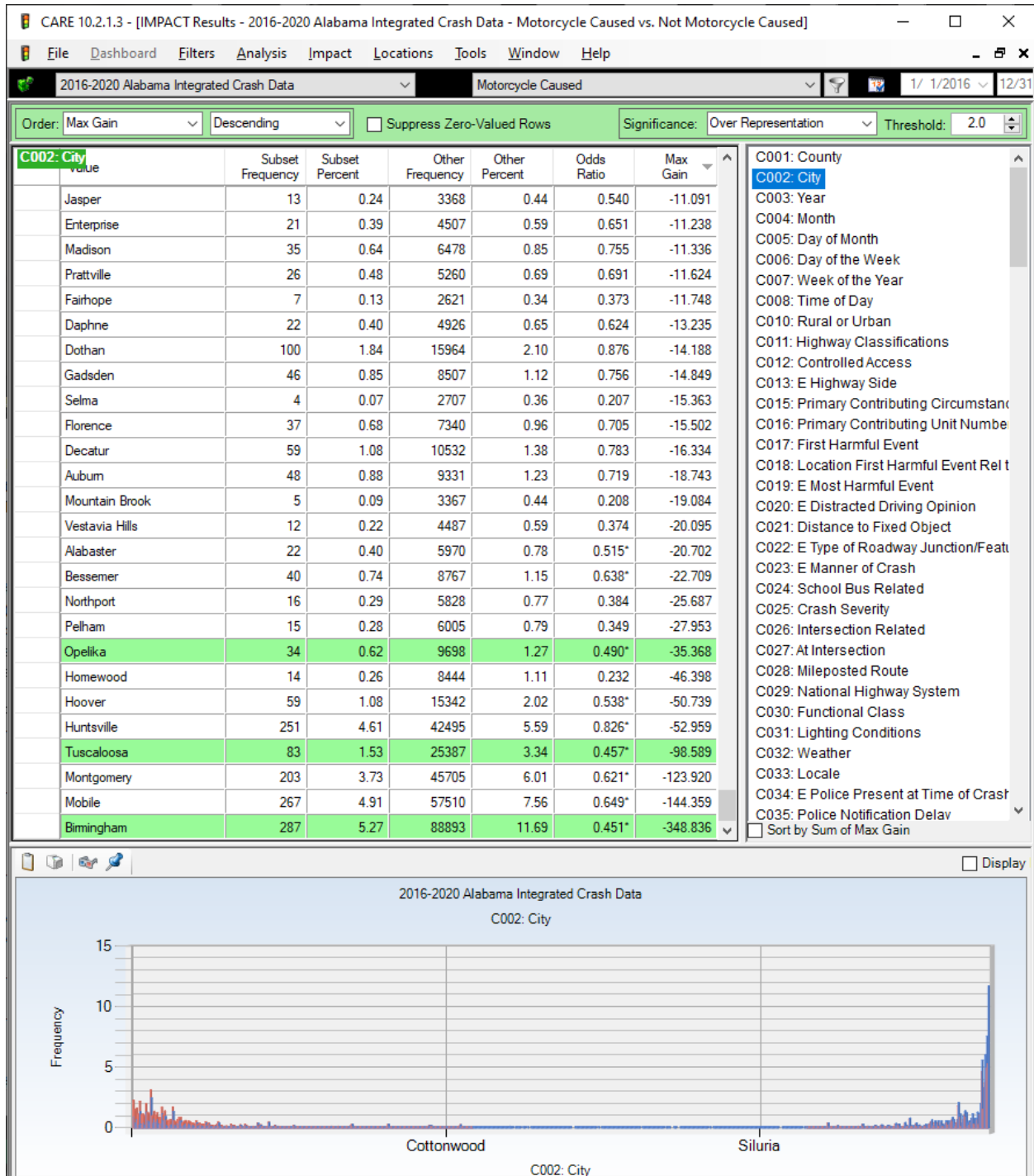
The large urban counties are under-represented in Motorcycle Caused (MC) crashes. Those over-represented are for the most part, the more rural counties.

C002 City (MC over-represented; Max Gain < 20 excluded)



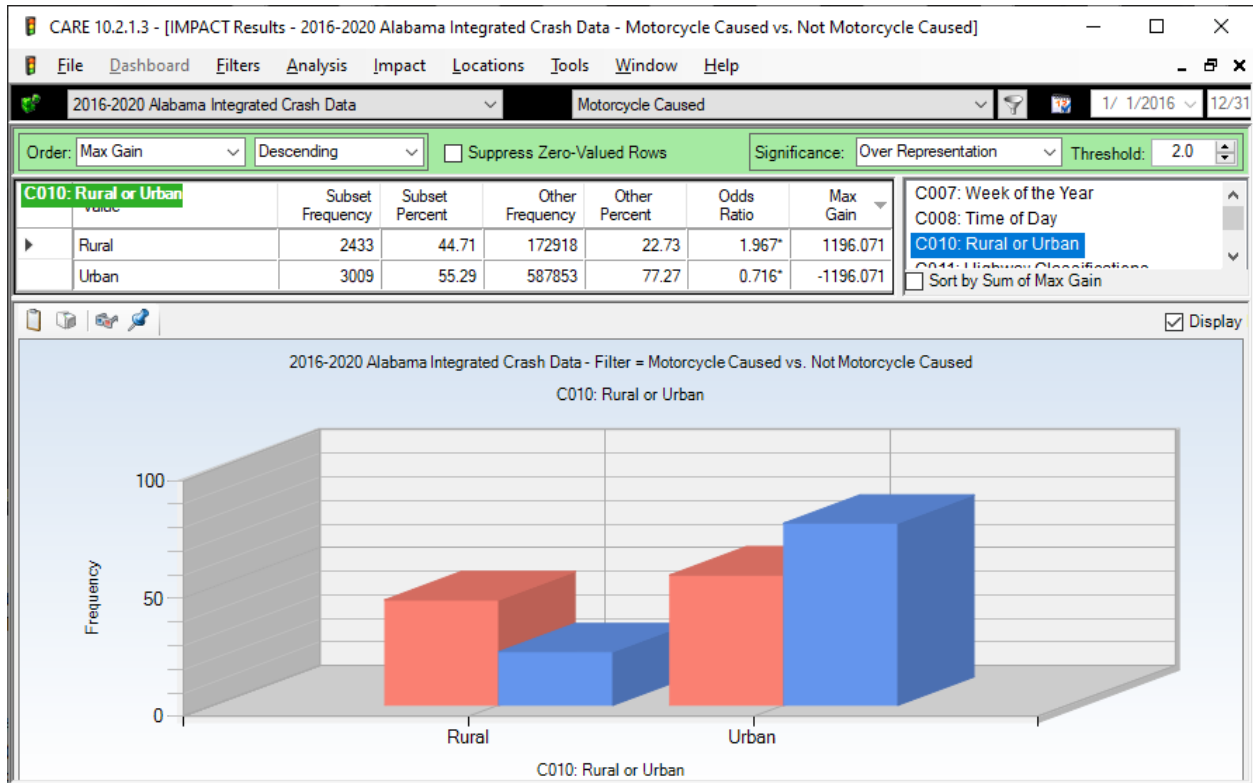
Rural areas of the more populated counties have the highest over-representations.

C002 City (MC under-represented; total < 11 excluded)



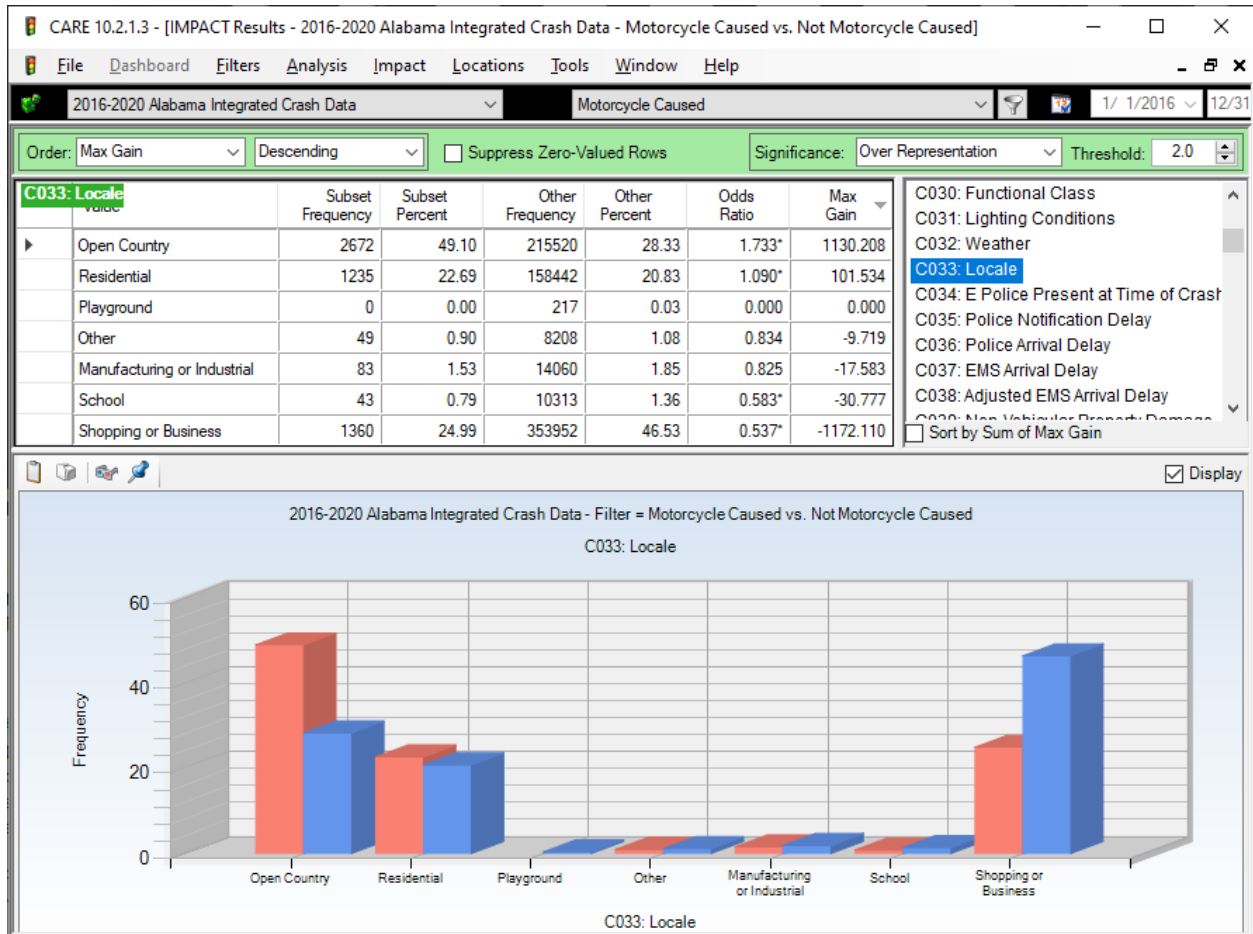
The largest under-representations are in the large urban cities.

C010 Rural or Urban



After seeing the city and county results, it comes as no surprise that rural areas of the state are over-represented by about twice what would be expected in comparison to the non-MC crashes.

C033 Locale



Open Country, which could be within some city limits, has the highest over-representation (Odds Ratio = 1.733), indicating a little over 73% higher than expectation from the non-Motorcycle-Caused (non-MC) crashes. It is the only Locale that has a statistically significant over-representation. Residential is also over-represented but clearly not as much (OR = 1.090). School and Shopping or Business were significantly under-represented.

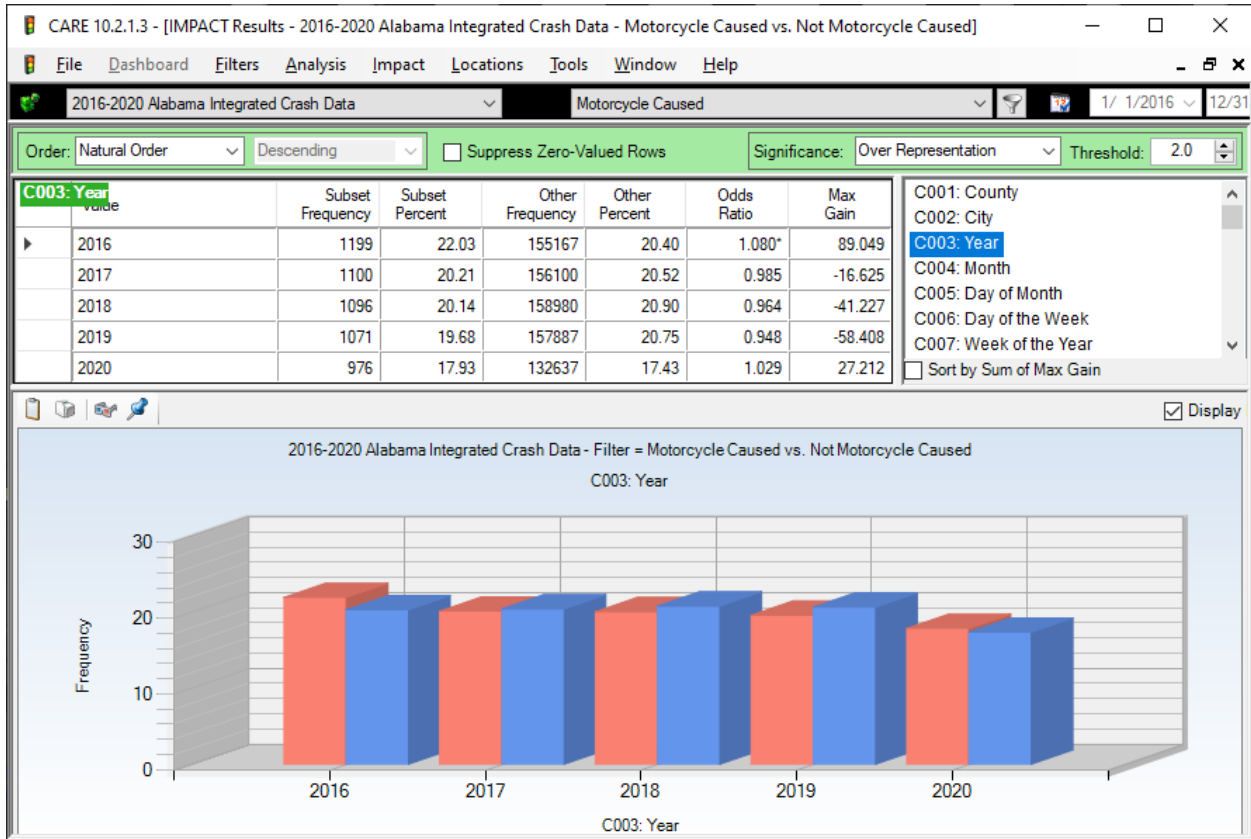
C110 CU Driver Residence Distance



MC crashes tend to be further than 25 miles from the driver's residence. The proportion of these crashes is over 30% (Odds Ratio = 1.303) greater than the non-MC crashes.

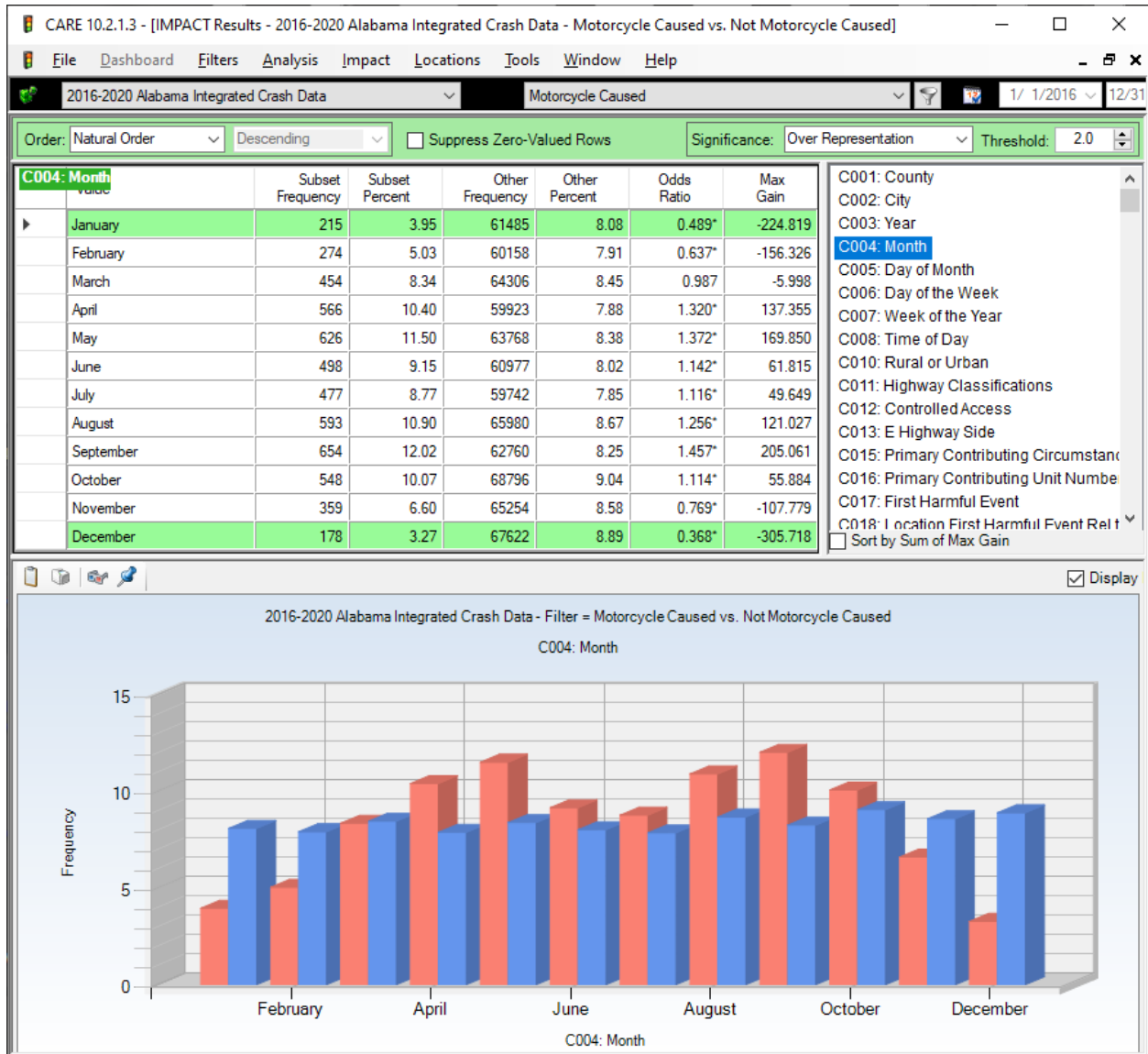
Time Factors

C003 Year



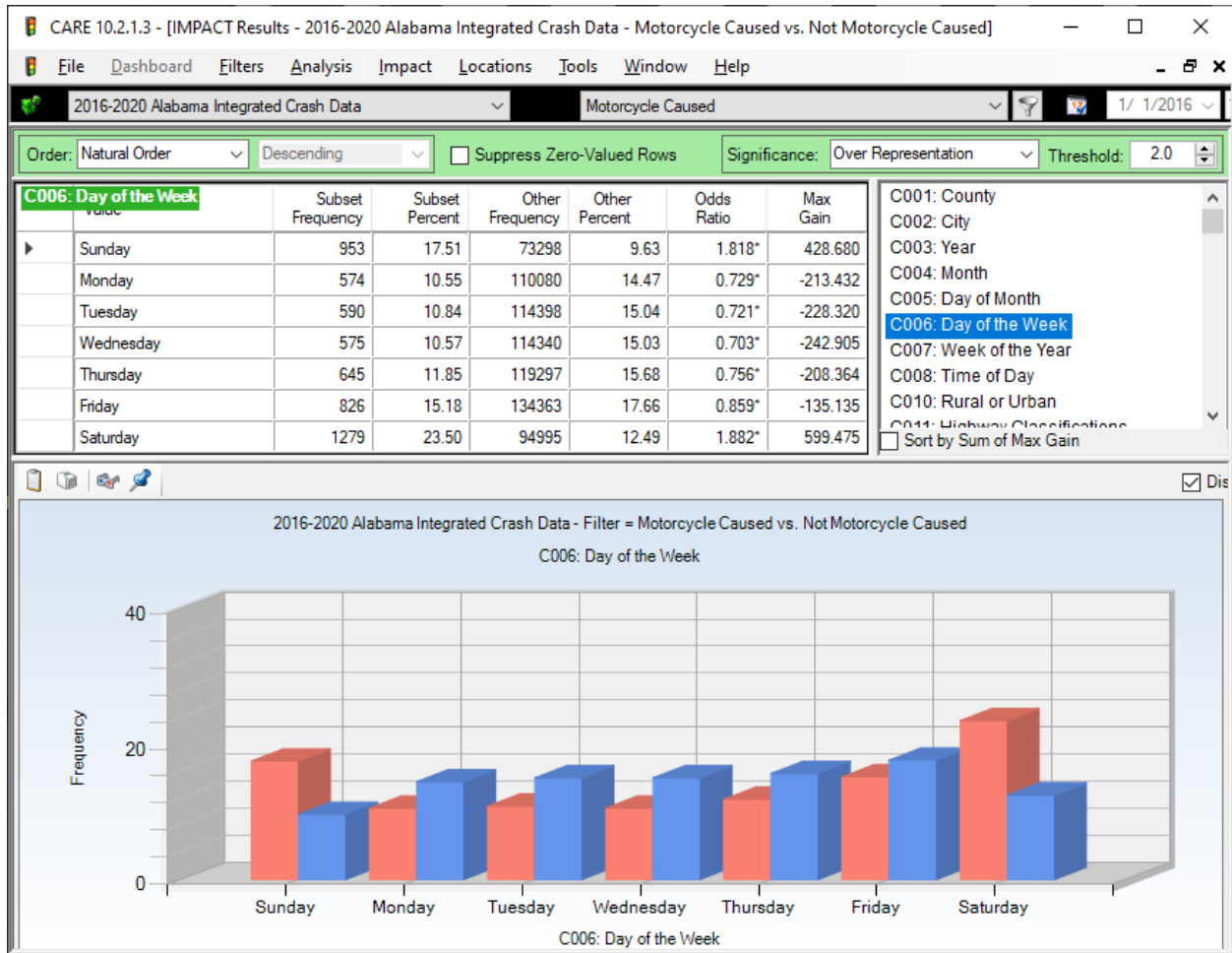
The 2016 year was significantly over-represented, but the following three were quite close to expected. The 2020 year (of COVID) showed an increase of about 3%, which was not considered to be statistically significant.

C004 Month



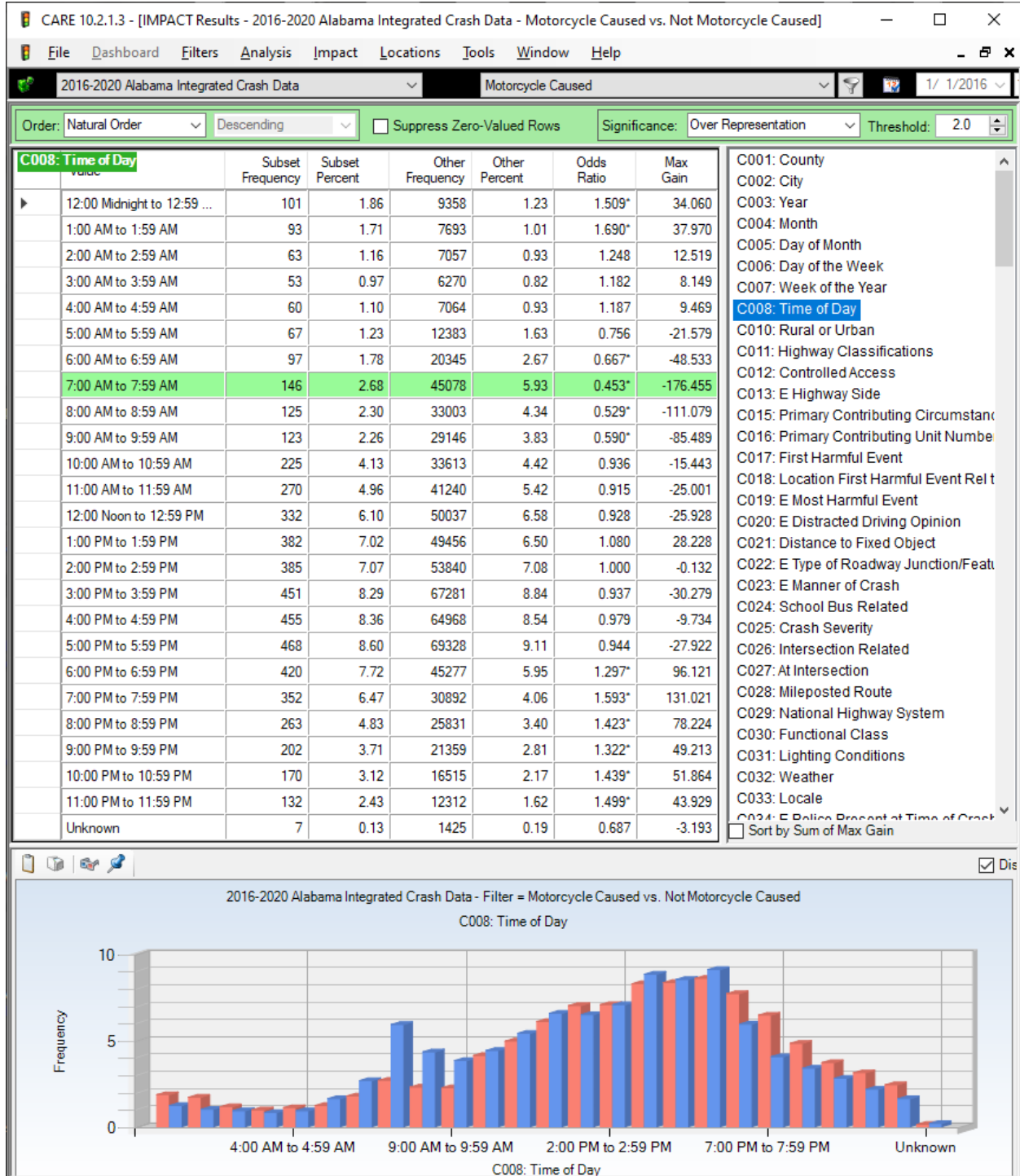
The spring and late summer months are favored by motorcyclists.

C006 Day of the Week



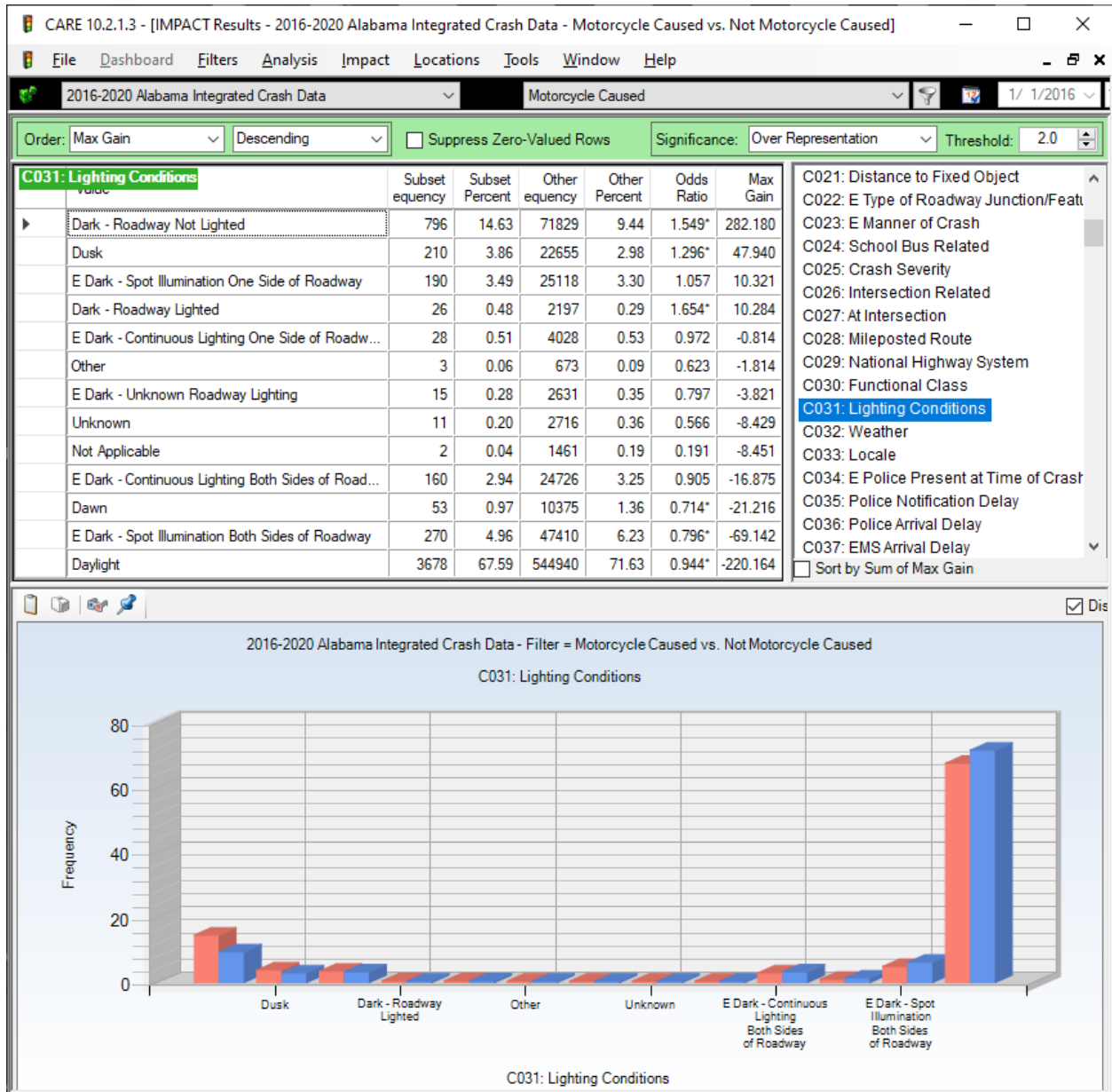
The very high over-representations on Saturday and Sunday are indicative of DUI, which will be considered further below in the Driver Factors section.

C008 Time of Day



Nighttime is consistently over-represented from 6:00 PM through 4:49 AM.

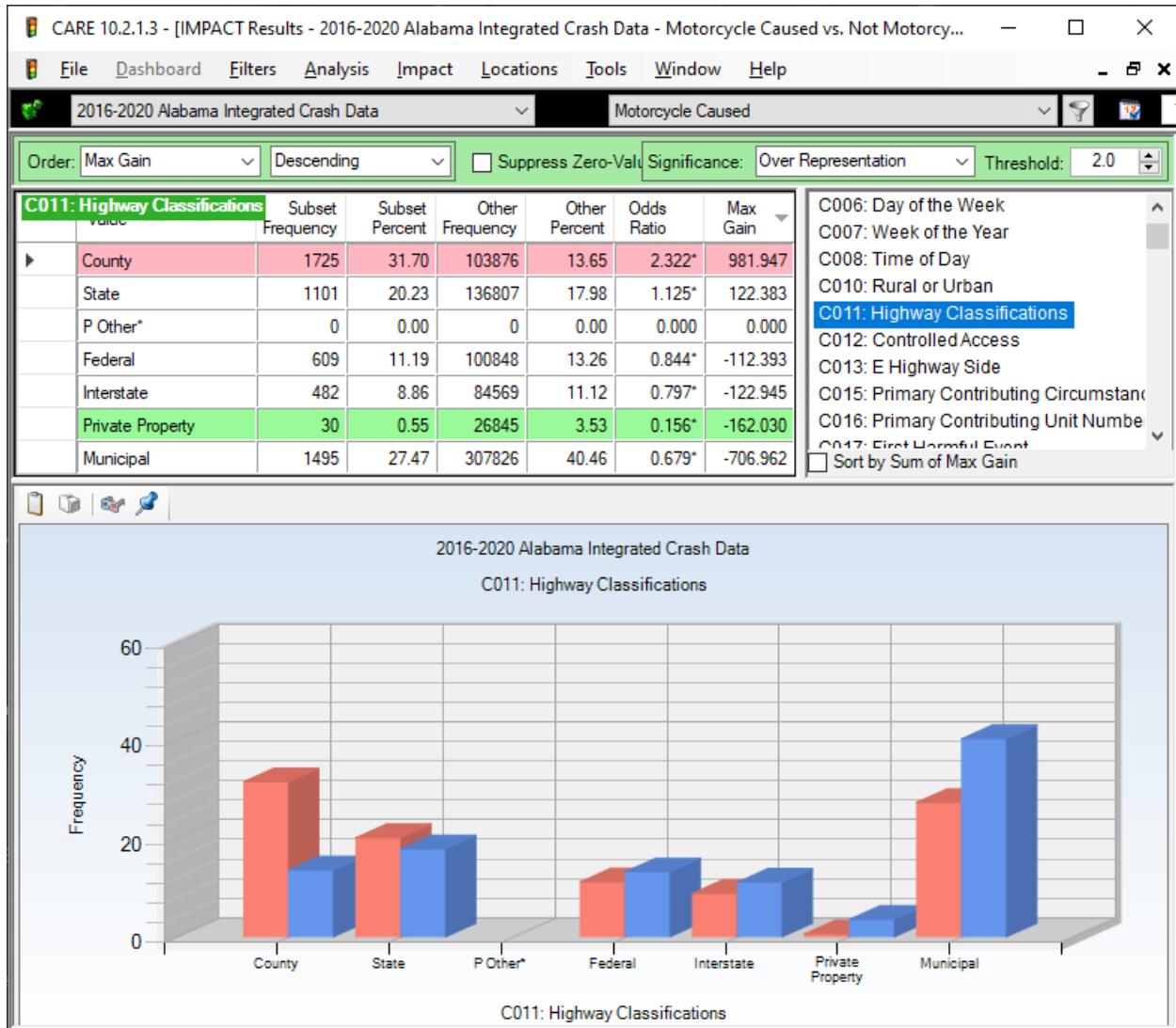
C031 Lighting Conditions



Significantly over-represented in order: Dark – Roadway Not Lighted, Dusk, and Dark – Roadway Lighted. Significantly under-represented Daylight, Dark – Spot Illumination Both Sides of Roadway, and Dawn.

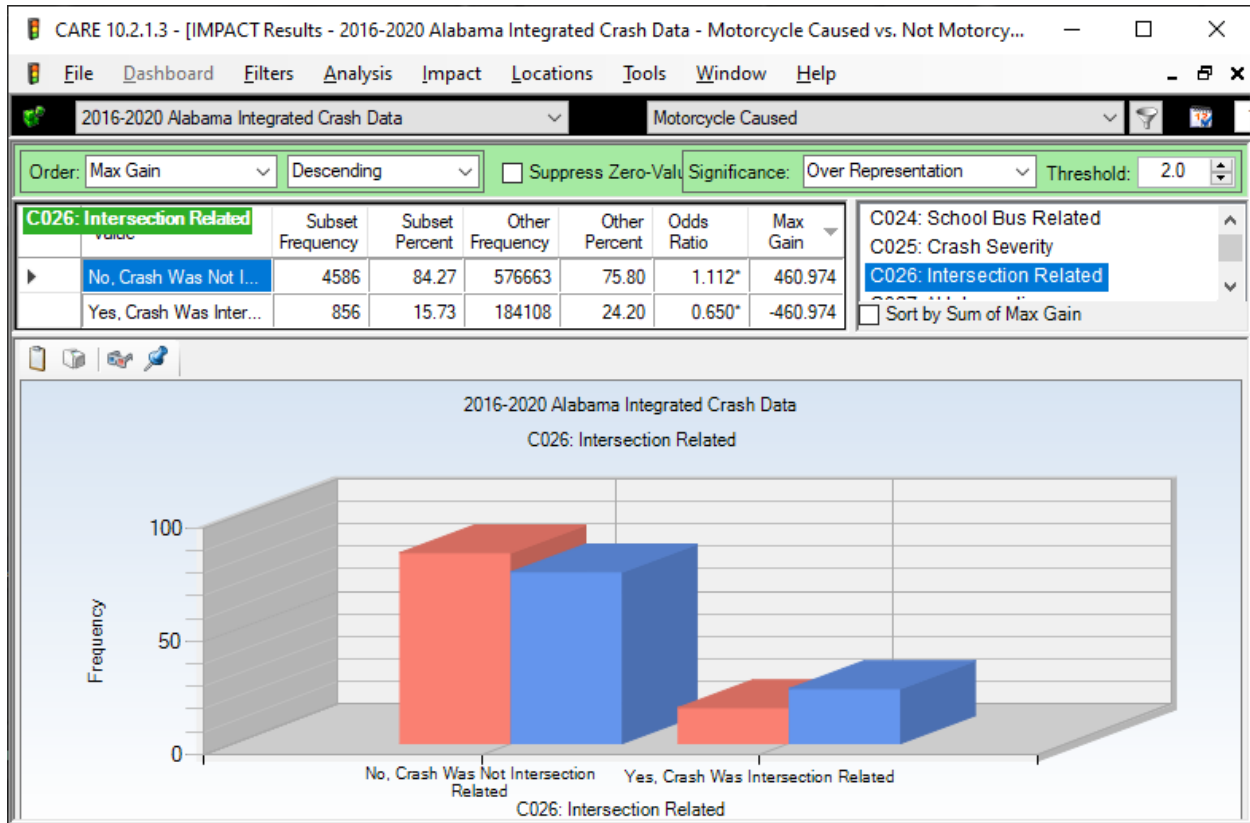
Roadway Characteristics

C011 Highway Classification



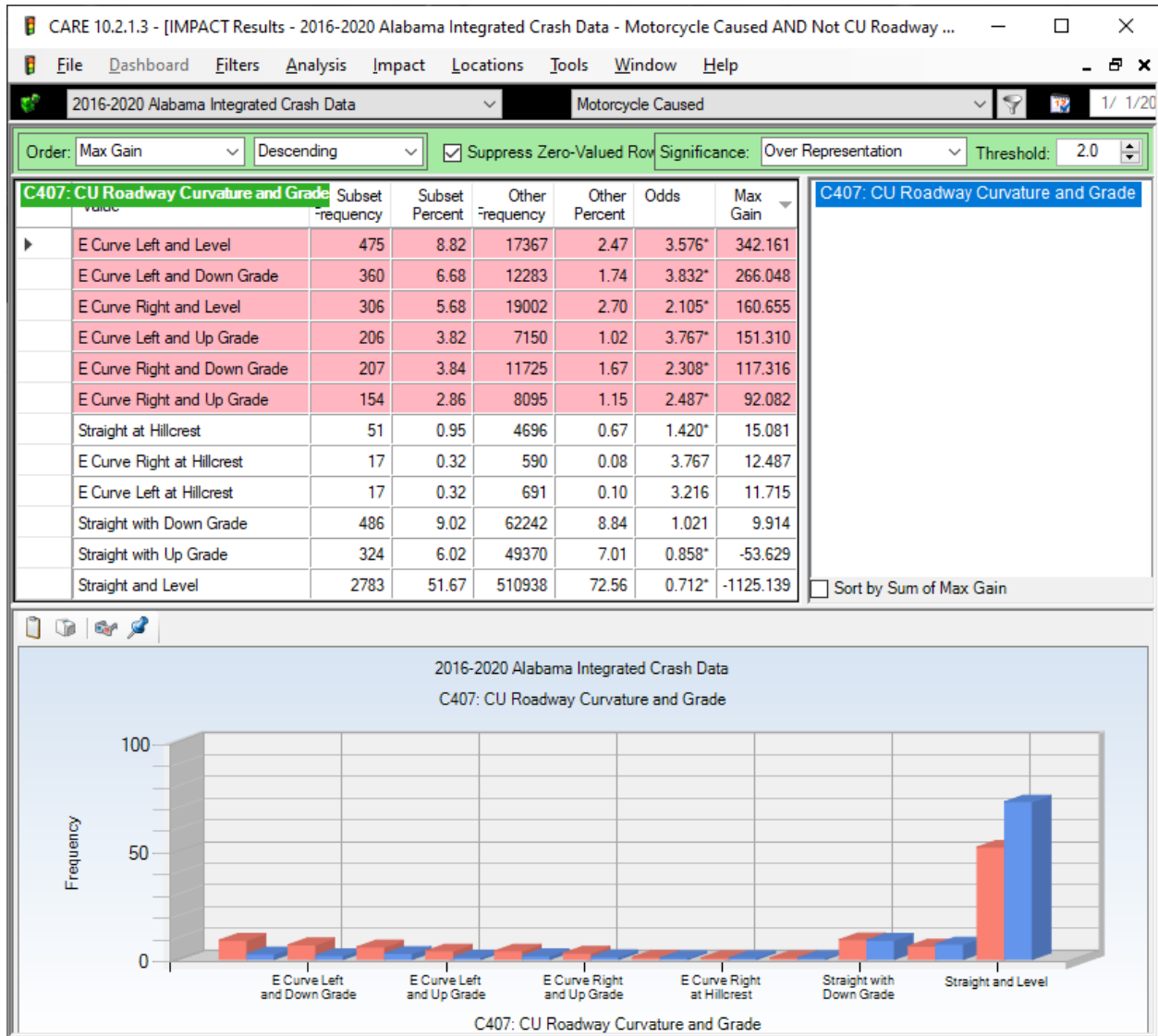
The county MC proportion is over twice the non-MC. State routes are also significantly over-represented but only by a little over 12%. All other Highway Classifications are under-represented.

C026 Intersection Related



Intersection Related crashes are significantly under-represented, further reflection of their rural nature.

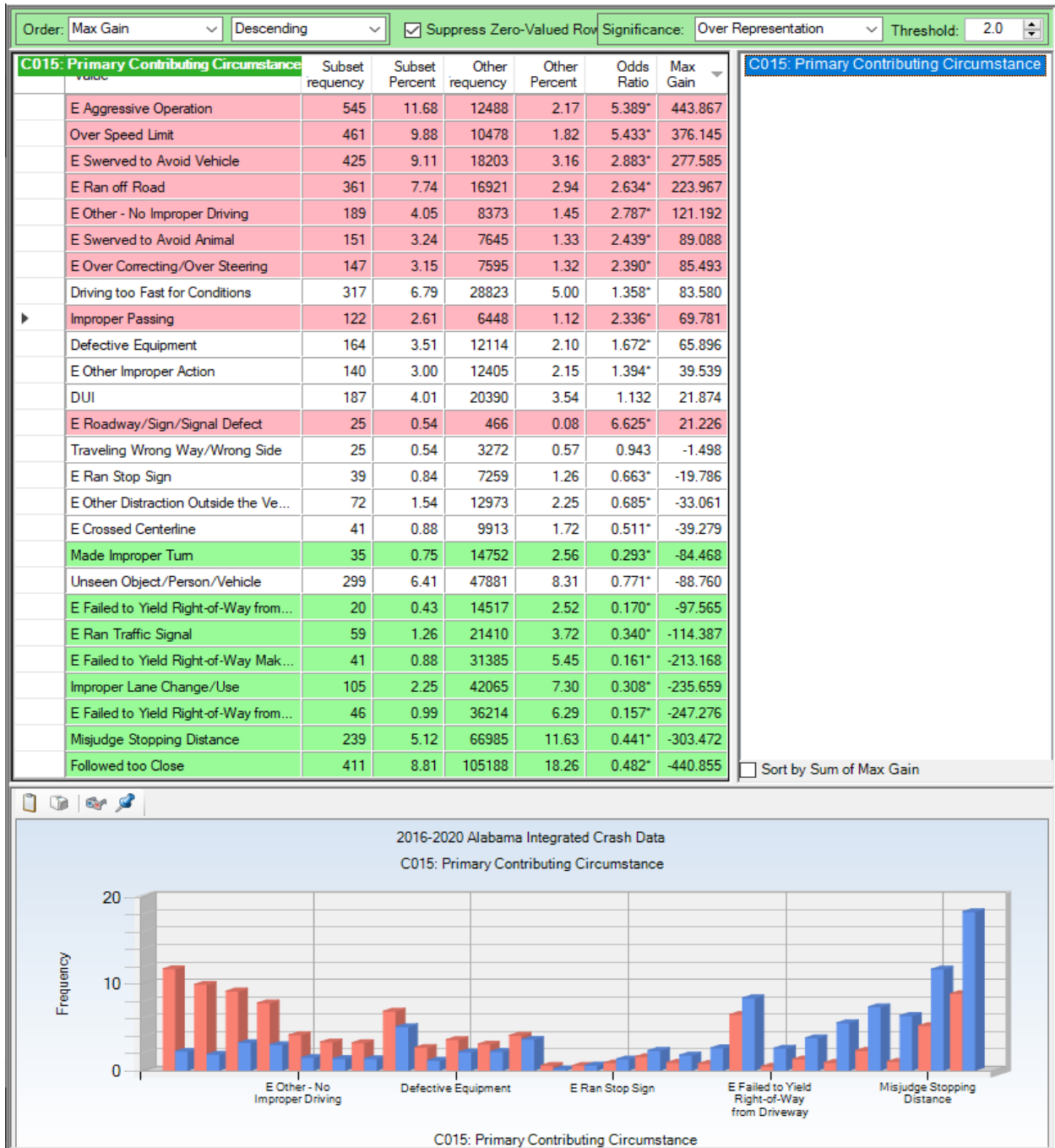
C407 CU Roadway Curvature and Grade



All of the highly significant over-represented items involve curves. In order, these are: Curve Left and Level, Curve Left and Down Grade, Curve Right and Level, Curve Left and Up Grade, Curve Right and Down Grade, and Curve Right and Up Grade. Two of the others that are not red because of less than 20 sample sizes also show very high Odds Ratios. We can conclude that slopes do not affect crash causation nearly as much as curves.

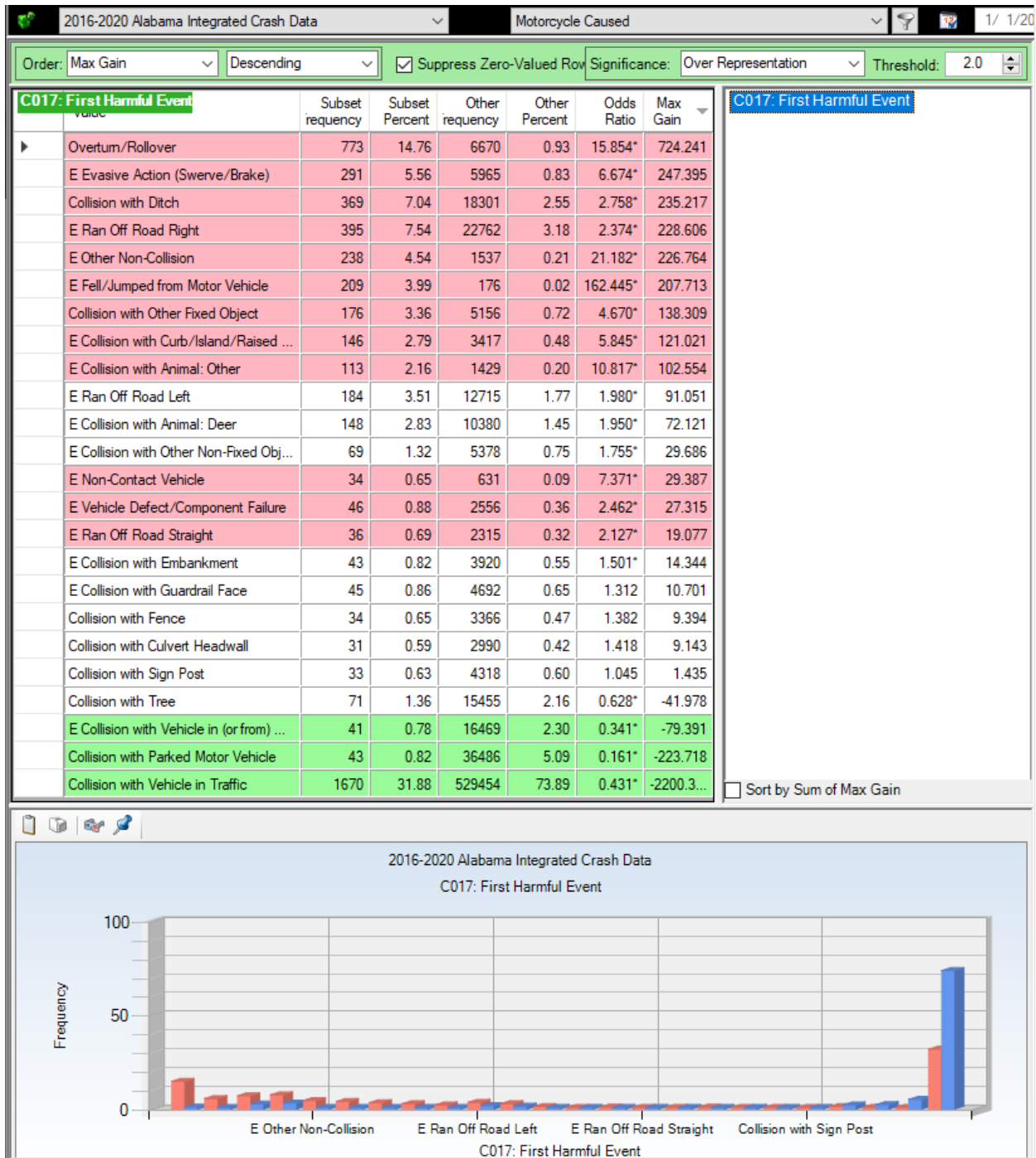
Driver Factors

C015 Primary Contributing Circumstances (excluding < 20 item frequency)



See discussion after C017.

C017 First Harmful Event (excluding < 30)



See discussion below.

C015 Primary Contributing Circumstances Discussion

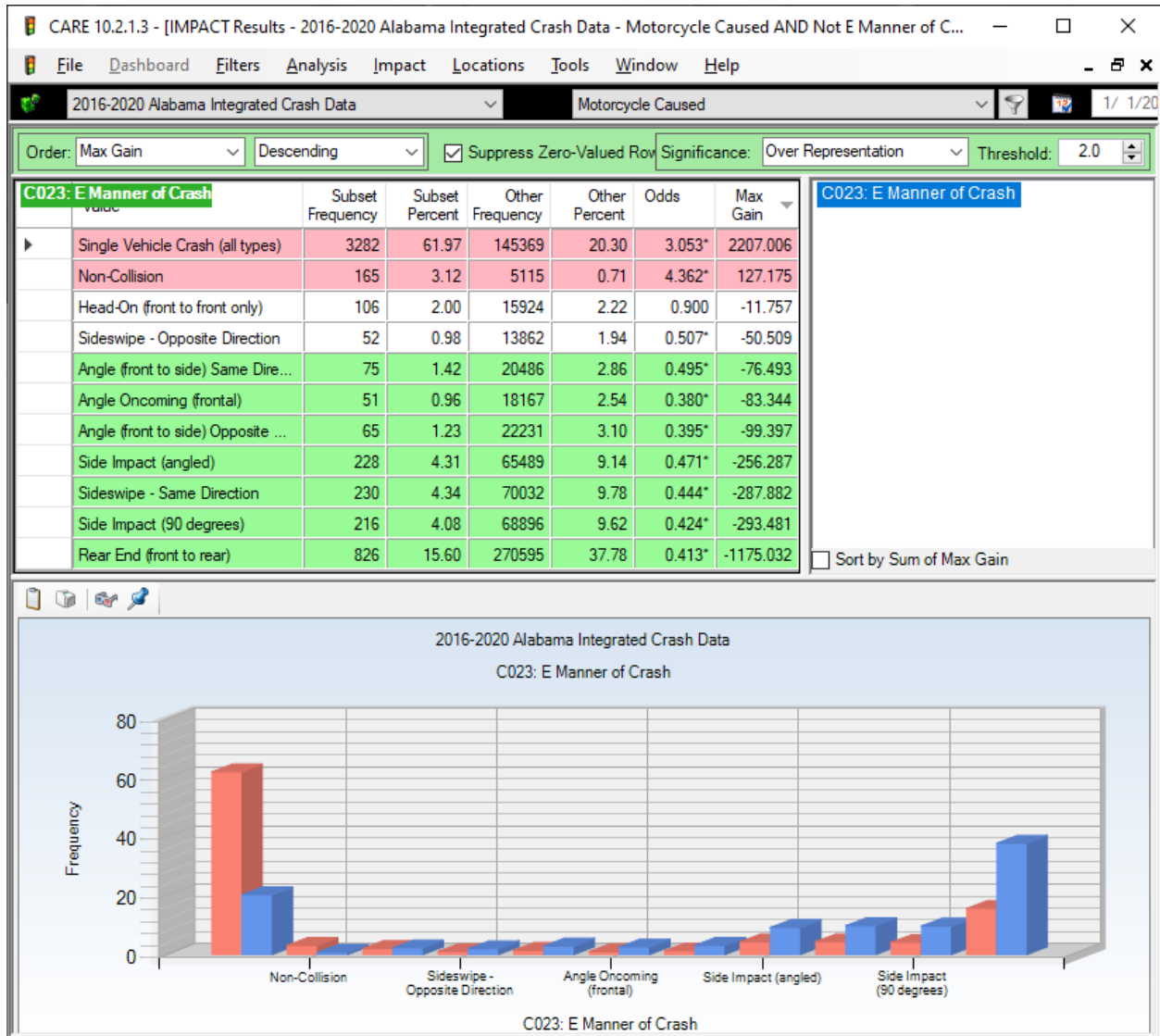
The top two, Aggressive Operation and Over Speed Limit, are closely linked to each other, and they show an attitude on the part of the driver. This would also be true of some of the others, including Driving too Fast for Conditions and DUI. Many of the others show the motorcyclist as a victim, e.g., Swerved to Avoid Vehicle, Swerved to Avoid Animal and Improper Passing. Any of these might provide the basis for motorcyclist information. At the other end, Improper Turns and Failure to Yield and several others that are under-represented, show the common sense of most motorcyclists, and thus would not need to be emphasized.

C017 First Harmful Event Discussion

When we consider motorcycle operations the reason for the highly over-represented items becomes apparent (those with the red background have an Odds Ratio > 2). For most other types of crashes this attribute gives us “what was hit.” This is true for the lower frequency items on this list, but the ones on the top reflect motorcycle vulnerabilities. The following had highly significant over-representations with Max Gains in excess of 20 crashes:

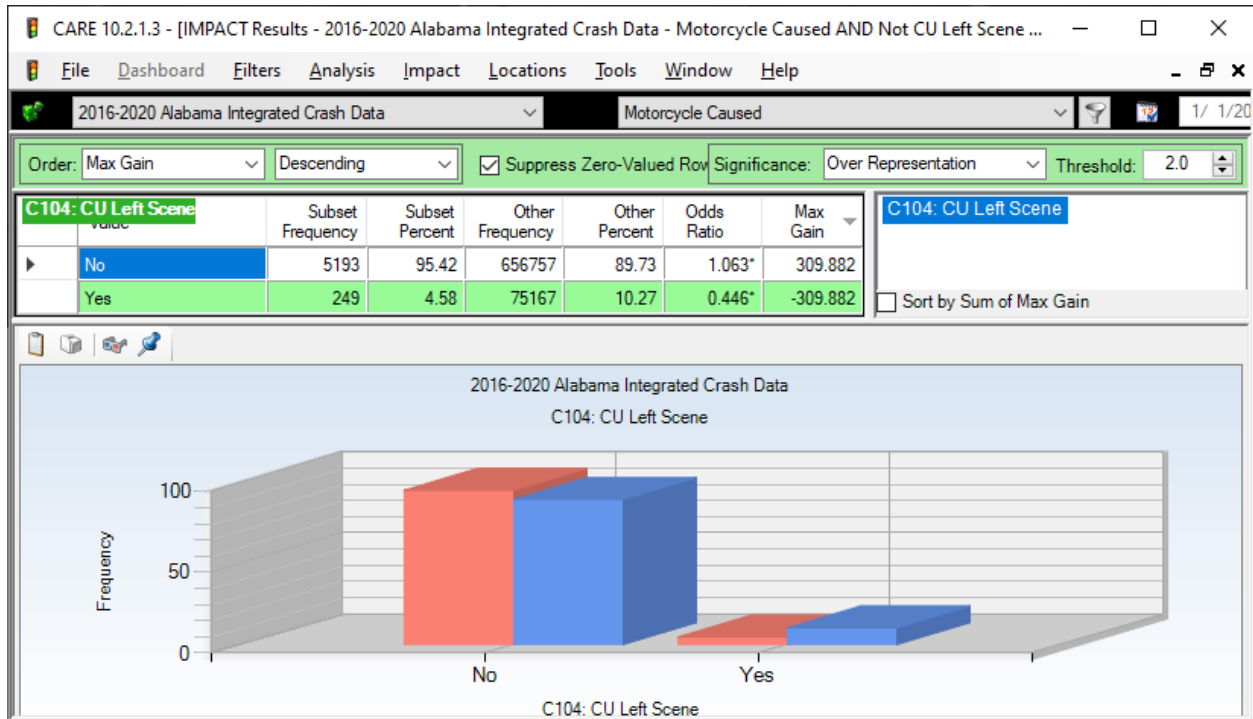
- Overturn/Rollover,
- Evasive Action (Swerve/Brake),
- Collision with Ditch,
- Ran Off Road Right,
- Other Non-Collision,
- Fell/Jumped from Motor Vehicle,
- Collision with Other Fixed Object,
- Collision with Curb/Island/Raised Median,
- Collision with Animal: Other than Deer,
- Ran Off Road Left,
- Collision with Animal: Deer,
- Collision with Other Non-Fixed Object,
- Non-Contact Vehicle,
- Vehicle Defect/Component Failure, and
- Ran Off Road Straight.

C023 Manner of Crash



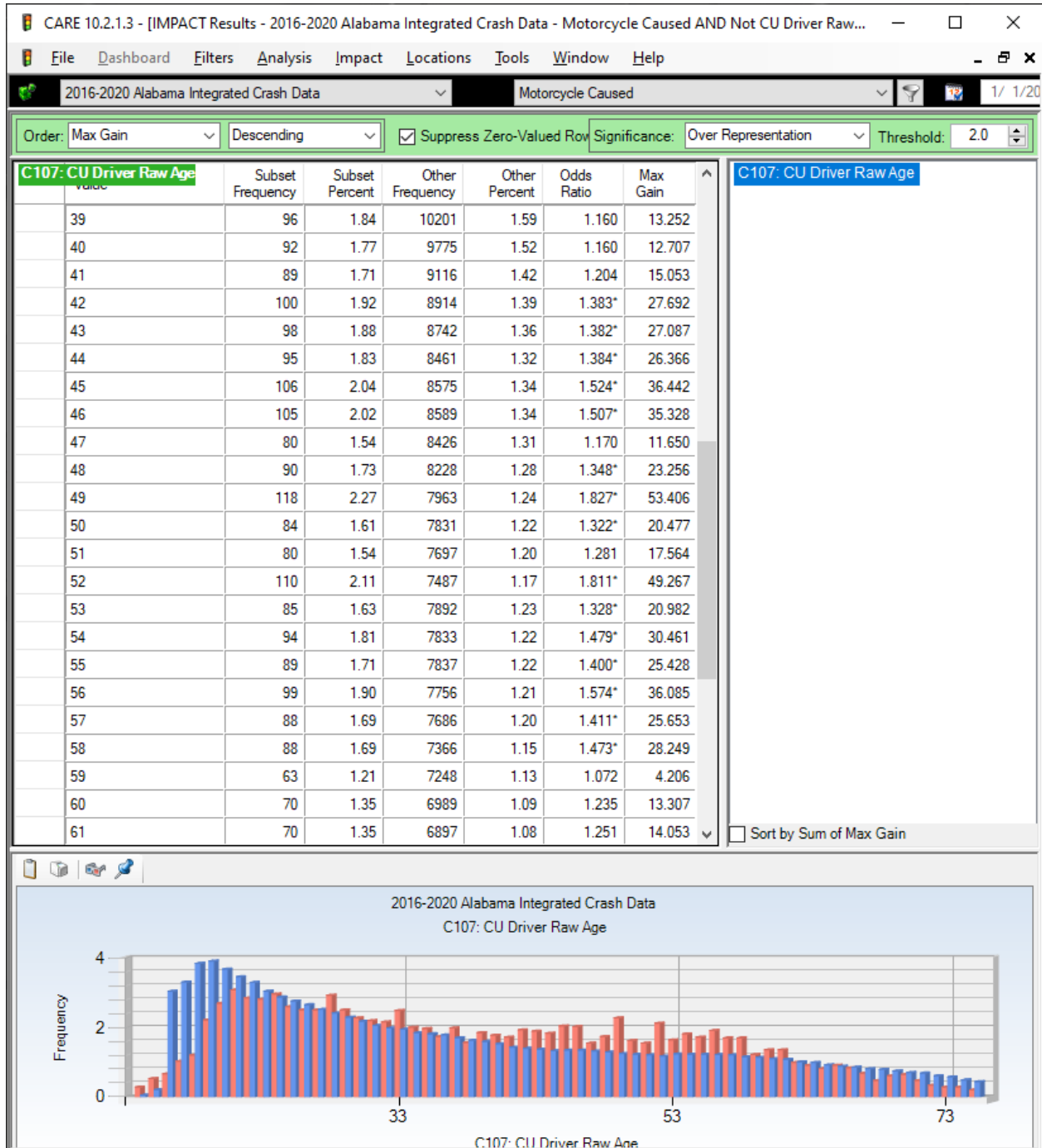
The top two over-represented items are reasonable for motorcycles. Most of the common Manner of Crash types for 4-wheeled vehicles are under-represented for motorcycles.

C104 Left Scene



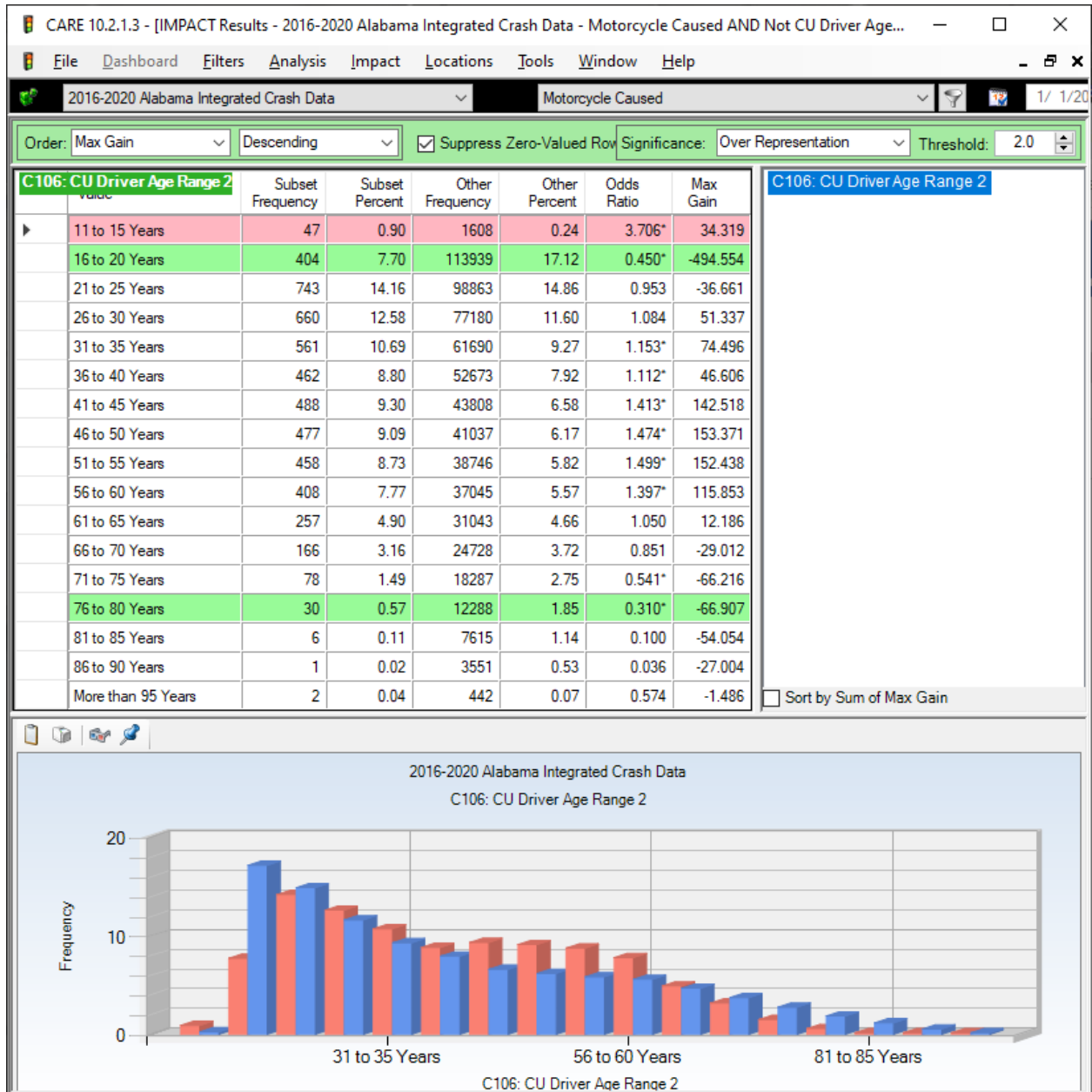
Motorcyclists proportion of leaving the scene is significantly lower than those of the general population of drivers.

C107 CU Driver Raw Age



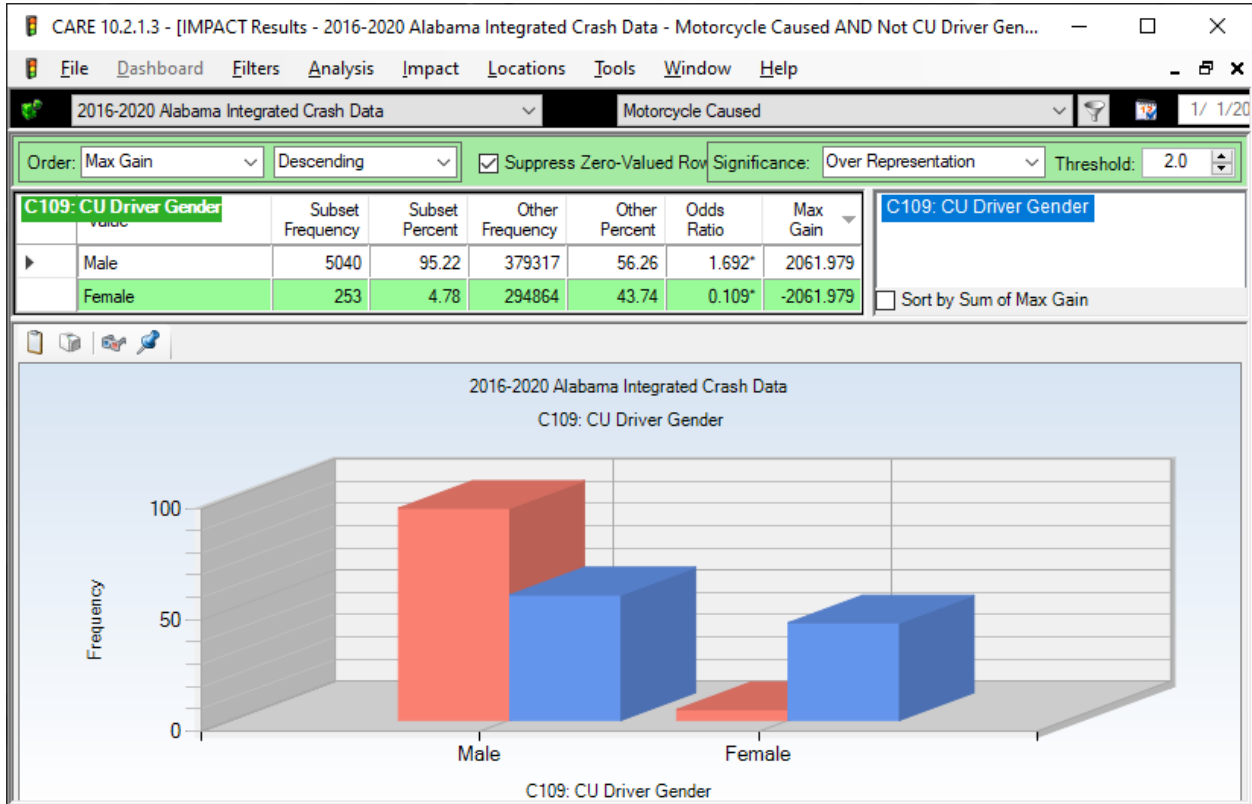
Except for ages 14 and 15, the younger ages are under-represented up to ages 28 and 33. The major over-represented grouping is from 39 to 61, which are shown in the table above.

C106 CU Driver Age Range – five year intervals



The over-representation in the 11 to 15 year-old category is alarming, but it probably reflects the motorcycle licensing of 14 and 15 year olds. The major over-representation is in the 41 to 60 year-old category.

C109 CU Driver Gender



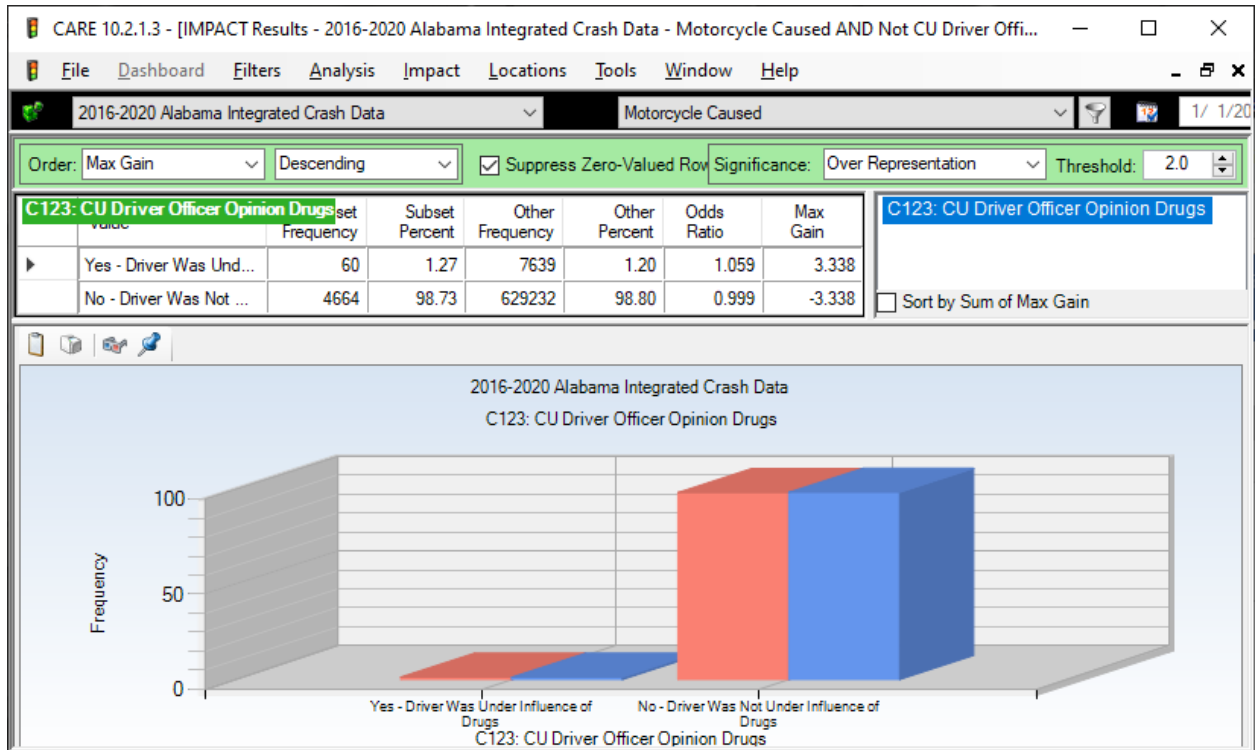
It is no surprise that males outnumber females as drivers in MC crashes by about 20 to 1.

C122 CU Driver Officer Opinion Alcohol



The proportion of MC alcohol DUI crashes is about 70% higher than non-MC crashes.

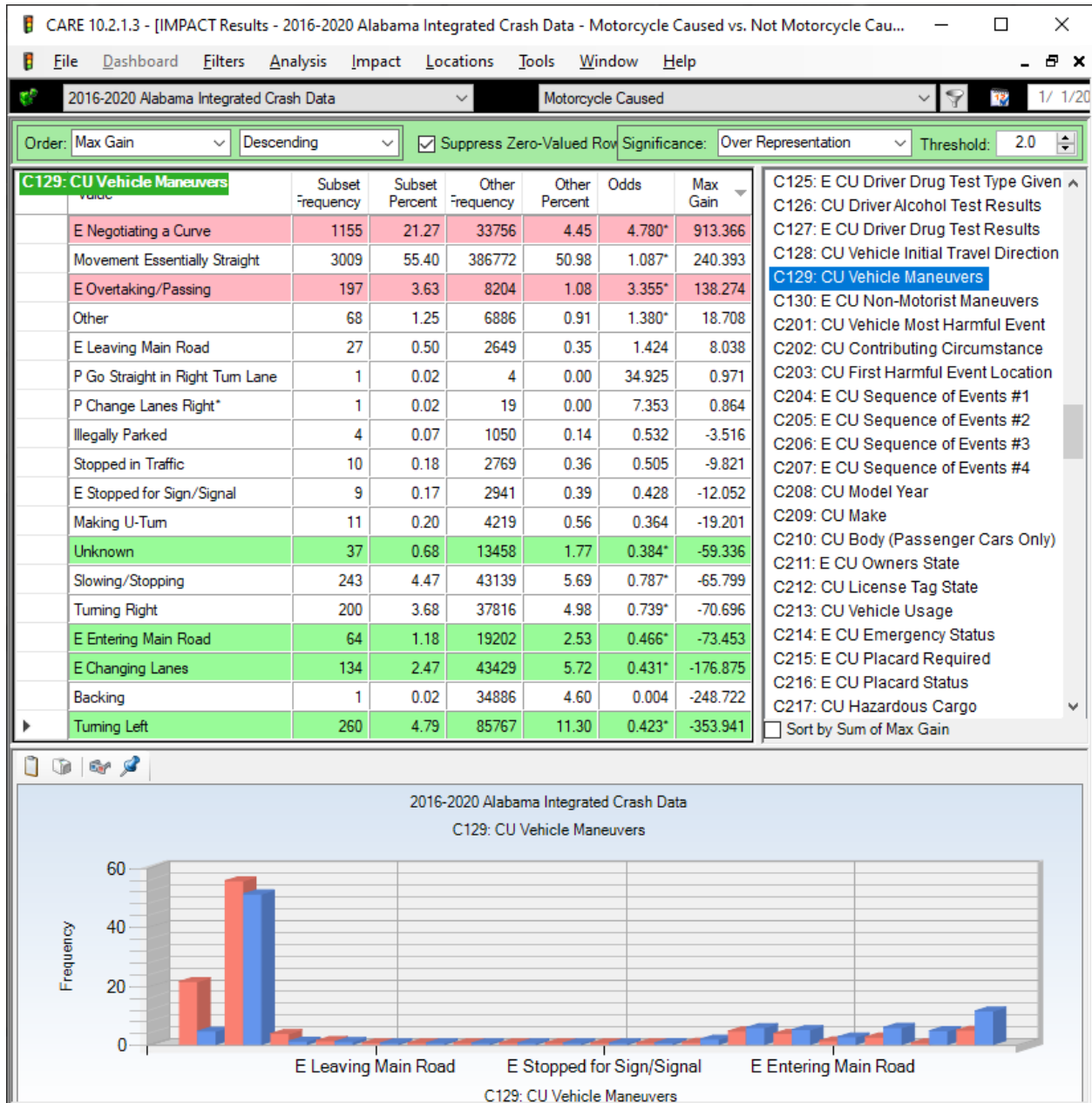
C123 CU Driver Officer Opinion Drugs



The proportion of MC drug DUI crashes is about 60% higher than non-MC crashes.

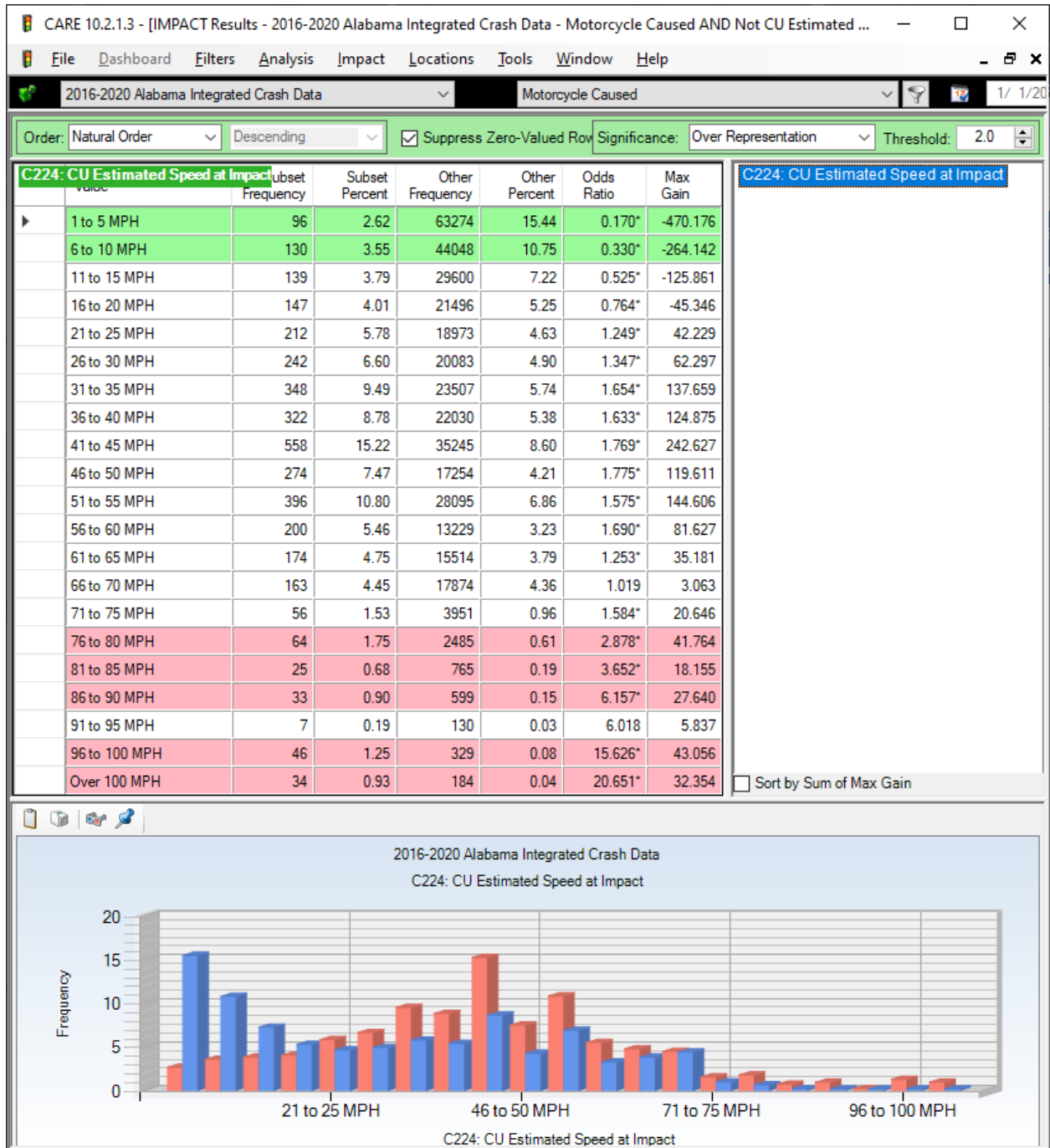
Alcohol is a drug – we are using the word “drugs” accommodatively here to mean non-alcohol drugs.

C129 CU Vehicle Maneuver



As was seen in variable C407 above, Curves are the major problem for motorcycles. This also shows Overtaking and Passing to be a potential problem, but it has only 197 crashes in the five years as opposed to 1,155 for Negotiating a Curve.

C224 CU Estimated Speed at Impact



The combination of speed and the lack of protection is a deadly combination for motorcycle crashes. See this relationship in the next display.

Cross-tabulation Injury Severity vs Impact Speed

CARE 10.2.1.3 - [Crosstab Results - 2016-2020 Alabama Integrated Crash Data - Filter = Motorcycle Caused]

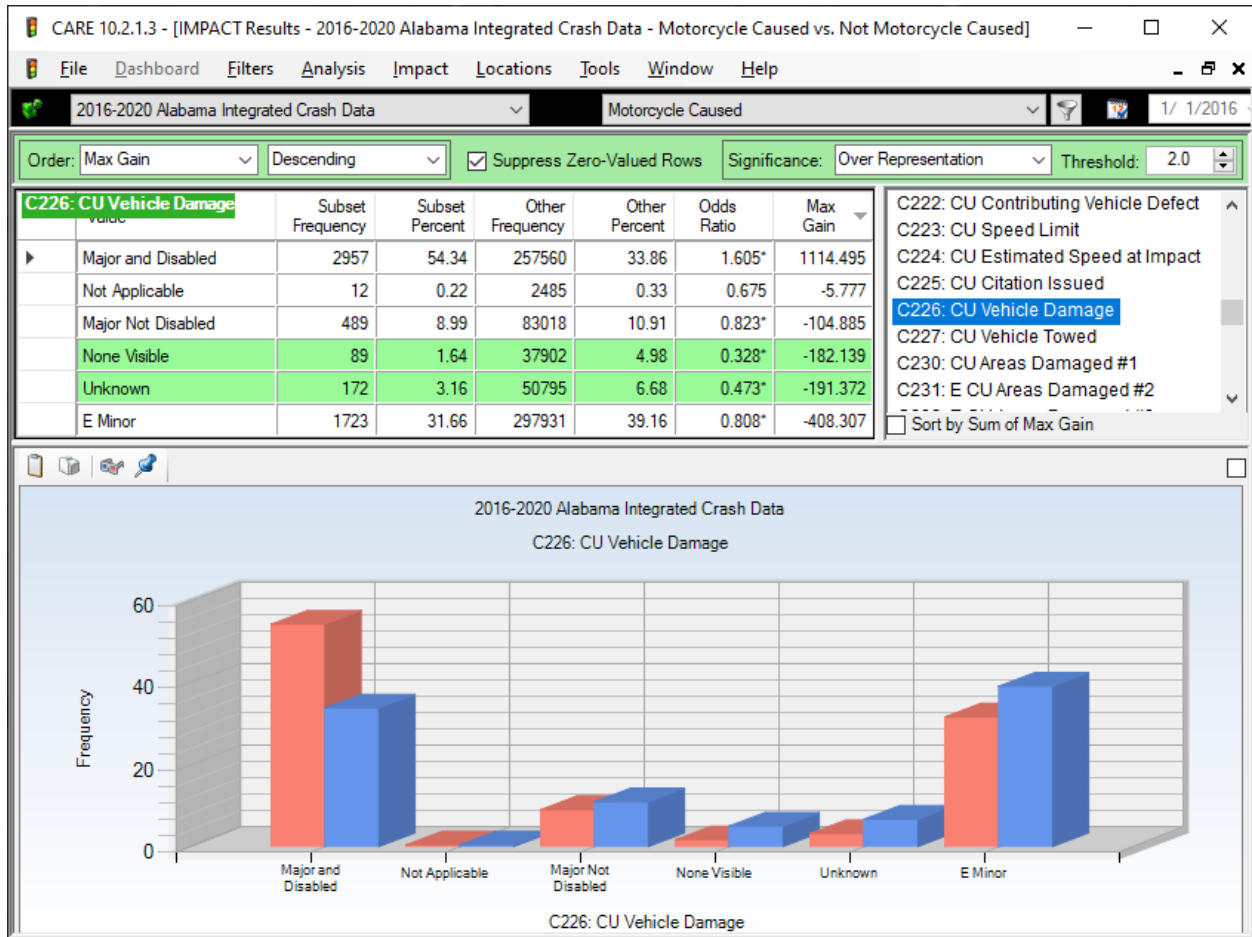
File Dashboard Filters Analysis Crosstab Locations Tools Window Help

2016-2020 Alabama Integrated Crash Data Motorcycle Caused 1/ 1/2016

Suppress Zero Values: Rows and Columns 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	0 0.00%	0 0.00%	0 0.00%	0 0.00%	1 0.08%	0 0.00%	1 0.02%
1 to 5 MPH	1 0.34%	8 0.57%	14 0.79%	9 1.81%	60 4.56%	4 2.35%	96 1.76%
6 to 10 MPH	1 0.34%	14 1.00%	30 1.70%	12 2.41%	69 5.24%	4 2.35%	130 2.39%
11 to 15 MPH	1 0.34%	16 1.15%	47 2.66%	9 1.81%	66 5.02%	0 0.00%	139 2.56%
16 to 20 MPH	2 0.69%	20 1.43%	45 2.55%	15 3.01%	60 4.56%	5 2.94%	147 2.70%
21 to 25 MPH	1 0.34%	39 2.79%	72 4.07%	28 5.62%	69 5.24%	3 1.76%	212 3.90%
26 to 30 MPH	2 0.69%	45 3.22%	90 5.09%	22 4.42%	76 5.78%	7 4.12%	242 4.45%
31 to 35 MPH	4 1.37%	89 6.37%	128 7.24%	24 4.82%	94 7.14%	9 5.29%	348 6.40%
36 to 40 MPH	15 5.15%	100 7.16%	109 6.17%	28 5.62%	62 4.71%	8 4.71%	322 5.92%
41 to 45 MPH	23 7.90%	201 14.39%	177 10.01%	53 10.64%	98 7.45%	6 3.53%	558 10.26%
46 to 50 MPH	11 3.78%	97 6.94%	100 5.66%	25 5.02%	38 2.89%	3 1.76%	274 5.04%
51 to 55 MPH	21 7.22%	135 9.66%	153 8.65%	25 5.02%	57 4.33%	5 2.94%	396 7.28%
56 to 60 MPH	22 7.56%	76 5.44%	64 3.62%	13 2.61%	23 1.75%	2 1.18%	200 3.68%
61 to 65 MPH	15 5.15%	67 4.80%	54 3.05%	13 2.61%	20 1.52%	5 2.94%	174 3.20%
66 to 70 MPH	17 5.84%	60 4.29%	51 2.88%	4 0.80%	27 2.05%	4 2.35%	163 3.00%
71 to 75 MPH	3 1.03%	20 1.43%	20 1.13%	7 1.41%	6 0.46%	0 0.00%	56 1.03%
76 to 80 MPH	14 4.81%	27 1.93%	15 0.85%	0 0.00%	7 0.53%	1 0.59%	64 1.18%
81 to 85 MPH	6 2.06%	10 0.72%	7 0.40%	0 0.00%	2 0.15%	0 0.00%	25 0.46%
86 to 90 MPH	5 1.72%	11 0.79%	11 0.62%	2 0.40%	3 0.23%	1 0.59%	33 0.61%
91 to 95 MPH	4 1.37%	2 0.14%	0 0.00%	0 0.00%	1 0.08%	0 0.00%	7 0.13%
96 to 100 MPH	19 6.53%	16 1.15%	7 0.40%	3 0.60%	1 0.08%	0 0.00%	46 0.85%
Over 100 MPH	13 4.47%	10 0.72%	5 0.28%	1 0.20%	5 0.38%	0 0.00%	34 0.63%
E Stationary	0 0.00%	9 0.64%	3 0.17%	0 0.00%	10 0.76%	1 0.59%	23 0.42%
Unknown	89 30.58%	313 22.41%	543 30.71%	193 38.76%	434 32.98%	94 55.29%	1666 30.63%
Not Applicable	2 0.69%	12 0.86%	23 1.30%	12 2.41%	27 2.05%	8 4.71%	84 1.54%
TOTAL	291 5.35%	1397 25.68%	1768 32.50%	498 9.15%	1316 24.19%	170 3.13%	5440 100.00%

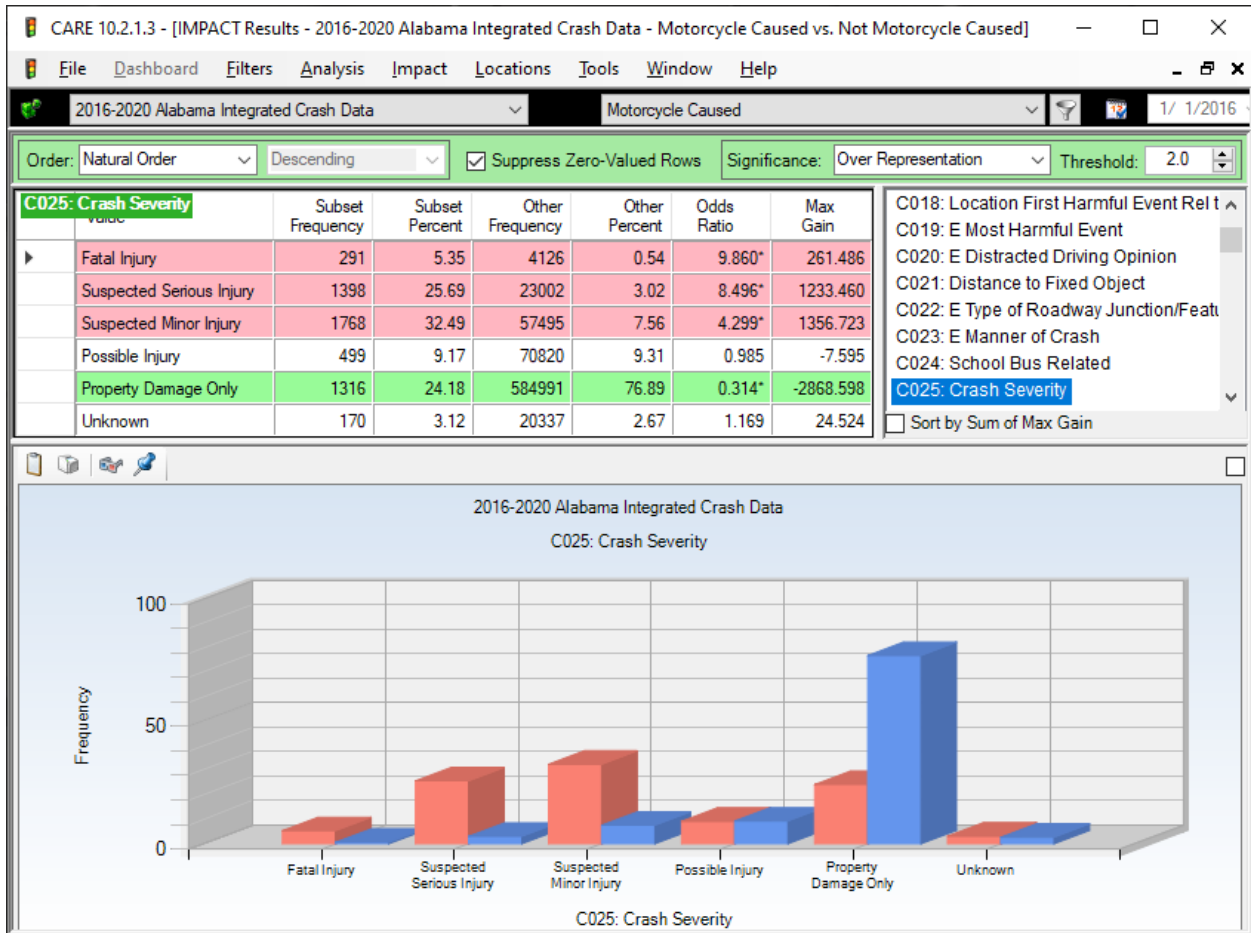
C226 CU Vehicle Damage



Major and Disabled was the only over-represented value, having a proportion that is over 60% higher than the non-MC crashes.

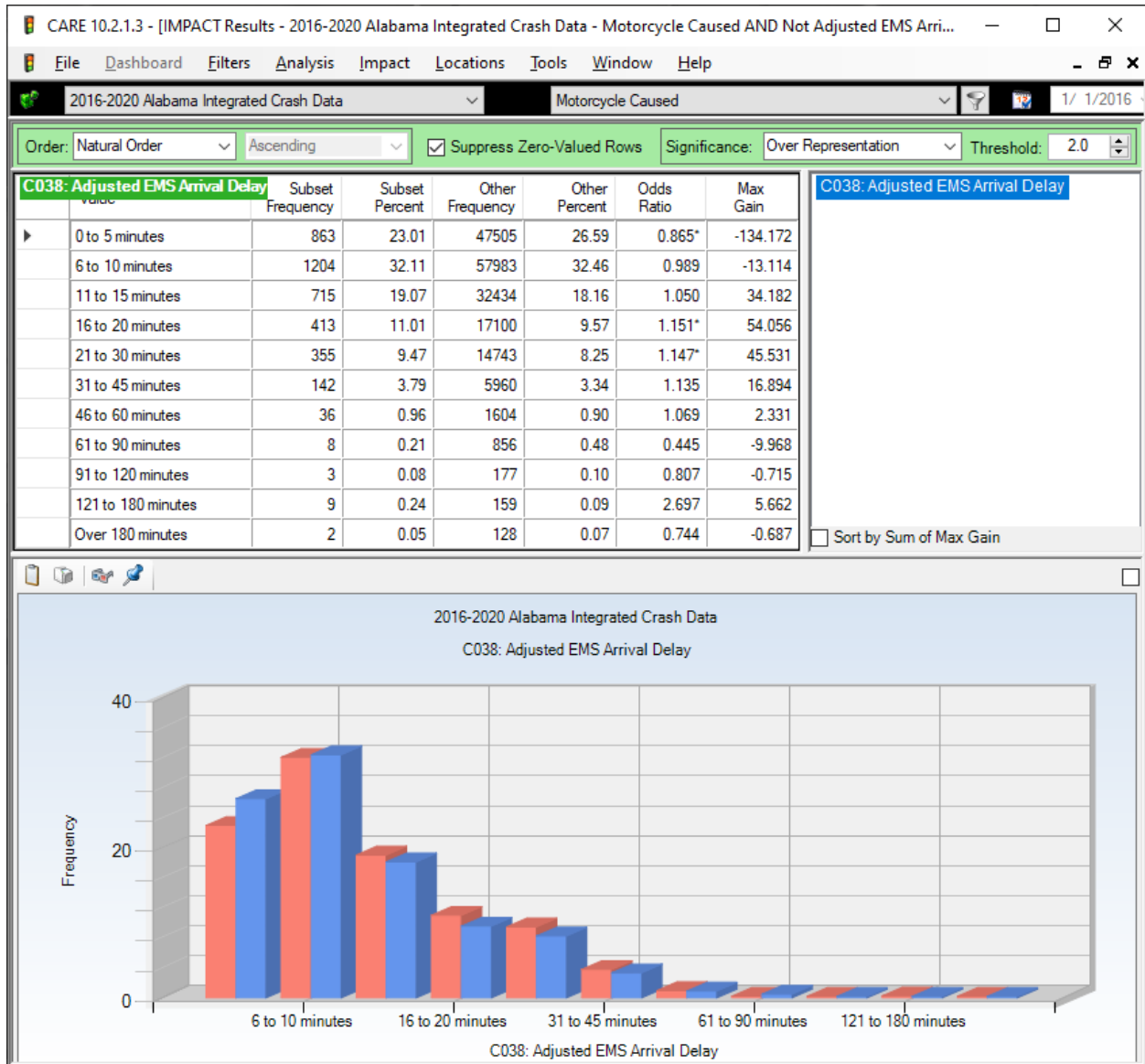
Severity Factors

C026 Crash Severity



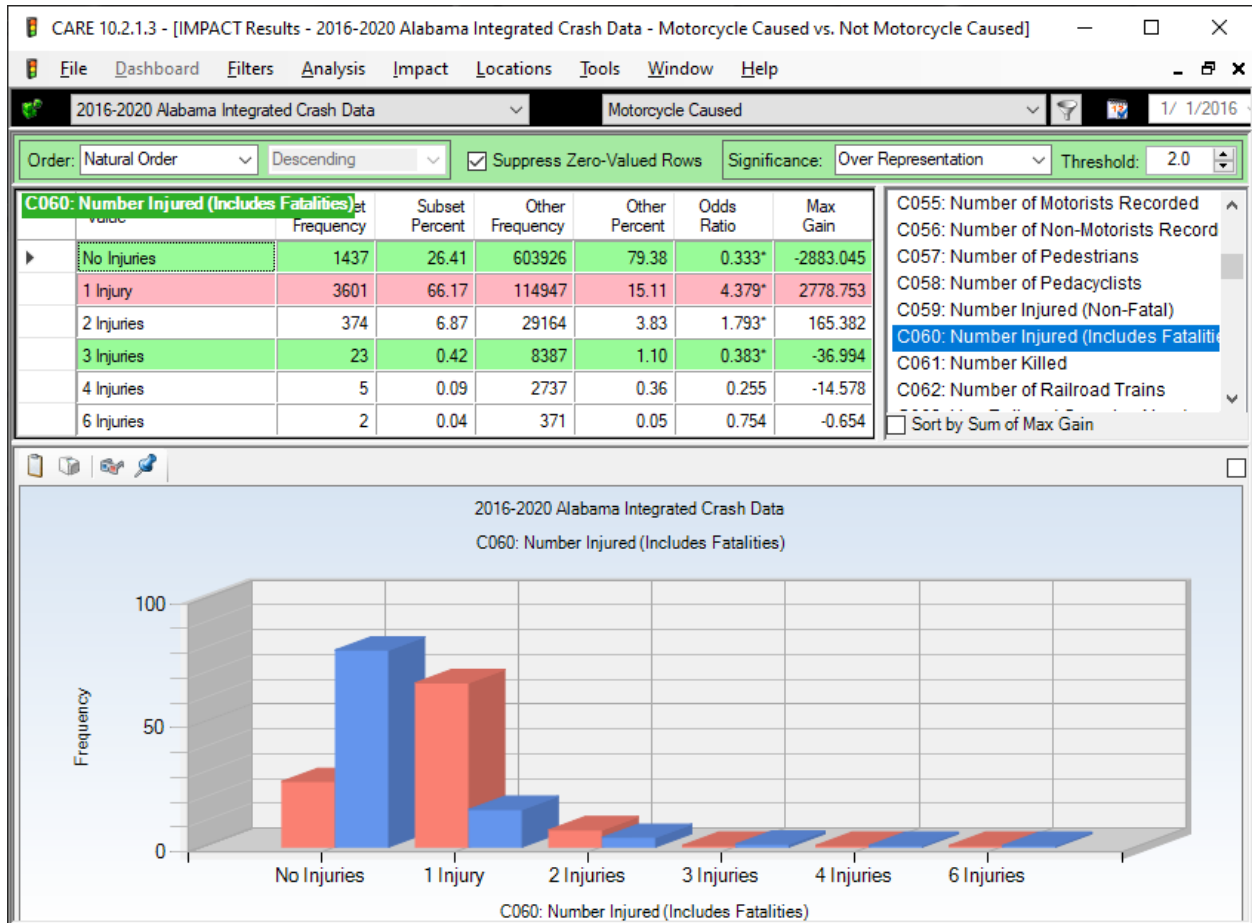
The fatality rate proportion for MC crashes is close to ten (9.860) times what it is for non-MC crashes. Suspected Serious Injury is comparable to this with an Odds Ratio of 8.496.

C038 Adjusted EMS Arrival Delay

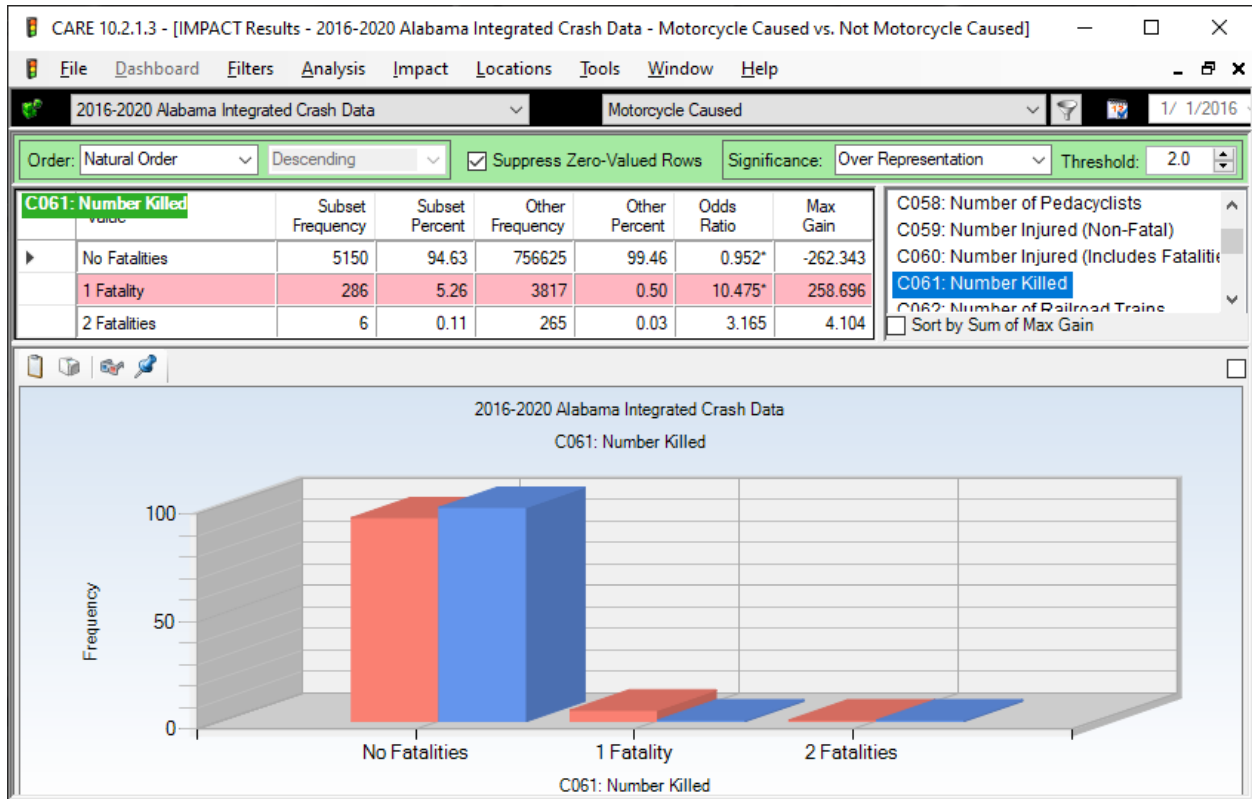


Some of the increased delay has to do with the proportion of the SC crashes being in rural areas. A few of the highest delay times were probably due to a lack of discover in the late night or early morning hours.

C060 Number of Injured (Includes Fatalities)



C061 Number Killed



For additional motorcycle information from NHTSA and other sources, see:
<http://www.safehomealabama.gov/tag/motorcycles/>