A Comparison of CMV and Heavy Truck (CMVHT) Involved with Non-CMVHT Involved Crashes CY2010-2014

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Abstract

This abstract summarizes and IMPACT study conducted for CMV and Heavy Trucks (CMVHT) that compared crashes in which CMVHTs were *involved* against those in which CMVHTs *were not involved*. "Involved" does not imply that the CMVHT vehicles/drivers caused the crash; the CMVHT involved subset includes both these and those in which the CMVHTs were the non-causal vehicle. The summary of this study will be given in the categories used in performing the analysis, which are as follows:

- **Technical CMV Involved and CMV plus Heavy Truck (CMVHT) Causation.** The filter applied included a combination of CMVs and other heavy vehicle. A proportion of 54.2% of the crashes that were in the subset were reported to have been caused by the CMVHT. An analysis of two-vehicle crashes showed that for crashes involving CMVHTs the following causation probabilities were assigned:
    - For all crashes CMVHT caused 53.9% of the crashes;
    - For fatality crashes CMVHT cause 21.4% of the fatality crashes.

  The 21.4% fault percentage for CMVHTs demonstrates that most fatal crashes involving CMVHTs are the fault of the lighter vehicles, according to crash reports – only about one in five is caused by the CMVHT, which we would anticipate that this number would be one in two.
- **Driver Behavior, Impaired and Distracted Driving**. There should be no inference that the CMVHT is (or is not) at fault because the subset is of CMVHT *involved*, not caused crashes. Primary Contributing Circumstances that are least significant include DUI, CU Driver Condition, Distracted Driving. Fatigued/Asleep is a category included in the distracted driving attribute, and it is shown to be slightly over-represented (difference is no statistically significant, as was the case with C121 above). The number of Left Scene positives was about 11.5% higher than expected, which is significant. Single Vehicle Crashes were significantly under-represented for crashes involving CMVHTs. Sideswipes were seen to be an obvious problem. Vehicle Maneuver showed that sideswipes resulting in lane changes are a major issue. The First Harmful Event pattern that emerged is that unforced errors (characterized by single vehicle crashes) are consistently under-represented. These unforced error type crashes most often go with alcohol/drug use and distracted driving, which attests to the professional nature of the CMVHT drivers and the time that they drive.
- **Driver Demographics.** While not over-represented the large number of young people involved shows that the dangers of risk-taking around trucks should be emphasized in whatever way might motivate young people. It is important to recognize that this distribution is increasing by one each year, and basically is "not getting any younger." With increasing life spans and the necessity to postpone retirement, we can expect that the

problem age group will get into the seventies over the next decade. The number of truck drivers is relatively small up until the 31-35 age grouping. It expands from there peaking at 46-50, and then it does not drop to a break even with the non-truck driving population until 71-75. After that the age groups are under-represented. While it is expected that males would be over-represented in their crash causation for CMVHT-involved crashes as compared to all other crashes, the specific degree is important to note. Also, this is a category that needs to be watched because it is changing from year to year. The CMVHT drivers drive up the Greater than 25 Miles frequency, but the majority of causal drivers are still within 25 miles of home, again emphasizing that the subset of concern is not isolated to CMVHT-caused crashes – in contains all CMVHT-involved crashes.

- **Roadway Characteristics.** Speed Limit shows that the problem areas are on those roadway sections that had the higher speed limits, and in particular, that had 70 MPH speed limits – that would be the rural areas. Estimated Speed at Impact showed that the highest over-representations are where they vehicles were operating at nor near the speed limit. However, significant over-representation occur up through 80 MPH indicating the need for speed enforcement. As expected the Highway Classification most over-represented is that of Interstates. This should not indicate that these highways are in any way deficient; rather, it is just that the majority of CMVHT traffic is on these roadways. CMVHT-involved crashes were found to occur relatively proportionately more often in workzones (6.04%) than the control group (1.87%).
- **Time Factors.** Compared to other crash types that have been fairly stable with a large relative increase in 2014, CMVHT crashes were down significantly in both 2013 and 2014. This is a very good positive development for this component of the traffic mix in a time when the economy shows signs of rebounding. Time of Day analysis indicated that morning rush hour is a bad time, and all subsequent daytime hours through until the afternoon rush hours are high and over-represented. The Day of the Week analysis showed that the expected Monday through Friday are high with all but Friday being over-represented significantly, since seemingly the truck drivers avoid this time of the week.
- **Geographical Considerations.** The Rural/Urban analysis showed about 2/3rds of the crashes of CMVHT-involved vehicles occur in the urban areas, as compared to about 3/4ths of other crashes. Those in the urban areas were shown to be of much less severity because of the lower speeds. Rural areas of the state that are adjacent to heavily traveled urban areas tend to be consistently over-represented. Birmingham and Mobile were at the top of the city list, while Montgomery and Huntsville are at the very bottom.
- **Severity Factors.** The number of vehicles involved impacts the severity of the crash in that it will necessarily involve a smaller vehicle independent of causation. Since multiple vehicle crashes are the norm for CMVHT crashes, they can be expected to be more severe. Only about 15.2 CMVHT crashes are single vehicle as compared to 24.6% for non-CMVHTs. As expected, the fatality probability in a CMVHT-involved crash is over twice that of other crashes (single vehicle crashes included). The highest non-fatal severity case shows no significant difference, while the other two injury classifications are slightly but significantly under-represented. Unexpectedly, the no-injury category was over-represented, probably coming from the large number of CMVHT crashes that occur

in urban area. All of the single and multiple fatality classifications are over-represented, and correspondingly, the No Fatalities category is under-represented. This is expected since the typical CMVHT crash involves vehicles of extremely disparate size and weight.

- **Vehicle Factors.** It is expected that large trucks have a greater number of vehicle defects to contribute to a crash than would apply to passenger cars, and these types are anticipated to be over-represented (e.g., Tire Blowout, Wheels, Trailer Hitch, Power Train, Suspension). While 55 crashes involving trains (11 per year) might not seem like many compared to the total CMVHT-involved crashes (41,473), the fact that they occur in three times the frequency of other crashes indicates that additional training might be warranted. The CU vehicle in this case would be a heavy truck since the second vehicle is the train. In addition, these crashes are quite spectacular, especially if the truck is carrying hazardous materials.
- **Roadway Environment.** Weather was not a large causal factor in CMVHT-involved crashes, about 5% under the expectation for other crashes. However, weather combinations that involve wind were over-represented. The weather conditions obscuring vision demonstrates that it is when the weather event is progress that the problem occurs. Cars in the vicinity of large trucks during rain would be particularly vulnerable to this problem.

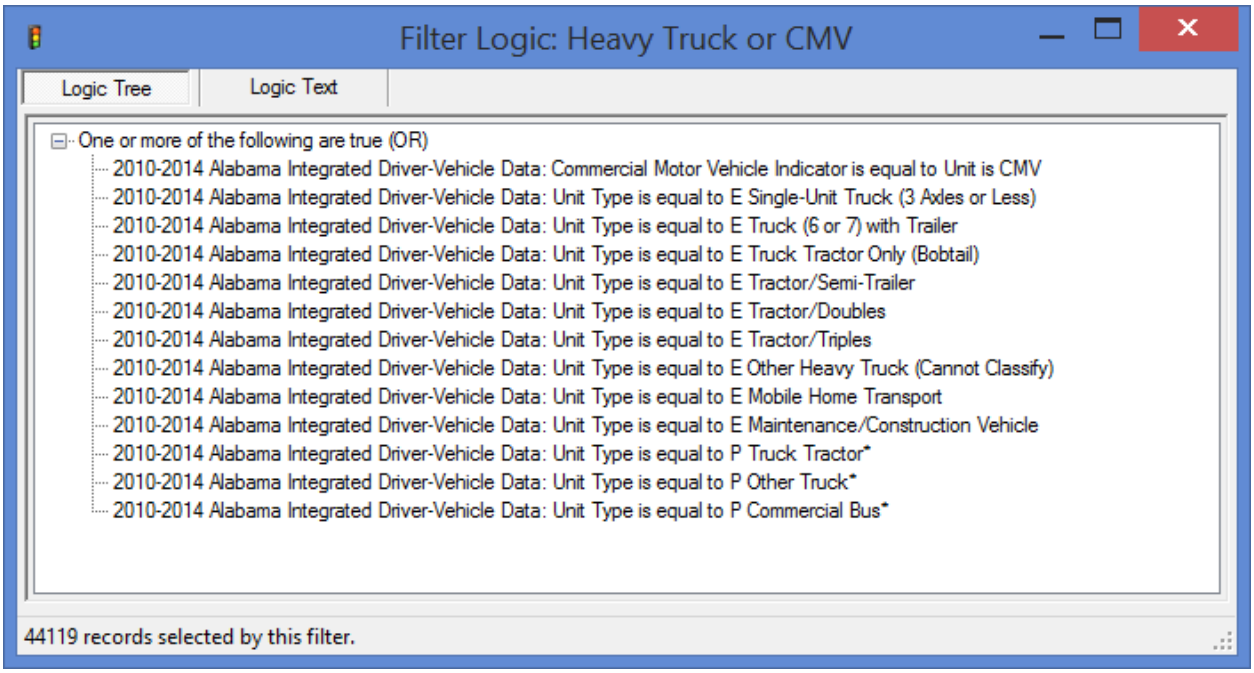
Introduction

This is the first of three IMPACT studies conducted on CMV and Heavy Trucks (CMVHT), including:

- A comparison of crashes in which CMVHTs were *involved* against those in which CMVHTs *were not involved* (this study);
- A comparison of crashes in which the CMVHT was *at fault* against those crashes involving a CMVHT, but where the CMVHT was *not at fault*; and
- A comparison of crashes involving CMVHTs in *CY2014* against the same that occurred in the *previous four year period* (CY2010-2013).

The goal of all of these studies to surface the most effective countermeasures for reducing these crash frequencies and severities in the future.

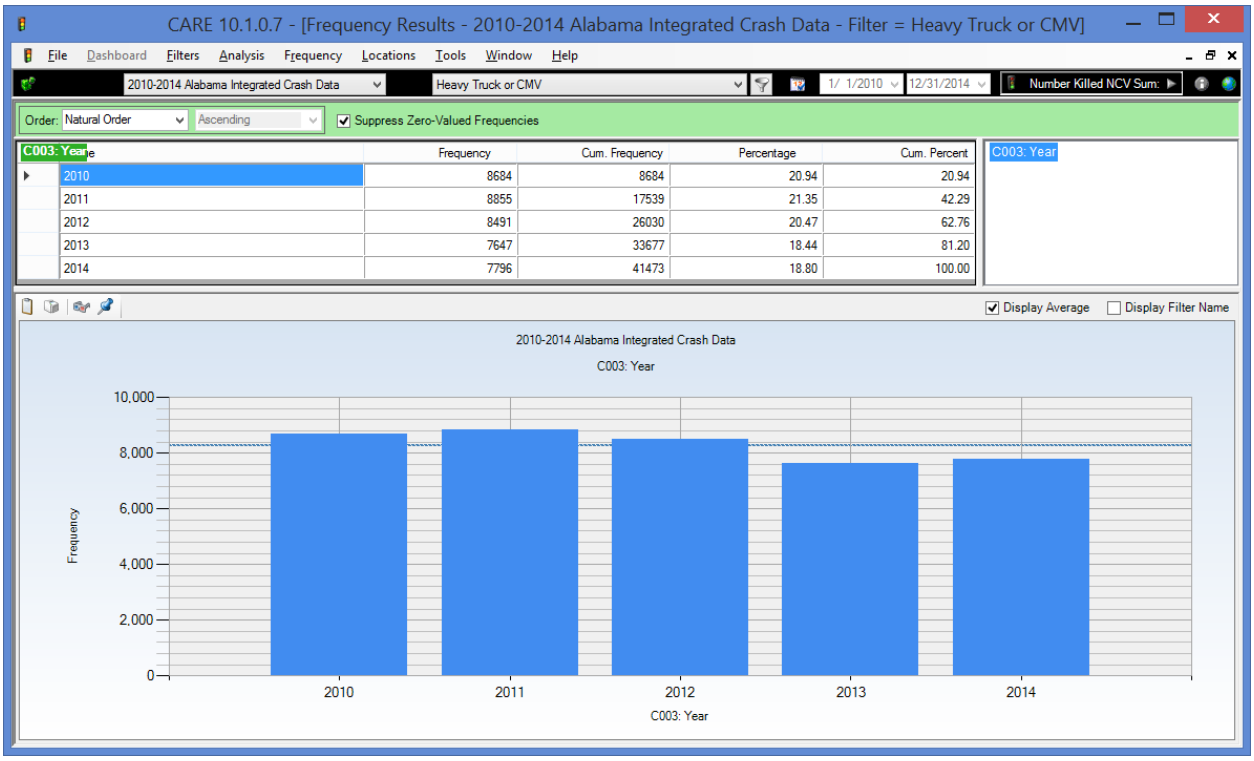
The acronym "CMVHT" will be used to describe the subset of concern in this current report. It was thought to be of benefit for this analysis to enlarge the subset to include all heavy trucks and not just those that are classified to be technically Commercial Motor Vehicles. The following display shows exactly what is in the subset that is of concern:



It will be shown below in the IMPACT run of C080 that 11.0% of this subset were not indicated on the crash form to be technically CMVs, although the indicators of the heavy truck or commercial bus given above applied. Essentially the subset started with the technical CMV designation and then added the other indicators for heavy trucks. Within CARE the filter is called "Heavy

Truck or CMV," but for purposes of this report we will use the acronym CMVHT to apply to this entire subset. The rationale for this is that these other heavy truck vehicles will generally display much the same characteristics as CMVs, and for purposes of this study, we are interested in developing countermeasures to all of these crashes.

The following display gives the frequency distribution for overall crashes by year for this defined subset of crashes. The blue line is the average over the five years.



Clearly there was a significant reduction in CMV crashes in years 2013 and 2014. This will be discussed in more detail in light of the overall crash trend below under the Time Factors major heading, attribute C003, Year.

IMPACT Outputs for CMVHT Involved (Not Necessarily Caused)

CMVHT involved. In interpreting the displays below it is critical that the reader keep in mind just what the subset is and not make any inferences as to causation. It is reasonable to expect that because the CMVHT subset is almost exclusively heavy trucks that a large proportion of the crashes under consideration will be caused by this subset. All other things being equal it could be expected that in a crash involving a passenger care and a CMVHT, 50% of the crashes will be caused by the CMVHT. But this subset also includes single vehicle CMVHT crashes as well as crashes involving two CMVHTs, both of which fault must be assigned to the CMVHT. This will skew the results, and the reader should be aware of that. However, causation was not at all a factor in creating the subset in order to get the richest subset possible to aid in the creation and development of countermeasures.

FMCSA not qualified variables. Variables C451-C459 are not shown because they had 10,284 (93.9%) of their crashes in a category "Crash is Not Qualified," yielding a remaining sample that would not be representative of all heavy truck crashes. "Crashes Not Qualified" are crashes for which the FMCSA CMV data elements are not required. The absence of these attribute values in such a large proportion of the CMVHT subset makes these variables of no value for the comparisons.

Interpretation of IMPACT displays. The following sections presents a number of IMPACT runs that surface some of the major characteristics of crashes in which CMVHTs were involved as compared to all of the rest of the crash records. 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.

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 most 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 those cases where outputs were pruned the result forms an estimate of reality that is, in most cases, is more accurate in the relative distribution sense than if these categories were left in, to say nothing of their distraction from the important results. In situations where more than these 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 either an E or a P. This indicates that the attribute value (or the entire attribute) is either exclusive to eCrash (E) or to the Paper form (P). If this does not appear then it should be concluded that the attribute or value is coded similarly enough in both modes that it can be considered essentially the same variable, and thus comparable. In some cases where there were very few P responses these were pruned from the output; in other cases where they were felt to be significant they can be combined with the E results to form an overall picture of reality. CU = Causal Unit – the unit and driver indicated by the officer to have the most cause for the crash.

Summary of output results by general IMPACT category. The following gives a brief summary of the IMPACT displays that follow:

- **Technical CMV Involved and CMVHT Causation** – this category helps to understand the contents of the CMVHT subset and to determine when these vehicles are the cause of two-vehicle crashes.
    - C450 CMV Involved. This display shows that 11.0% of the crash records generated by the filter discussed above were obtained from vehicles that were not CMVs. We expect to do a future study what will concentrate solely on CMVs.
    - C103 Causal Unit is the CMV. This display indicates that 54.2% of the crashes that are in the subset were reported to have been caused by the CMV. The subset includes single vehicle CMV crashes as well as crashes in which two or more CMVs might be involved. So this is not an indicator of the crash causation percentage between CMVs and other motor vehicles.
    - C101 Causal Unit (CU) Type (multi-vehicle crashes). This frequency distribution was produced for the CMVHT subset that was further restricted to *multi-vehicle crashes only*. This enabled the causal vehicle to be determined for those types of vehicles in the CMVHT subset and a percentage to be computed. However, this frequency distribution could not indicate those vehicles that were indicated to be CMVs but not included in the heavy truck logic. In fact, some lighter trucks and passenger cars are indicated to be CMVs. Further analysis created a cross-tabulation of C450 (see above) vs. C101 from which the additional CMV causal units could be added. The results correspond closely to those past IMPACT studies that identify crash causation by vehicle. The results are, for crashes for which they are involved:
        - For all crashes CMVHT cause 53.9%
        - For fatality crashes CMVHT cause 21.4%

      In both cases multiple vehicle crashes that just involved two or more CMVHTs were charged against the CMVHT fault count. The 53.9% is statistically significantly higher than 50% due to the very high numbers involved; however, when considering the skill required to control vehicles of this size it is not unexpected that they would have a higher at-fault rate. The 21.4% fault percentage for CMVHTs demonstrates that most fatal crashes involving CMVHTs are the fault of the lighter vehicles, according to crash reports – only about one in five is caused by the CMVHT, which we would anticipate that this number would be one in two.

- **Driver Behavior, Impaired and Distracted Driving** – recall that any errors in skill or judgment could be attributed to the non-CMVHT vehicle for any attribute below (and in any of the categories) – there should be no inference that the CMVHT is (or is not) at fault. If these results imply driver errors, they are to deal with both CMVGT and non-CMVHT driver behaviors.
    - C015 Primary Contributing Circumstances (worse classifications). Some of the highly over-represented PCCs are clearly items that would pertain to trucks, such as Defective Equipment and Cargo Falling or Shifting. However, the other categories are items that could equally apply to non-CMVHT drivers and vehicles. Because of the number of possible values in this attribute it is presented in two displays, the worst for the CMVHT involved subset (this display) and the best (next display). All items with less than 200 occurrences were excluded. Note that E Ran Stop Sign appear on both displays.
    - C015 Primary Contributing Circumstances (best classifications). The best from the CMVHT-involved subset of crashes is at the bottom of the table listing. DUI is particularly significant for its absence in this subset (0.385 indicates only about a third of that expected when compared to the non-CMVHT crashes. These indicator are effectively telling us what CMVHT drivers and those within their proximity are "doing right," as opposed to the previous display.
    - C121 CU Driver Condition. While the CMVHT-involved crashes are under-represented in several of the categories, the potential problem with "E Asleep/Fainted/Fatigued" should be of concern in light of recent rule-making in this regard.
    - C122 CU Officer Opinion Alcohol/Drugs. This isolates the potential alcohol problem showing that it is a relatively small part of the problem of crashes involving CMVHTs.
    - C020 E Distracted Driving. Fatigued/Asleep is a category included in the distracted driving attribute, and it is shown to be slightly over-represented (difference is no statistically significant, as was the case with C121 above). These results should be reviewed as being relative, since it is known that this variable is generally unreported (through no fault of the reporting officer since this is not something that can usually be observed). However, the same under-reporting applies to the control subset (crashes that do not involve CMVHTs), so the comparisons are valid. Of particular interest would be the two electronic device/communications categories, both of which are significantly under-represented.
    - C105 CU Left Scene. The number of positives here is about 11.5% higher than expected, which is significant. If this is considered to be of importance to law enforcement additional analysis can be done to determine which units are more often leaving the scene as well as other aspects of this subset of crashes.
    - C023 E Manner of Crash (E indicates that this data element was only collected within the eCrash system). This is a very useful attribute that should be viewed as indicative of issues when two or more vehicles are involved. Note that Single Vehicle Crashes is a separate category at the bottom of the table, and it is significantly under-represented for crashes involving CMVHTs. Several categories are

highly over-represented – the red background indicates that the Odds Ratio > 2, which means that the category is occurring more than twice its expectation when compared to the rest of the population of crashes. Sideswipes are an obvious problem. Non-collision would imply that a non-contact vehicle caused an incident that may not have resulted in damage to that vehicle; however, the other vehicle may have crashed into something on the roadside. While this is coded as Non-Collision (as opposed to Single Vehicle), it is not to imply that there was no damage. Seventy-six of these Non-Collision crashes were injury crashes, with the rest reported as PDOs (27 Unknown).

- C129 CU Vehicle Maneuver. Here again, there is a dramatic difference between crashes involving CMVHTs and crashes in general. The Max Gain takes into consideration not only the Odds Ratio, but the Subset Frequency, essentially indicating how many crashes would be saved if there were some way to reduce the odds ratio to 1.000. Putting the results of the last two attributes together it appears that sideswipes resulting in lane changes are a major issue.
- C017. First Harmful Event (worst Max Gains; excluding items < 30 crashes). The most dramatic over-representations are those that are not typically incurred by non-CMVHT vehicles, and thus the comparisons should not be given as much weight as the raw subset frequencies in establishing importance. This was another variable that had too many codes to fit on one page.
- C017. First Harmful Event (best Max Gains; excluding items < 30 crashes). The pattern that is emerging here is that unforced errors (characterized by single vehicle crashes) are consistently under-represented. Most of these are of that nature. These unforced error type crashes most often go with alcohol/drug use and distracted driving, which attests to the professional nature of the CMVHT drivers and the time that they drive.
- C204 E CU Sequence of Events #1 (worst Max Gains, excluding items < 20). This is another new variable mandated by MMUCC that is part of eCrash. It tends to be quite useful in confirming the results given above, and in some cases is more specific.
- C204 E CU Sequence of Events #1 (best Max Gains, excluding items < 20). This is quite comparable to C017 above.

- **Driver Demographics**
  - C107 CU Driver Raw Age. The typical over-representation of young people that is shown by the blue bars is absent here, although they still appear in a fairly high number given the fact that the chances of them being the drivers of the CMVHTs is next to zero. The dangers of rick taking around trucks should be emphasized in whatever way might motivate young people. The other problem age group are those shown in the table, which was set to reflect the ages with the highest odds ratios, all of which are significant. While there are not big surprises here, it is important to recognize that this distribution is increasing by one each year, and

basically is "not getting any younger." With increasing life spans and the necessity to postpone retirement, we can expect that the problem age group will get into the seventies over the next decade.

- C600 CU Driver Age Range (5-year intervals). This is a new CARE variable that puts ages in uniform five year intervals. It enables comparisons to be made between the age groups much more effectively. For example, we can infer from this that the number of truck drivers is relatively small up until the 31-35 age grouping. It expands from there peaking at 46-50, and then it does not drop to a break even with the non-truck driving population until 71-75. After that the age groups are under-represented. Again, we remind the reader that the ages we are discussing here are not restricted to CMVHT drivers, although they are highly reflective f that – these are all of the drivers that caused CMVHT-involved crashes. See the discussion on crash causality above (C101).
- C109 CU Driver Gender. While it is expected that males would be over-represented in their crash causation for CMVHT-involved crashes as compared to all other crashes, the specific degree is important to note. Also, this is a category that needs to be watched because it is growing from year to year.
- C115 CU Driver CDL Status. For information of those who are involved with licensing, this is presented as a frequency distribution and not an IMPACT comparison (since there are no expected CDLs in the control subset). The output is arranged from highest to lowest to see the relative frequencies of the categories.
- C112 CU Driver First License Class. This attribute does have some high frequencies in the control subset that are of interest. However, those that are over-represented are expected of CMV drivers. This display was not pruned of the Unknown, Other, etc. categories, since they were felt to be of interest for this attribute.
- C110 CU Driver Residence Distance. The CMVHT drivers drive up the Greater than 25 Miles frequency, but the majority of causal drivers as still within 25 miles of home, again emphasizing that the subset of concern is not isolated to CMVHT-caused crashes – in contains all CMVHT-involved crashes.

- **Roadway Characteristics**
  - C028 Mileposted Route. This is valuable information for selective enforcement purposes. There are hundreds of routes, and they were pared down as indicated under the display. Of the remaining roads, this display contains all of those that were over-represented, so it is effectively a list of the worst roads for CMVHT crashes in the state. Additional CARE analytics are run annually to obtain the five and ten miles sections that are the worst on these roadways.
  - C223 CU Speed Limit. This shows that the problem areas are on those roadway sections that had the higher speed limits, and in particular, that had 70 MPH speed limits – that would be the rural areas.
  - C224 CU Estimated Speed at Impact. This display effectively shows that the highest over-representations are where they vehicles were operating at nor near

the speed limit. However, significant over-representation occur up through 80 MPH indicating the need for speed enforcement.

- C011 Highway Classification. This further summarizes the findings above. It is important to recognize that this finding is not that Interstate highways are in any way deficient; rather, it is just that the majority of CMVHT traffic is on these roadways. The only way to do a fair comparison would be to determine the rate in terms of the number of miles traveled on each of these roadway by CMVHT vehicles, data that are not currently available. On the other hand, it is important for selective enforcement resources to be deployed where the frequency of these crashes is high independent of the rate.
- C415 CU Workzone Related. While the numbers are relatively low, there is no doubt that CMVHT-involved crashes occur relatively more often in workzones (6.04%) than the control group (1.87%). The display presents that areas of the workzones that are most vulnerable.
- C407 CU Roadway Curvature and Grade. While there are several of these categories that are significant, it is difficult to see a pattern. For this reason the total unpruned output is presented.
- C409 CU Traffic Control (excluded items < 20 crashes). This attribute confirms that problem in workzones. Of interest is 107 crashes indicated to be in the proximity of railroads. This will be given further attention in the Vehicle Factors Section, C611.

- **Time Factors**
  - C003 Year. Compared to other crash types that have been fairly stable with a large relative increase in 2014, CMVHT crashes were down significantly in both 2013 and 2014. This is a very good positive development for this component of the traffic mix in a time when the economy shows signs of rebounding.
  - C008 Time of Day. CMVHT crashes are given by the red bars on the chart, which provides the best picture for seeing their over-representations. Morning rush hour is a bad time, and all subsequent hours through until the afternoon rush hours are high and over-represented.
  - C031 Lighting Conditions. This reflects the times, with the early rush hour correlated to Dawn. All of the dark times are under-represented.
  - C006 Day of the Week. It is quite clear that Monday through Friday are high with all but Friday over-represented significantly. It is a tribute to the CMVHT drivers that they do not have an increase with the normal increase in traffic on Friday afternoons. We would expect that if at all possible they avoid this time of the week.
  - C004 Month. The only significantly different times are May and June (over-represented), and November and December (under-represented). We will not speculate on the reason for this, but will state that in any given year the changes in the economy could have dramatic changes in the amount of CMVHT traffic.

- **Geographical Considerations**
  - C010 Rural or Urban. About 2/3rds of the crashes of CMVHT-involved vehicles occur in the urban areas, as compared to about 3/4ths of other crashes. Those in the urban areas of typically of much less severity because of the lower speeds. This is shown in the cross-tabulation under the C010 display. All of the more severe injury categories are highly over-represented in the rural areas. See more about severity in the Severity Factors section below.
  - C002 City (with highest Max Gains; excluding rural areas and cities < 20). Given that the rural areas adjacent to heavily traveled urban areas tend to be consistently over-represented, we removed these rural areas from this summary. Thus, we can focus on the actual cities that have the greatest and fewest crashes from a relative point of view. Interestingly, Birmingham and Mobile are at the top of the list while Montgomery and Huntsville are at the very bottom (next page). Perhaps an IMPACT comparison between these two pairs of cities can surface the reason for this disparity.
  - C002 City (with lowest Max Gains; excluding rural areas and cities < 20). This is the opposite end of the city spectrum, showing those cities that relatively speaking have the fewest CMVHT-related crashes.
  - C001 County (with highest Max Gains; excluding rural areas and cities < 200). Considering the geographic distribution in a more general sense, these results are quite analogous to those given for City.
  - C001 County (with lowest Max Gains; excluding rural areas and cities < 200).
  - C211 E CU Owners State. Comparing state of origin (or any other state indicator) would not yield useful results because of the large number of CMVHT-involved crashes caused by out-of-state vehicles. It was felt best to just arrange the frequency distribution in order of highest frequency first to get a feel for how many of the crashes are caused by out-of-state operators.

- **Severity Factors**
  - C051 Number of Vehicles. The number of vehicles involved impacts the severity of the crash in that it will necessarily involve a smaller vehicle independent of causation. Since multiple vehicle crashes are the norm for CMVHT crashes, they can be expected to be more severe. Only about 15.1 CMVHT crashes are single vehicle.
  - C026 Crash Severity. As expected, the fatality probability in a CMVHT-involved crash is over twice that of other crashes (single vehicle crashes included). The highest non-fatal severity case shows no significant difference, while the other two injury classifications are slightly but significantly under-represented. This attribute shows only the worse injury in the crash; the next two show how many injuries were incurred.
  - C059 Number Injured (Includes Fatalities). Unexpectedly, the no-injury category is over-represented, probably due to the large number of CMVHT crashes that occur in urban area. See C010 under Geographic Considerations above for a cross-

tabulation of Rural-Urban by severity. The 1, 2 and 3 injury categories are under-represented, but most of the multiple fatality classifications after that are over-represented. No significance is indicated when one or both of the sample sizes is 20 or less. The general conclusion is that while CMVHT crashes do not cause injuries to the extent that their non-CMVHT crashes do, when there are injuries the results can be particularly horrendous. This is seen in the next attribute as well.

- C060 Number Killed. All of the single and multiple fatality classifications are over-represented, and correspondingly, the No Fatalities category is under-represented. This is expected since the typical CMVHT crash involves vehicles of extremely disparate size and weight.
- C036 Police Arrival Delay. The first responder (police and EMS) delay has a major effect on crash severity and survivability. While the major part of the CMVHT-involved crashes are addressed within 15 minutes, CMVHT crashes are under-represented in these three categories. This delay has to be attributed to those crashes that occur in the rural areas, which are over-represented for CMVHT crashes. See C010 under Geographic Considerations.
- C601 Adjusted EMS Arrival Delay. The distribution of ambulance arrival times is comparable to the police arrival delay except for the 11 to 15 minute category where it becomes over-represented. This might be due to the 911 report coming in with a sense of urgency when a large vehicle is involved.
- C323 CU Driver Safety Equipment. Restraint use among truckers would seem to be significantly higher than that of the general population, which is extremely good (above 95%) in Alabama. Lap belt only is over-represented since the lap and shoulder combinations are not available in most older model trucks, and we would expect time to remedy this problem and the fleet is updated.
- C324 CU Driver Airbag Status. Airbags are not required in most large trucks, and the deployed categories that have values are probably to be attributed to the passenger cars being the CU.
- C452 CU CMV Hazardous Materials Involved. We consider hazardous cargo in this section since it is clearly related to the severity of any given crash. Over the five year period there were 73 (14.4 per year) incidents involving hazardous. C453 indicates that of these, 35 or about half actually led to the release of hazardous materials. The following presents the HazMat that were released:
    - 2 Chemicals
    - 2 Commodities/Dry Bulk
    - 2 Garbage/Refuse/Trash
    - 22 Liquids/Gasses in Tanks
    - 2 Other
    - 5 others demonstrated reporting officer did not understand HazMats
- C217-218 CU Hazardous Cargo Type-Released. The results above are inconsistent with these variable as is shown in the displays for these two variables. The source of this inconsistency can be seen in a cross-tabulation of C453 (E CU CMV Hazardous Materials Released) by C218 (E CU Hazardous Released),

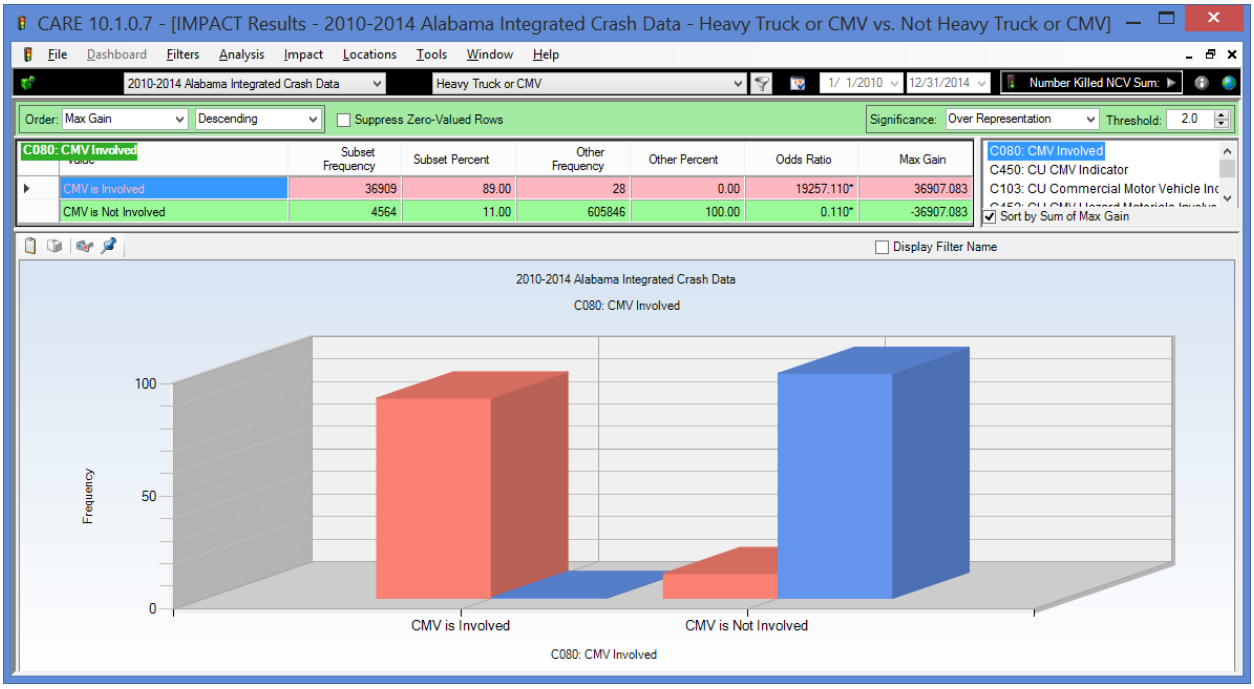
which is on the following page, and a discussion of this discrepancy appears under the cross-tabulation.
    - C216 E CU Placard Status. The large number of unknowns is an indication that additional training is required on this attribute.

- **Vehicle Factors**
    - C222 CU Contributing Vehicle Defect. It would be expected that large trucks would have a greater number of vehicle defects to contribute to a crash than would passenger cars, although the "None" category at the bottom of the table indicates that the percentage difference is only about 3%. The table gives a listing for the past five years roughly in the order of their frequency.
    - C213 CU Vehicle Usage (excluding categories with 50 or less crashes). This attribute is of interest to see the overall distribution of how the CMVHT-involved subset compares with the non-CMVHT-involved.
    - C219 CU Attachment. This is no surprise but the actual numbers are of interest. Realize that the CU for CMVHT-involved are not just heavy trucks, which tends to dilute the results if just looking for truck issues. However, because over half of these crashes were caused by the heavy trucks, many of their characteristics surface.
    - C611 Number of Railroad Trains. While 55 crashes involving trains (11 per year) might not seem like many compared to the total CMVHT-involved crashes (41,473), the fact that they occur in three times the frequency of other crashes indicates that additional training might be warranted. The CU vehicle in this case would be a heavy truck since the second vehicle is the train. In addition, these crashes are quite spectacular, especially if the truck is carrying hazardous materials.

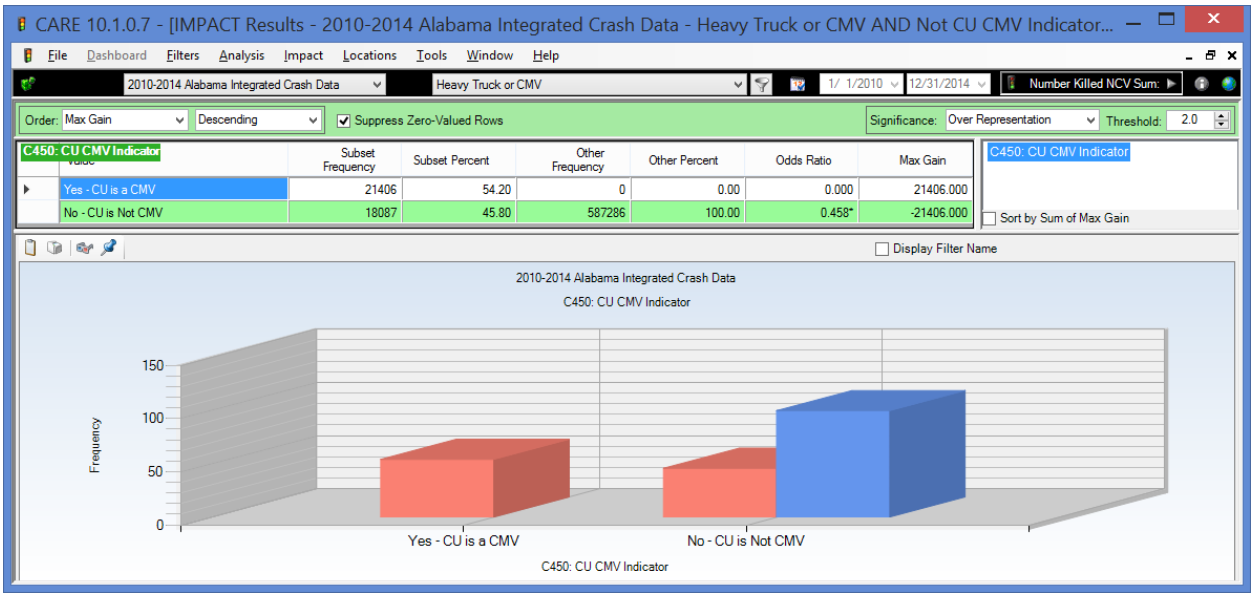
- **Roadway Environment**
    - C403 CU Roadway Condition. This indicates that weather is not a large causal factor in CMVHT-involved crashes, about 5% under the expectation for other crashes.
    - C032 CU Weather. This confirms the roadway condition findings, but it does surface the problems with weather combinations that involve wind.
    - C408 CU Vision Obscured By. The weather conditions obscuring vision might seem contradictory; however it demonstrates that it is when the weather event is in progress that the problem occurs. Cars in the vicinity of large trucks during rain would be particularly vulnerable to this problem.

“Technical CMV” Involved and CMVHT Causation

C080 CMV Involved

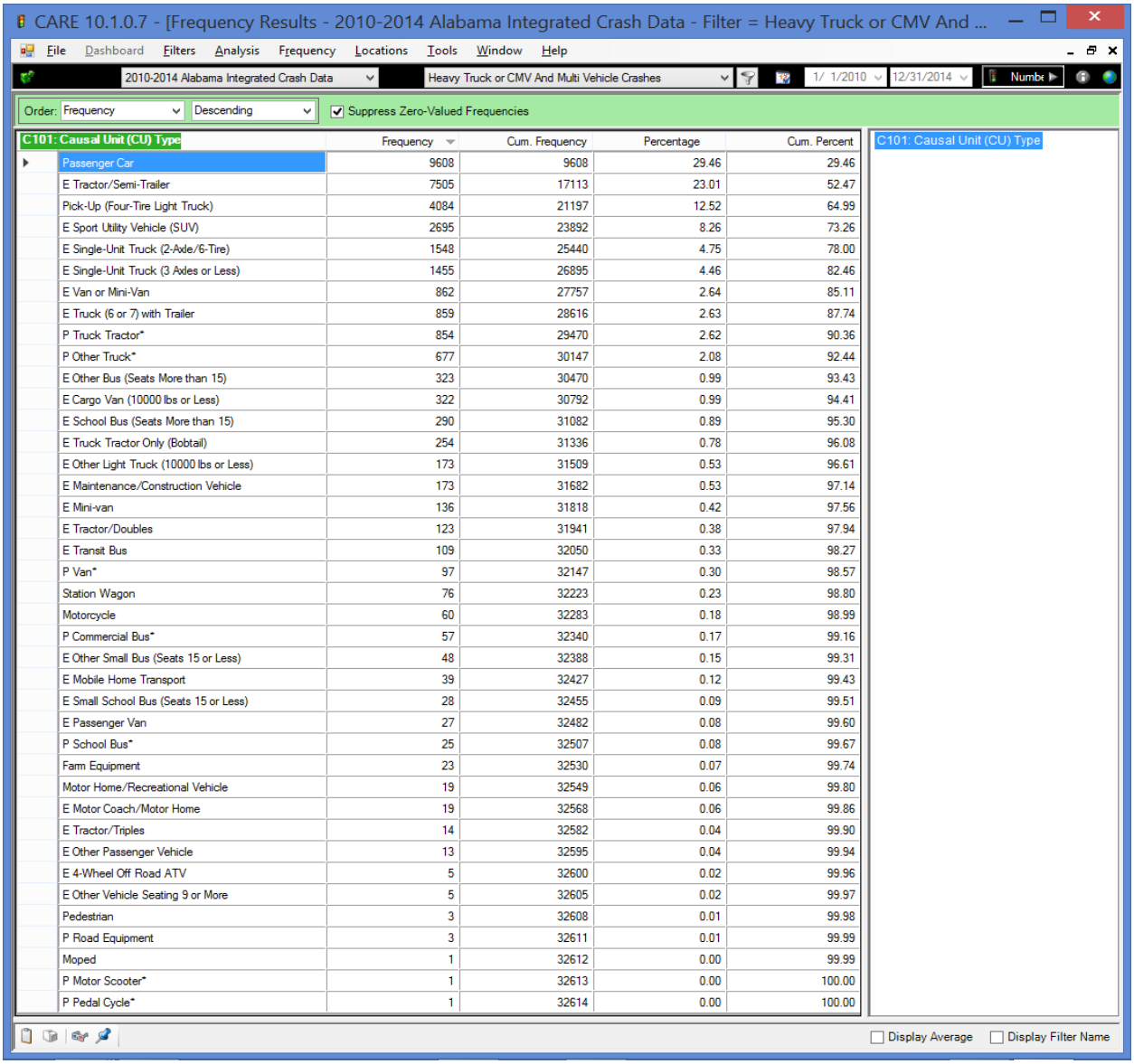


C450 Causal Unit (CU) CMV Indicator



Only for vehicle involved crashes, suppression of unknowns. Includes single vehicle crashes.

C101 Causal Unit (CU) Type (multi-vehicle crashes in subset)



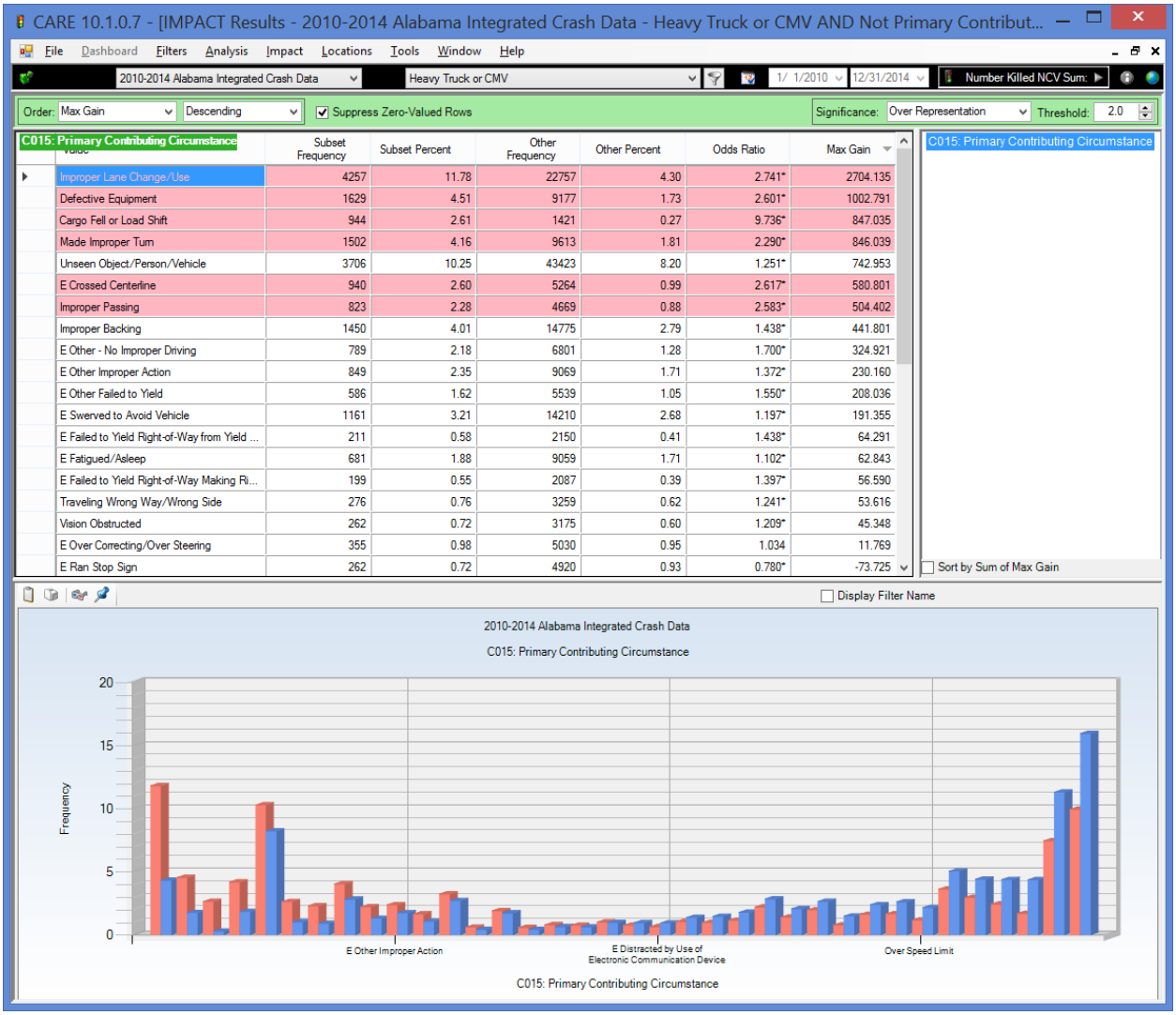
C101: Causal Unit (CU) Type	Frequency	Cum. Frequency	Percentage	Cum. Percent
Passenger Car	9608	9608	29.46	29.46
E Tractor/Semi-Trailer	7505	17113	23.01	52.47
Pick-Up (Four-Tire Light Truck)	4084	21197	12.52	64.99
E Sport Utility Vehicle (SUV)	2695	23892	8.26	73.26
E Single-Unit Truck (2-Axle/6-Tire)	1548	25440	4.75	78.00
E Single-Unit Truck (3 Axles or Less)	1455	26895	4.46	82.46
E Van or Mini-Van	862	27757	2.64	85.11
E Truck (6 or 7) with Trailer	859	28616	2.63	87.74
P Truck Tractor*	854	29470	2.62	90.36
P Other Truck*	677	30147	2.08	92.44
E Other Bus (Seats More than 15)	323	30470	0.99	93.43
E Cargo Van (10000 lbs or Less)	322	30792	0.99	94.41
E School Bus (Seats More than 15)	290	31082	0.89	95.30
E Truck Tractor Only (Bobtail)	254	31336	0.78	96.08
E Other Light Truck (10000 lbs or Less)	173	31509	0.53	96.61
E Maintenance/Construction Vehicle	173	31682	0.53	97.14
E Mini-van	136	31818	0.42	97.56
E Tractor/Doubles	123	31941	0.38	97.94
E Transit Bus	109	32050	0.33	98.27
P Van*	97	32147	0.30	98.57
Station Wagon	76	32223	0.23	98.80
Motorcycle	60	32283	0.18	98.99
P Commercial Bus*	57	32340	0.17	99.16
E Other Small Bus (Seats 15 or Less)	48	32388	0.15	99.31
E Mobile Home Transport	39	32427	0.12	99.43
E Small School Bus (Seats 15 or Less)	28	32455	0.09	99.51
E Passenger Van	27	32482	0.08	99.60
P School Bus*	25	32507	0.08	99.67
Farm Equipment	23	32530	0.07	99.74
Motor Home/Recreational Vehicle	19	32549	0.06	99.80
E Motor Coach/Motor Home	19	32568	0.06	99.86
E Tractor/Triples	14	32582	0.04	99.90
E Other Passenger Vehicle	13	32595	0.04	99.94
E 4-Wheel Off Road ATV	5	32600	0.02	99.96
E Other Vehicle Seating 9 or More	5	32605	0.02	99.97
Pedestrian	3	32608	0.01	99.98
P Road Equipment	3	32611	0.01	99.99
Moped	1	32612	0.00	99.99
P Motor Scooter*	1	32613	0.00	100.00
P Pedal Cycle*	1	32614	0.00	100.00

All Crashes
Total number crashes qualifying = 33,370; in subset 17,985 = 53.9% of CMVHT at fault

Fatal Crashes
Total number crashes qualifying = 401; in subset 86 = 21.4% of CMVHT at fault

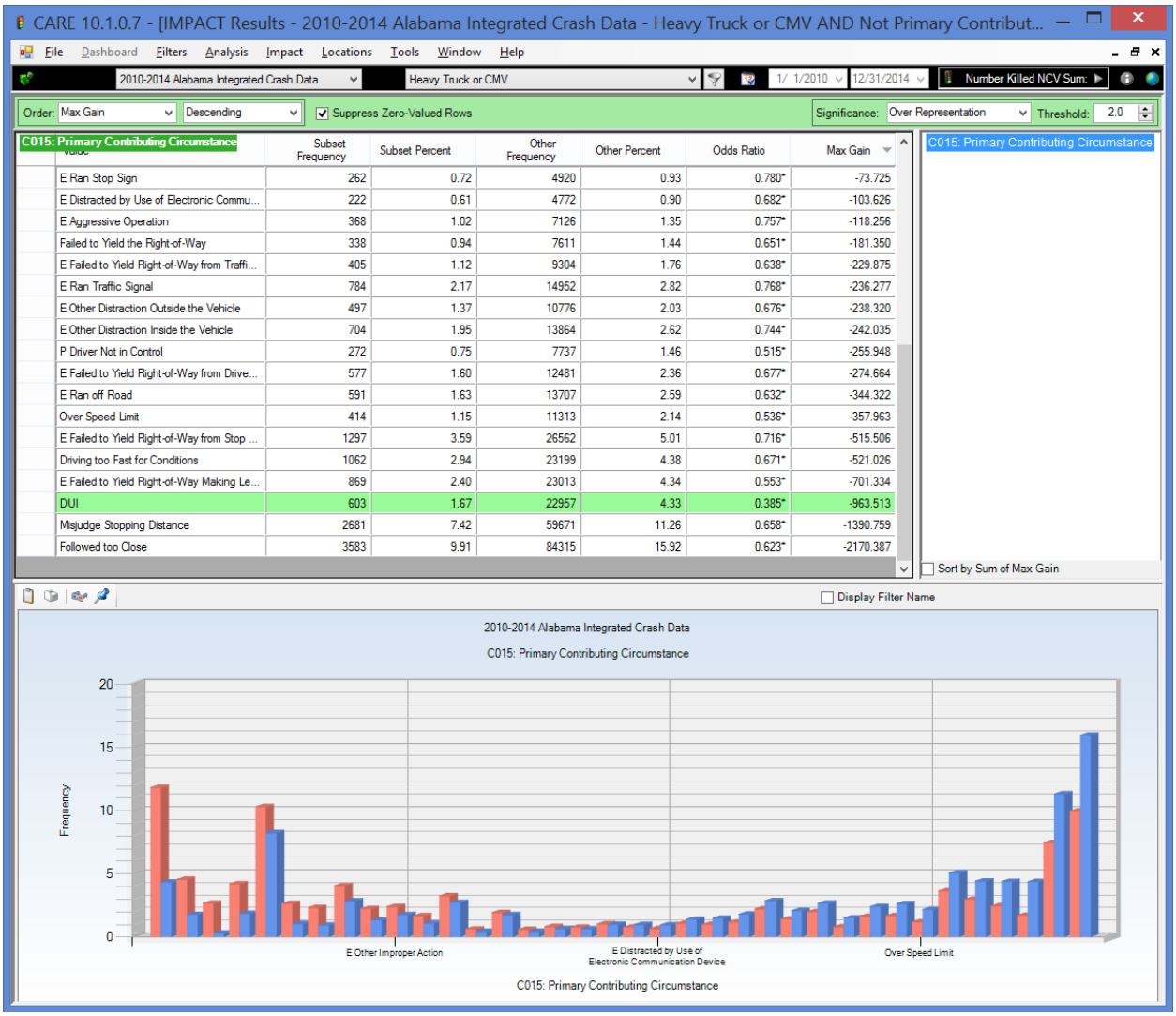
Driver Behavior; Impaired and Distracted Driving

C015 Primary Contributing Circumstances (Worst Classifications)



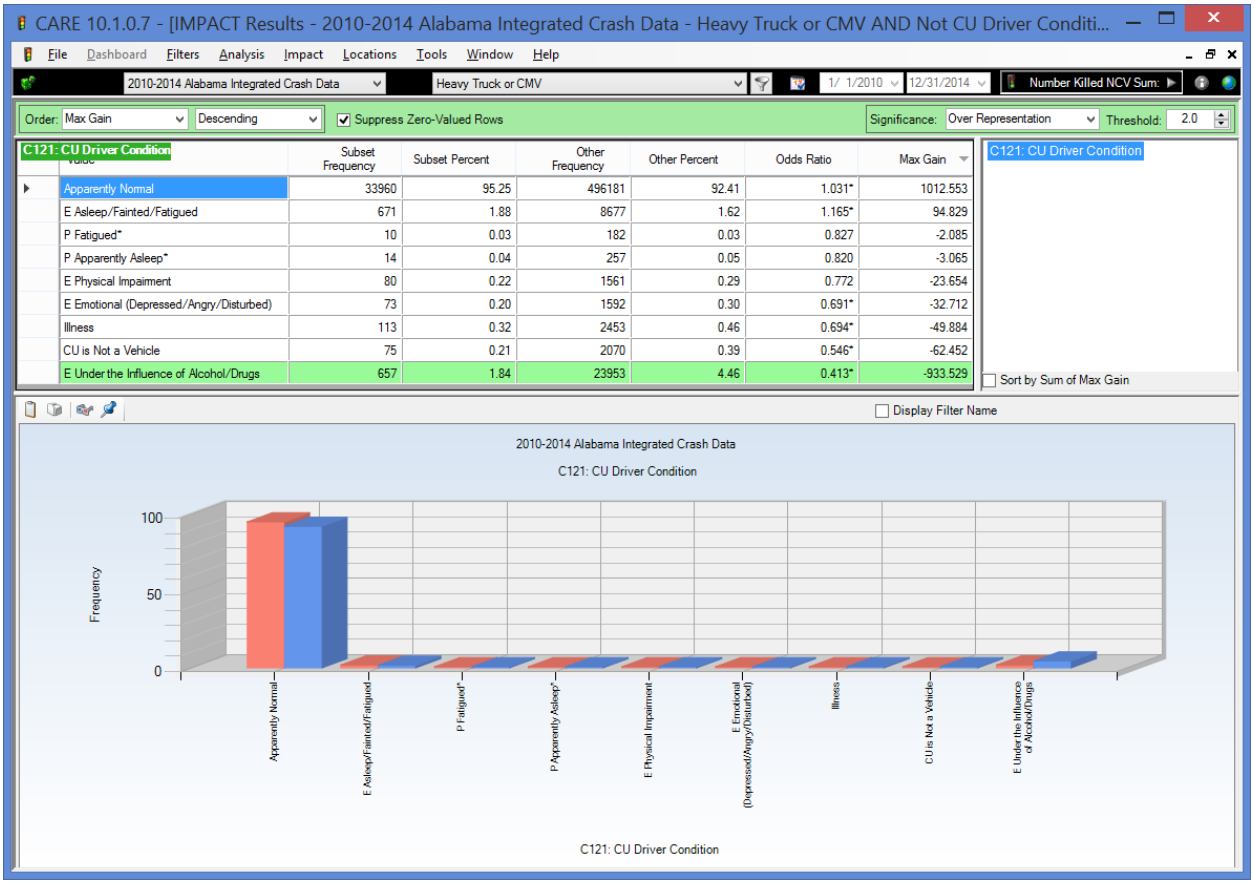
C015: Primary Contributing Circumstance Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Improper Lane Change/Use	4257	11.78	22757	4.30	2.741*	2704.135
Defective Equipment	1629	4.51	9177	1.73	2.601*	1002.791
Cargo Fell or Load Shift	944	2.61	1421	0.27	9.736*	847.035
Made Improper Turn	1502	4.16	9613	1.81	2.290*	846.039
Unseen Object/Person/Vehicle	3706	10.25	43423	8.20	1.251*	742.953
E Crossed Centerline	940	2.60	5264	0.99	2.617*	580.801
Improper Passing	823	2.28	4669	0.88	2.583*	504.402
Improper Backing	1450	4.01	14775	2.79	1.438*	441.801
E Other - No Improper Driving	789	2.18	6801	1.28	1.700*	324.921
E Other Improper Action	849	2.35	9069	1.71	1.372*	230.160
E Other Failed to Yield	586	1.62	5539	1.05	1.550*	208.036
E Swerved to Avoid Vehicle	1161	3.21	14210	2.68	1.197*	191.355
E Failed to Yield Right-of-Way from Yield ...	211	0.58	2150	0.41	1.438*	64.291
E Fatigued/Asleep	681	1.88	9059	1.71	1.102*	62.843
E Failed to Yield Right-of-Way Making Ri...	199	0.55	2087	0.39	1.397*	56.590
Traveling Wrong Way/Wrong Side	276	0.76	3259	0.62	1.241*	53.616
Vision Obstructed	262	0.72	3175	0.60	1.209*	45.348
E Over Correcting/Over Steering	355	0.98	5030	0.95	1.034	11.769
E Ran Stop Sign	262	0.72	4920	0.93	0.780*	-73.725

C015 Primary Contributing Circumstances (Best Classifications)



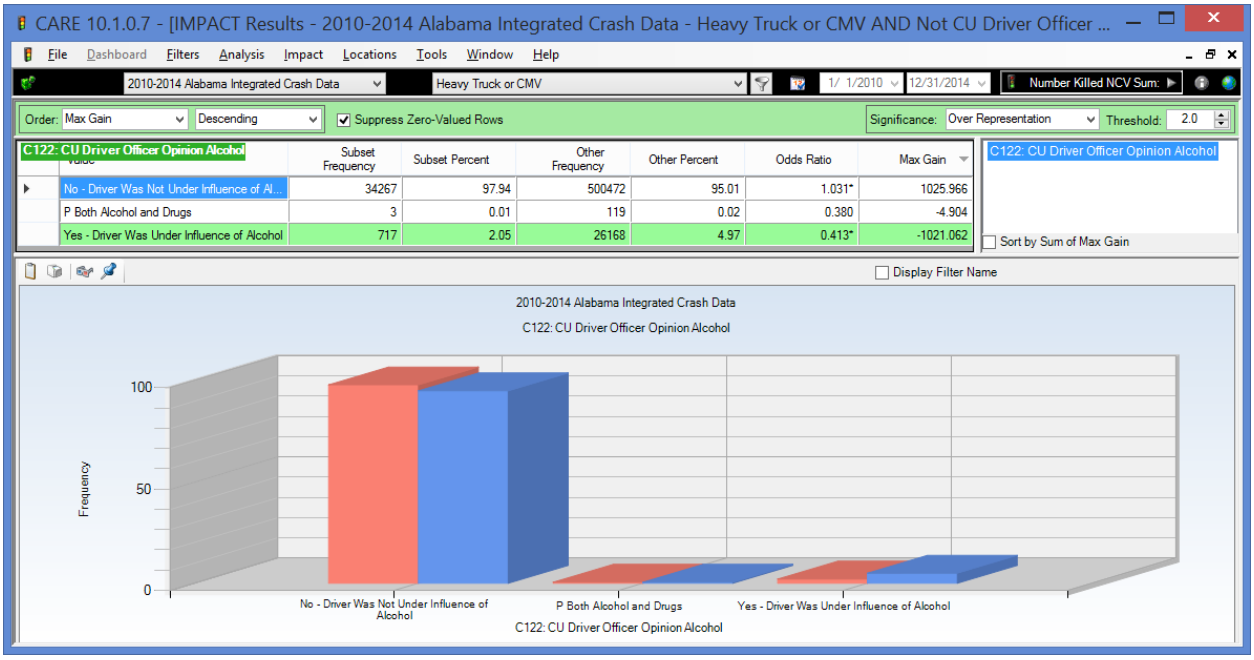
C015: Primary Contributing Circumstance	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Ran Stop Sign	262	0.72	4920	0.93	0.780*	-73.725
E Distracted by Use of Electronic Commu...	222	0.61	4772	0.90	0.682*	-103.626
E Aggressive Operation	368	1.02	7126	1.35	0.757*	-118.256
Failed to Yield the Right-of-Way	338	0.94	7611	1.44	0.651*	-181.350
E Failed to Yield Right-of-Way from Traffi...	405	1.12	9304	1.76	0.638*	-229.875
E Ran Traffic Signal	784	2.17	14952	2.82	0.768*	-236.277
E Other Distraction Outside the Vehicle	497	1.37	10776	2.03	0.676*	-238.320
E Other Distraction Inside the Vehicle	704	1.95	13864	2.62	0.744*	-242.035
P Driver Not in Control	272	0.75	7737	1.46	0.515*	-255.948
E Failed to Yield Right-of-Way from Drive...	577	1.60	12481	2.36	0.677*	-274.664
E Ran off Road	591	1.63	13707	2.59	0.632*	-344.322
Over Speed Limit	414	1.15	11313	2.14	0.536*	-357.963
E Failed to Yield Right-of-Way from Stop ...	1297	3.59	26562	5.01	0.716*	-515.506
Driving too Fast for Conditions	1062	2.94	23199	4.38	0.671*	-521.026
E Failed to Yield Right-of-Way Making Le...	869	2.40	23013	4.34	0.553*	-701.334
DUI	603	1.67	22957	4.33	0.385*	-963.513
Misjudge Stopping Distance	2681	7.42	59671	11.26	0.658*	-1390.759
Followed too Close	3583	9.91	84315	15.92	0.623*	-2170.387

C121 CU Driver Condition

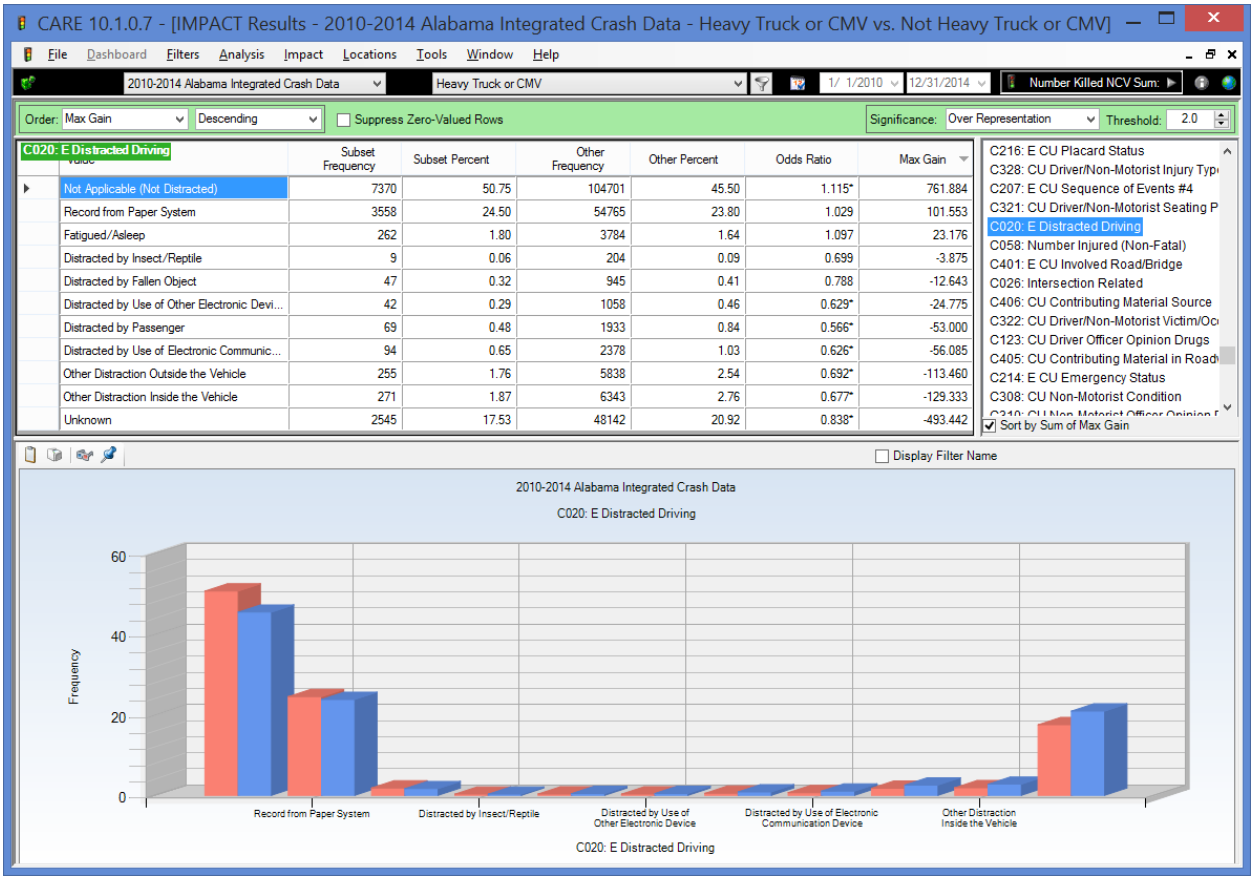


C121: CU Driver Condition	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Apparently Normal	33960	95.25	496181	92.41	1.031*	1012.553
E Asleep/Fainted/Fatigued	671	1.88	8677	1.62	1.165*	94.829
P Fatigued*	10	0.03	182	0.03	0.827	-2.085
P Apparently Asleep*	14	0.04	257	0.05	0.820	-3.065
E Physical Impairment	80	0.22	1561	0.29	0.772	-23.654
E Emotional (Depressed/Angry/Disturbed)	73	0.20	1592	0.30	0.691*	-32.712
Illness	113	0.32	2453	0.46	0.694*	-49.884
CU is Not a Vehicle	75	0.21	2070	0.39	0.546*	-62.452
E Under the Influence of Alcohol/Drugs	657	1.84	23953	4.46	0.413*	-933.529

C122 CU Officer Opinion Alcohol/Drugs



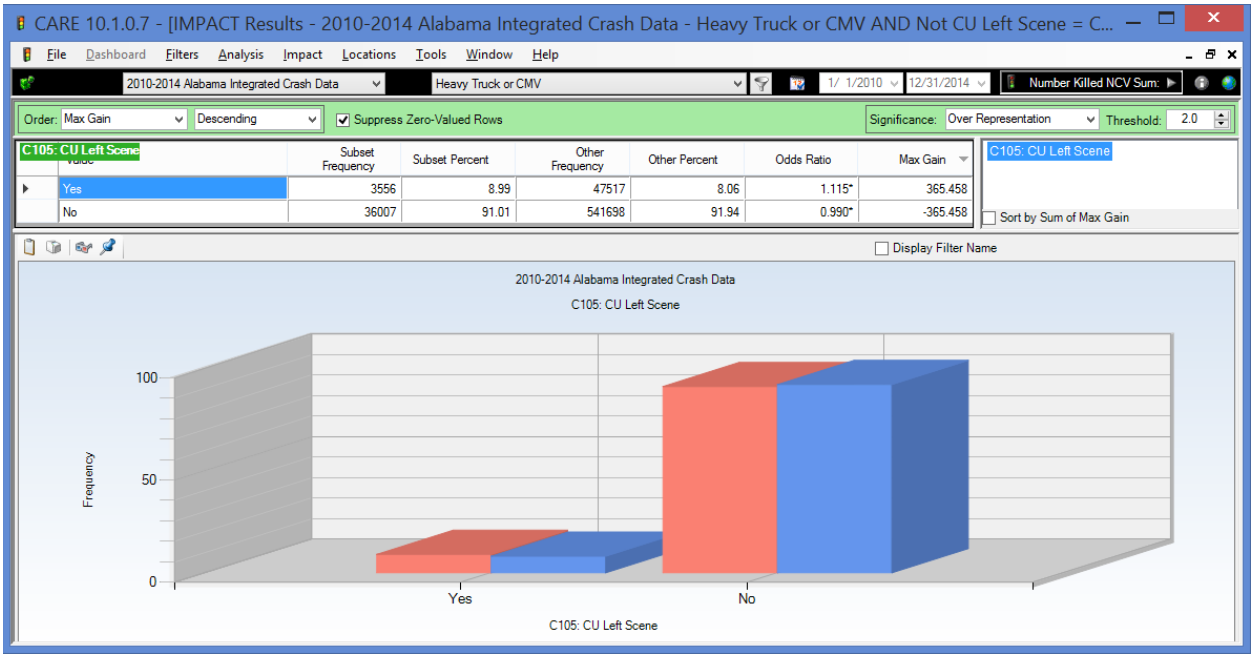
C020 E Distracted Driving



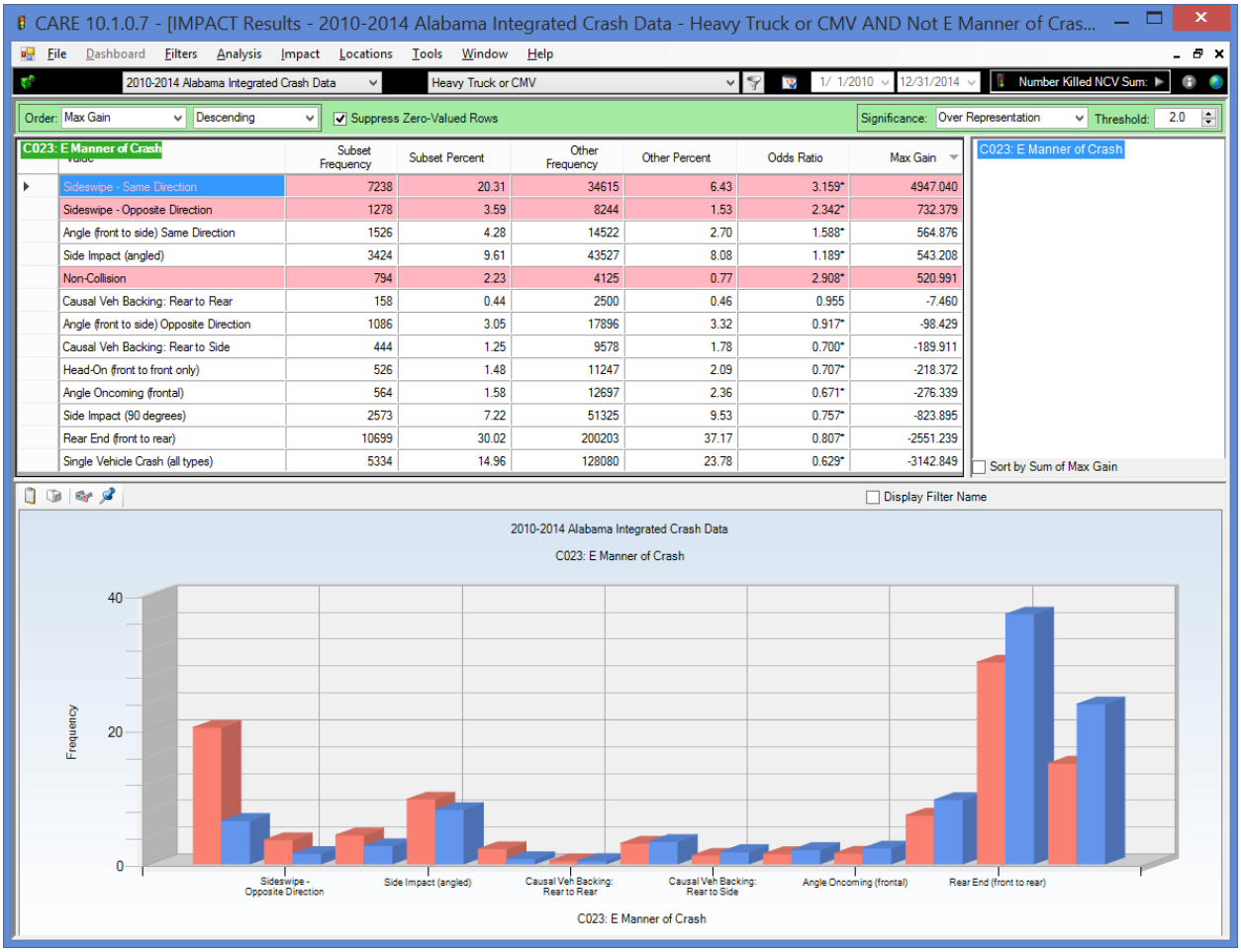
C020: E Distracted Driving	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Not Applicable (Not Distracted)	7370	50.75	104701	45.50	1.115*	761.884
Record from Paper System	3558	24.50	54765	23.80	1.029	101.553
Fatigued/Asleep	262	1.80	3784	1.64	1.097	23.176
Distracted by Insect/Reptile	9	0.06	204	0.09	0.699	-3.875
Distracted by Fallen Object	47	0.32	945	0.41	0.788	-12.643
Distracted by Use of Other Electronic Devi...	42	0.29	1058	0.46	0.629*	-24.775
Distracted by Passenger	69	0.48	1933	0.84	0.566*	-53.000
Distracted by Use of Electronic Communic...	94	0.65	2378	1.03	0.626*	-56.085
Other Distraction Outside the Vehicle	255	1.76	5838	2.54	0.692*	-113.460
Other Distraction Inside the Vehicle	271	1.87	6343	2.76	0.677*	-129.333
Unknown	2545	17.53	48142	20.92	0.838*	-493.442

C216: E CU Placard Status
C328: CU Driver/Non-Motorist Injury Typ
C207: E CU Sequence of Events #4
C321: CU Driver/Non-Motorist Seating P
C020: E Distracted Driving
C058: Number Injured (Non-Fatal)
C401: E CU Involved Road/Bridge
C026: Intersection Related
C406: CU Contributing Material Source
C322: CU Driver/Non-Motorist Victim/Oc
C123: CU Driver Officer Opinion Drugs
C405: CU Contributing Material in Road
C214: E CU Emergency Status
C308: CU Non-Motorist Condition
Sort by Sum of Max Gain

C105 CU Left Scene

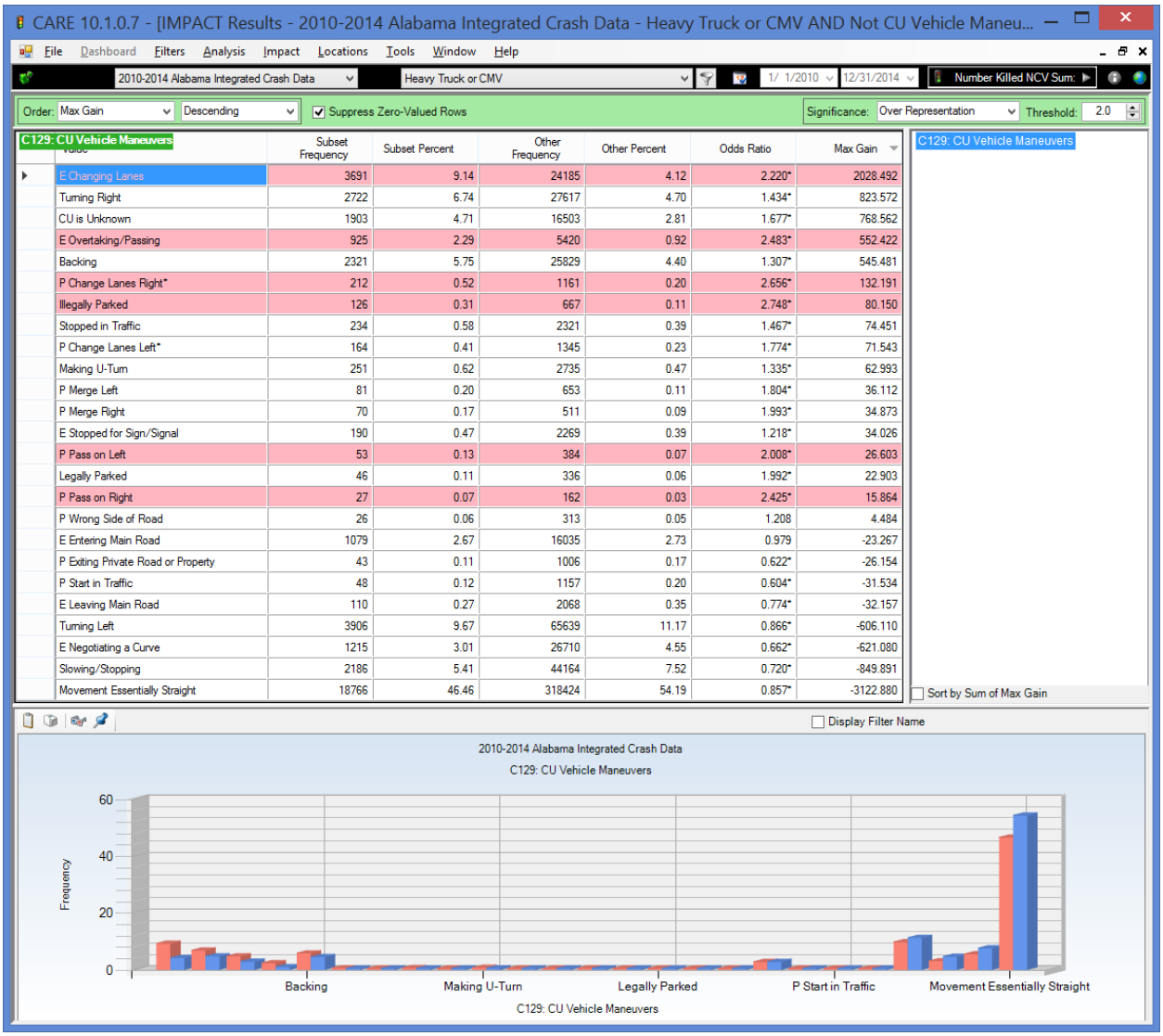


C023 E Manner of Crash (E = data only collected within eCrash)



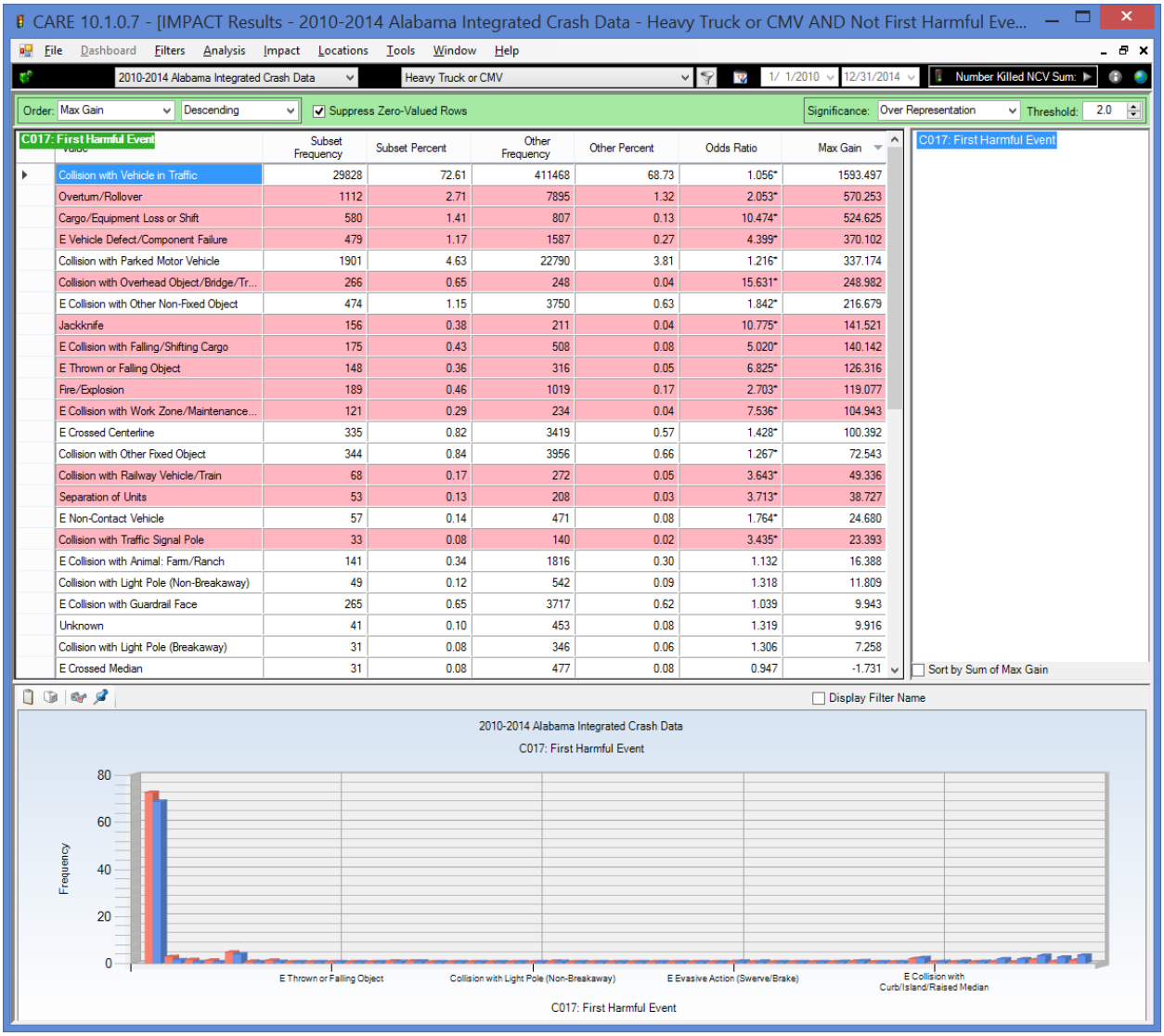
C023: E Manner of Crash Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Sideswipe - Same Direction	7238	20.31	34615	6.43	3.159*	4947.040
Sideswipe - Opposite Direction	1278	3.59	8244	1.53	2.342*	732.379
Angle (front to side) Same Direction	1526	4.28	14522	2.70	1.588*	564.876
Side Impact (angled)	3424	9.61	43527	8.08	1.189*	543.208
Non-Collision	794	2.23	4125	0.77	2.908*	520.991
Causal Veh Backing: Rear to Rear	158	0.44	2500	0.46	0.955	-7.460
Angle (front to side) Opposite Direction	1086	3.05	17896	3.32	0.917*	-98.429
Causal Veh Backing: Rear to Side	444	1.25	9578	1.78	0.700*	-189.911
Head-On (front to front only)	526	1.48	11247	2.09	0.707*	-218.372
Angle Oncoming (frontal)	564	1.58	12697	2.36	0.671*	-276.339
Side Impact (90 degrees)	2573	7.22	51325	9.53	0.757*	-823.895
Rear End (front to rear)	10699	30.02	200203	37.17	0.807*	-2551.239
Single Vehicle Crash (all types)	5334	14.96	128080	23.78	0.629*	-3142.849

C129 CU Vehicle Maneuver



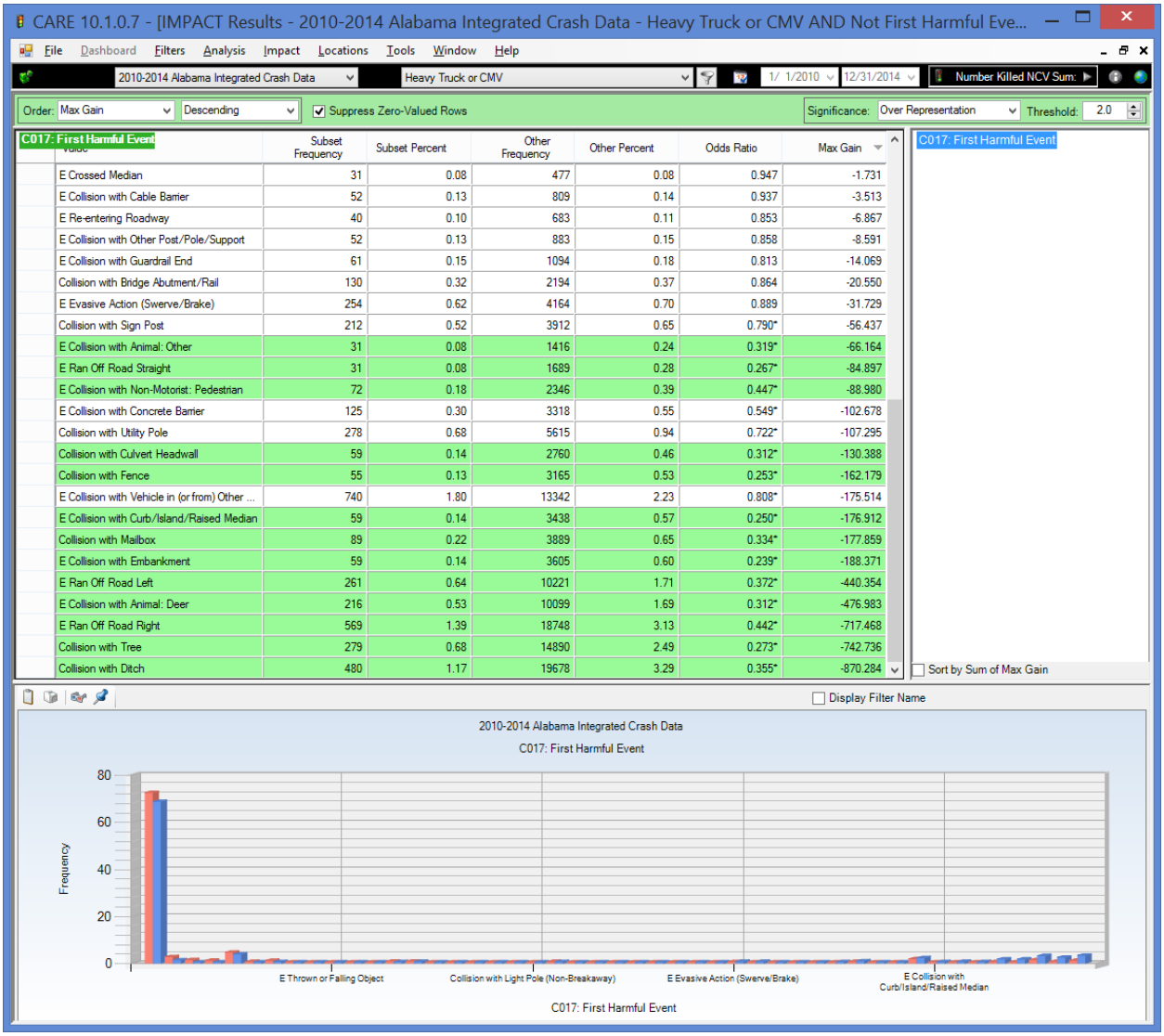
C129: CU Vehicle Maneuvers	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Changing Lanes	3691	9.14	24185	4.12	2.220*	2028.492
Turning Right	2722	6.74	27617	4.70	1.434*	823.572
CU is Unknown	1903	4.71	16503	2.81	1.677*	768.562
E Overtaking/Passing	925	2.29	5420	0.92	2.483*	552.422
Backing	2321	5.75	25829	4.40	1.307*	545.481
P Change Lanes Right*	212	0.52	1161	0.20	2.656*	132.191
Illegally Parked	126	0.31	667	0.11	2.748*	80.150
Stopped in Traffic	234	0.58	2321	0.39	1.467*	74.451
P Change Lanes Left*	164	0.41	1345	0.23	1.774*	71.543
Making U-Turn	251	0.62	2735	0.47	1.335*	62.993
P Merge Left	81	0.20	653	0.11	1.804*	36.112
P Merge Right	70	0.17	511	0.09	1.993*	34.873
E Stopped for Sign/Signal	190	0.47	2269	0.39	1.218*	34.026
P Pass on Left	53	0.13	384	0.07	2.008*	26.603
Legally Parked	46	0.11	336	0.06	1.992*	22.903
P Pass on Right	27	0.07	162	0.03	2.425*	15.864
P Wrong Side of Road	26	0.06	313	0.05	1.208	4.484
E Entering Main Road	1079	2.67	16035	2.73	0.979	-23.267
P Exiting Private Road or Property	43	0.11	1006	0.17	0.622*	-26.154
P Start in Traffic	48	0.12	1157	0.20	0.604*	-31.534
E Leaving Main Road	110	0.27	2068	0.35	0.774*	-32.157
Turning Left	3906	9.67	65639	11.17	0.866*	-606.110
E Negotiating a Curve	1215	3.01	26710	4.55	0.662*	-621.080
Slowing/Stopping	2186	5.41	44164	7.52	0.720*	-849.891
Movement Essentially Straight	18766	46.46	318424	54.19	0.857*	-3122.880

C017 First Harmful Event (Worst Max Gain; excluding less than 30 crashes)



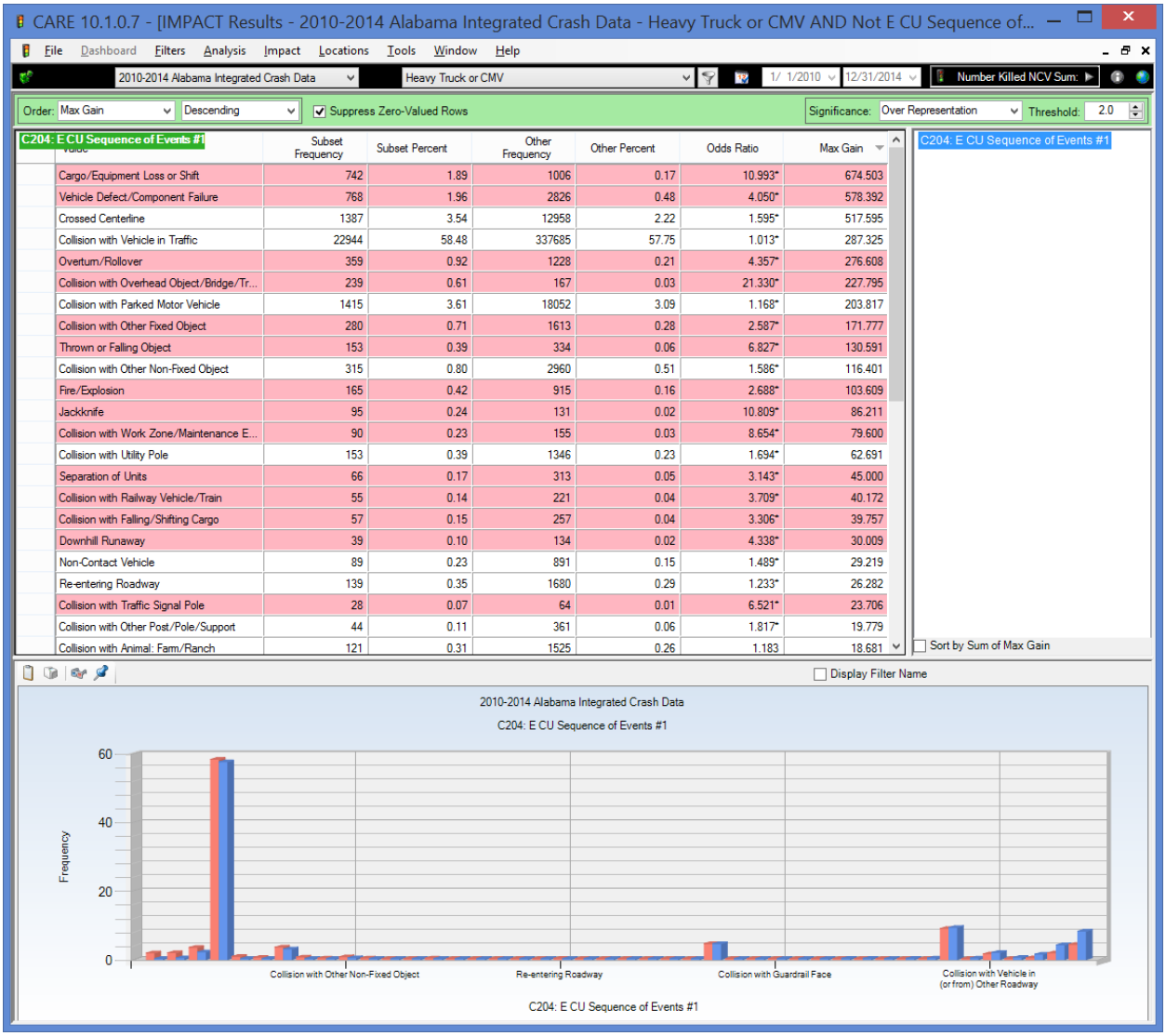
C017: First Harmful Event	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Collision with Vehicle in Traffic	29828	72.61	411468	68.73	1.056*	1593.497
Overturn/Rollover	1112	2.71	7895	1.32	2.053*	570.253
Cargo/Equipment Loss or Shift	580	1.41	807	0.13	10.474*	524.625
E Vehicle Defect/Component Failure	479	1.17	1587	0.27	4.399*	370.102
Collision with Parked Motor Vehicle	1901	4.63	22790	3.81	1.216*	337.174
Collision with Overhead Object/Bridge/Tr...	266	0.65	248	0.04	15.631*	248.982
E Collision with Other Non-Fixed Object	474	1.15	3750	0.63	1.842*	216.679
Jackknife	156	0.38	211	0.04	10.775*	141.521
E Collision with Falling/Shifting Cargo	175	0.43	508	0.08	5.020*	140.142
E Thrown or Falling Object	148	0.36	316	0.05	6.825*	126.316
Fire/Explosion	189	0.46	1019	0.17	2.703*	119.077
E Collision with Work Zone/Maintenance...	121	0.29	234	0.04	7.536*	104.943
E Crossed Centerline	335	0.82	3419	0.57	1.428*	100.392
Collision with Other Fixed Object	344	0.84	3956	0.66	1.267*	72.543
Collision with Railway Vehicle/Train	68	0.17	272	0.05	3.643*	49.336
Separation of Units	53	0.13	208	0.03	3.713*	38.727
E Non-Contact Vehicle	57	0.14	471	0.08	1.764*	24.680
Collision with Traffic Signal Pole	33	0.08	140	0.02	3.435*	23.393
E Collision with Animal: Farm/Ranch	141	0.34	1816	0.30	1.132	16.388
Collision with Light Pole (Non-Breakaway)	49	0.12	542	0.09	1.318	11.809
E Collision with Guardrail Face	265	0.65	3717	0.62	1.039	9.943
Unknown	41	0.10	453	0.08	1.319	9.916
Collision with Light Pole (Breakaway)	31	0.08	346	0.06	1.306	7.258
E Crossed Median	31	0.08	477	0.08	0.947	-1.731

C017 First Harmful Event (Best Max Gain; excluding less than 30 crashes)



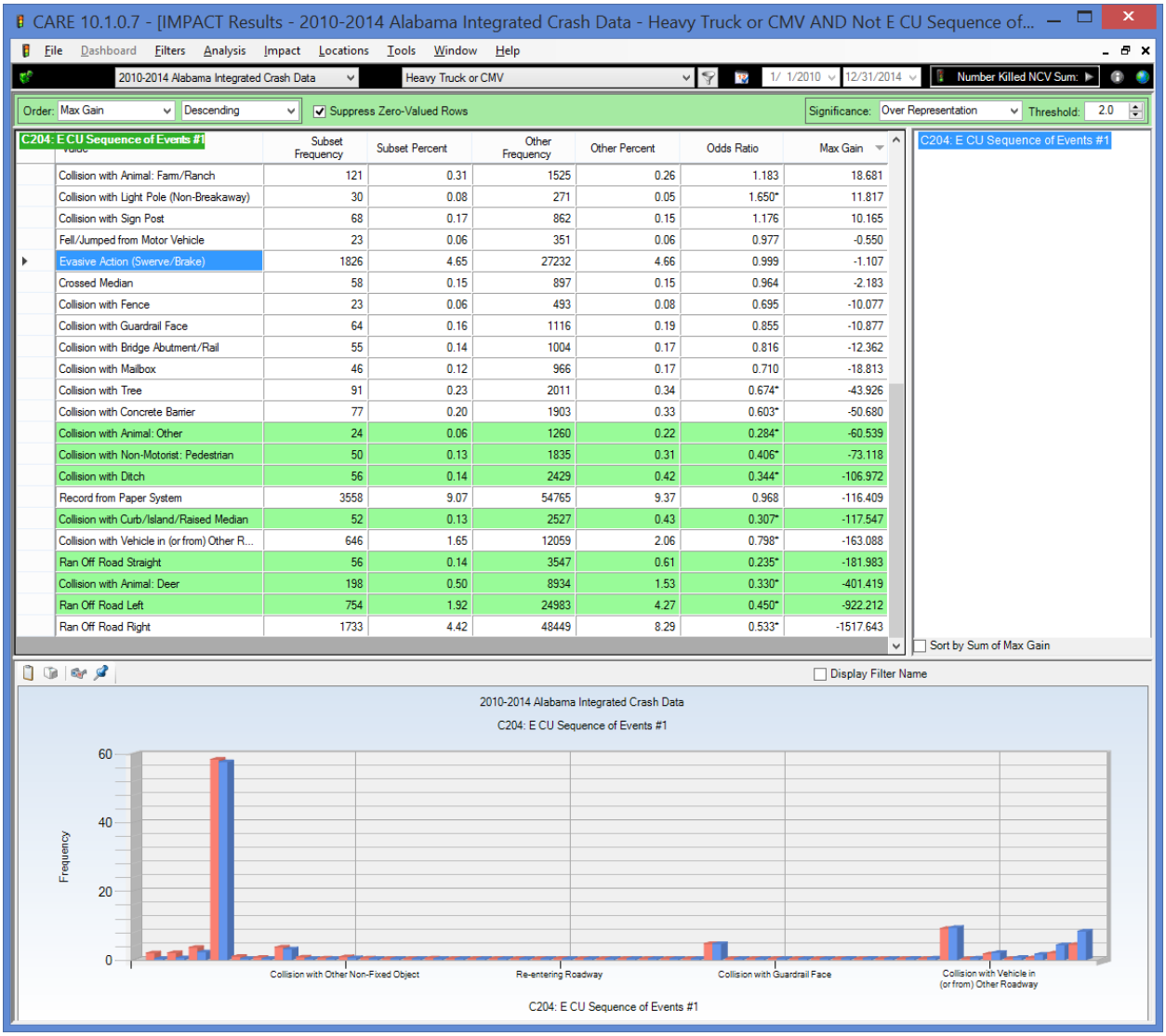
C017: First Harmful Event	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Crossed Median	31	0.08	477	0.08	0.947	-1.731
E Collision with Cable Barrier	52	0.13	809	0.14	0.937	-3.513
E Re-entering Roadway	40	0.10	683	0.11	0.853	-6.867
E Collision with Other Post/Pole/Support	52	0.13	883	0.15	0.858	-8.591
E Collision with Guardrail End	61	0.15	1094	0.18	0.813	-14.069
Collision with Bridge Abutment/Rail	130	0.32	2194	0.37	0.864	-20.550
E Evasive Action (Swerve/Brake)	254	0.62	4164	0.70	0.889	-31.729
Collision with Sign Post	212	0.52	3912	0.65	0.790*	-56.437
E Collision with Animal: Other	31	0.08	1416	0.24	0.319*	-66.164
E Ran Off Road Straight	31	0.08	1689	0.28	0.267*	-84.897
E Collision with Non-Motorist: Pedestrian	72	0.18	2346	0.39	0.447*	-88.980
E Collision with Concrete Barrier	125	0.30	3318	0.55	0.549*	-102.678
Collision with Utility Pole	278	0.68	5615	0.94	0.722*	-107.295
Collision with Culvert Headwall	59	0.14	2760	0.46	0.312*	-130.388
Collision with Fence	55	0.13	3165	0.53	0.253*	-162.179
E Collision with Vehicle in (or from) Other ...	740	1.80	13342	2.23	0.808*	-175.514
E Collision with Curb/Island/Raised Median	59	0.14	3438	0.57	0.250*	-176.912
Collision with Mailbox	89	0.22	3889	0.65	0.334*	-177.859
E Collision with Embankment	59	0.14	3605	0.60	0.239*	-188.371
E Ran Off Road Left	261	0.64	10221	1.71	0.372*	-440.354
E Collision with Animal: Deer	216	0.53	10099	1.69	0.312*	-476.983
E Ran Off Road Right	569	1.39	18748	3.13	0.442*	-717.468
Collision with Tree	279	0.68	14890	2.49	0.273*	-742.736
Collision with Ditch	480	1.17	19678	3.29	0.355*	-870.284

C204 E CU Sequence of Events #1 (Worst Max Gains; Excluding items < 20)



C204: E CU Sequence of Events #1 Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Cargo/Equipment Loss or Shift	742	1.89	1006	0.17	10.993*	674.503
Vehicle Defect/Component Failure	768	1.96	2826	0.48	4.050*	578.392
Crossed Centerline	1387	3.54	12958	2.22	1.595*	517.595
Collision with Vehicle in Traffic	22944	58.48	337685	57.75	1.013*	287.325
Overturn/Rollover	359	0.92	1228	0.21	4.357*	276.608
Collision with Overhead Object/Bridge/Tr...	239	0.61	167	0.03	21.330*	227.795
Collision with Parked Motor Vehicle	1415	3.61	18052	3.09	1.168*	203.817
Collision with Other Fixed Object	280	0.71	1613	0.28	2.587*	171.777
Thrown or Falling Object	153	0.39	334	0.06	6.827*	130.591
Collision with Other Non-Fixed Object	315	0.80	2960	0.51	1.586*	116.401
Fire/Explosion	165	0.42	915	0.16	2.688*	103.609
Jackknife	95	0.24	131	0.02	10.809*	86.211
Collision with Work Zone/Maintenance E...	90	0.23	155	0.03	8.654*	79.600
Collision with Utility Pole	153	0.39	1346	0.23	1.694*	62.691
Separation of Units	66	0.17	313	0.05	3.143*	45.000
Collision with Railway Vehicle/Train	55	0.14	221	0.04	3.709*	40.172
Collision with Falling/Shifting Cargo	57	0.15	257	0.04	3.306*	39.757
Downhill Runaway	39	0.10	134	0.02	4.338*	30.009
Non-Contact Vehicle	89	0.23	891	0.15	1.489*	29.219
Re-entering Roadway	139	0.35	1680	0.29	1.233*	26.282
Collision with Traffic Signal Pole	28	0.07	64	0.01	6.521*	23.706
Collision with Other Post/Pole/Support	44	0.11	361	0.06	1.817*	19.779
Collision with Animal: Farm/Ranch	121	0.31	1525	0.26	1.183	18.681

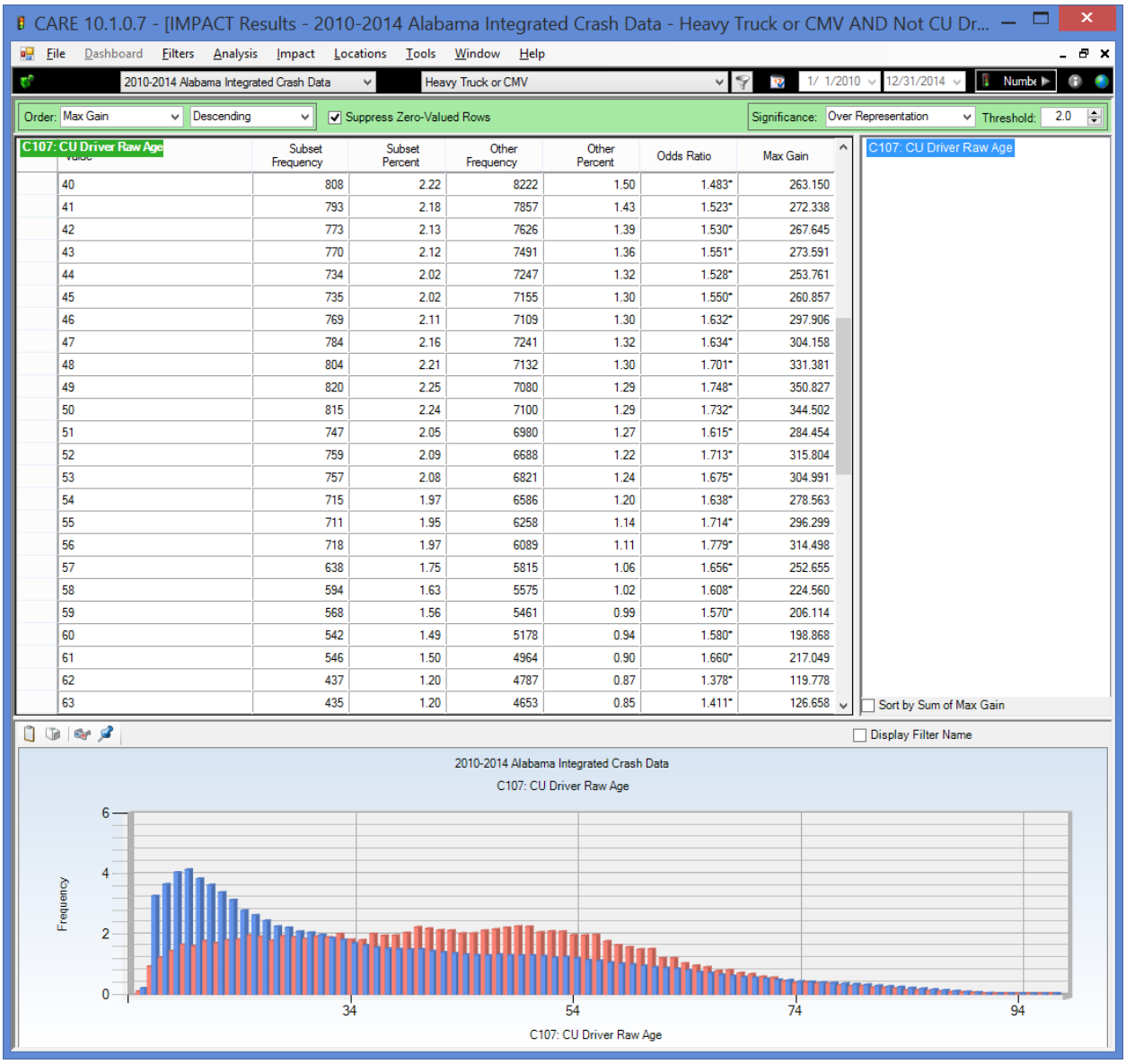
C204 E CU Sequence of Events #1 (Best Max Gains; Excluding items < 20)



C204: E CU Sequence of Events #1	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Collision with Animal: Farm/Ranch	121	0.31	1525	0.26	1.183	18.681
Collision with Light Pole (Non-Breakaway)	30	0.08	271	0.05	1.650*	11.817
Collision with Sign Post	68	0.17	862	0.15	1.176	10.165
Fell/Jumped from Motor Vehicle	23	0.06	351	0.06	0.977	-0.550
Evasive Action (Swerve/Brake)	1826	4.65	27232	4.66	0.999	-1.107
Crossed Median	58	0.15	897	0.15	0.964	-2.183
Collision with Fence	23	0.06	493	0.08	0.695	-10.077
Collision with Guardrail Face	64	0.16	1116	0.19	0.855	-10.877
Collision with Bridge Abutment/Rail	55	0.14	1004	0.17	0.816	-12.362
Collision with Mailbox	46	0.12	966	0.17	0.710	-18.813
Collision with Tree	91	0.23	2011	0.34	0.674*	-43.926
Collision with Concrete Barrier	77	0.20	1903	0.33	0.603*	-50.680
Collision with Animal: Other	24	0.06	1260	0.22	0.284*	-60.539
Collision with Non-Motorist: Pedestrian	50	0.13	1835	0.31	0.406*	-73.118
Collision with Ditch	56	0.14	2429	0.42	0.344*	-106.972
Record from Paper System	3558	9.07	54765	9.37	0.968	-116.409
Collision with Curb/Island/Raised Median	52	0.13	2527	0.43	0.307*	-117.547
Collision with Vehicle in (or from) Other R...	646	1.65	12059	2.06	0.798*	-163.088
Ran Off Road Straight	56	0.14	3547	0.61	0.235*	-181.983
Collision with Animal: Deer	198	0.50	8934	1.53	0.330*	-401.419
Ran Off Road Left	754	1.92	24983	4.27	0.450*	-922.212
Ran Off Road Right	1733	4.42	48449	8.29	0.533*	-1517.643

Driver Demographics

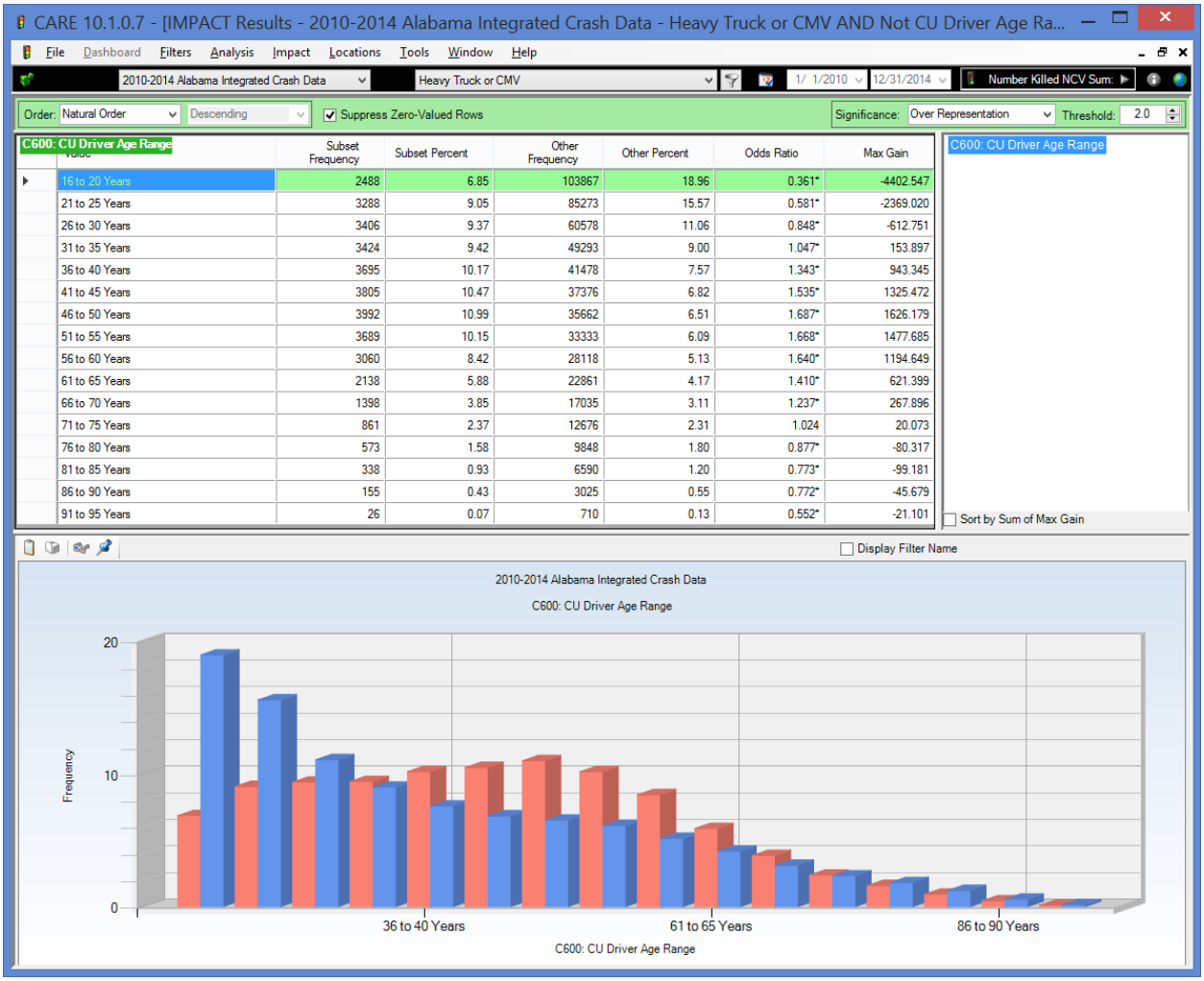
C107 CU Driver Raw Age



C107: CU Driver Raw Age Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
40	808	2.22	8222	1.50	1.483*	263.150
41	793	2.18	7857	1.43	1.523*	272.338
42	773	2.13	7626	1.39	1.530*	267.645
43	770	2.12	7491	1.36	1.551*	273.591
44	734	2.02	7247	1.32	1.528*	253.761
45	735	2.02	7155	1.30	1.550*	260.857
46	769	2.11	7109	1.30	1.632*	297.906
47	784	2.16	7241	1.32	1.634*	304.158
48	804	2.21	7132	1.30	1.701*	331.381
49	820	2.25	7080	1.29	1.748*	350.827
50	815	2.24	7100	1.29	1.732*	344.502
51	747	2.05	6980	1.27	1.615*	284.454
52	759	2.09	6688	1.22	1.713*	315.804
53	757	2.08	6821	1.24	1.675*	304.991
54	715	1.97	6586	1.20	1.638*	278.563
55	711	1.95	6258	1.14	1.714*	296.299
56	718	1.97	6089	1.11	1.779*	314.498
57	638	1.75	5815	1.06	1.656*	252.655
58	594	1.63	5575	1.02	1.608*	224.560
59	568	1.56	5461	0.99	1.570*	206.114
60	542	1.49	5178	0.94	1.580*	198.868
61	546	1.50	4964	0.90	1.660*	217.049
62	437	1.20	4787	0.87	1.378*	119.778
63	435	1.20	4653	0.85	1.411*	126.658

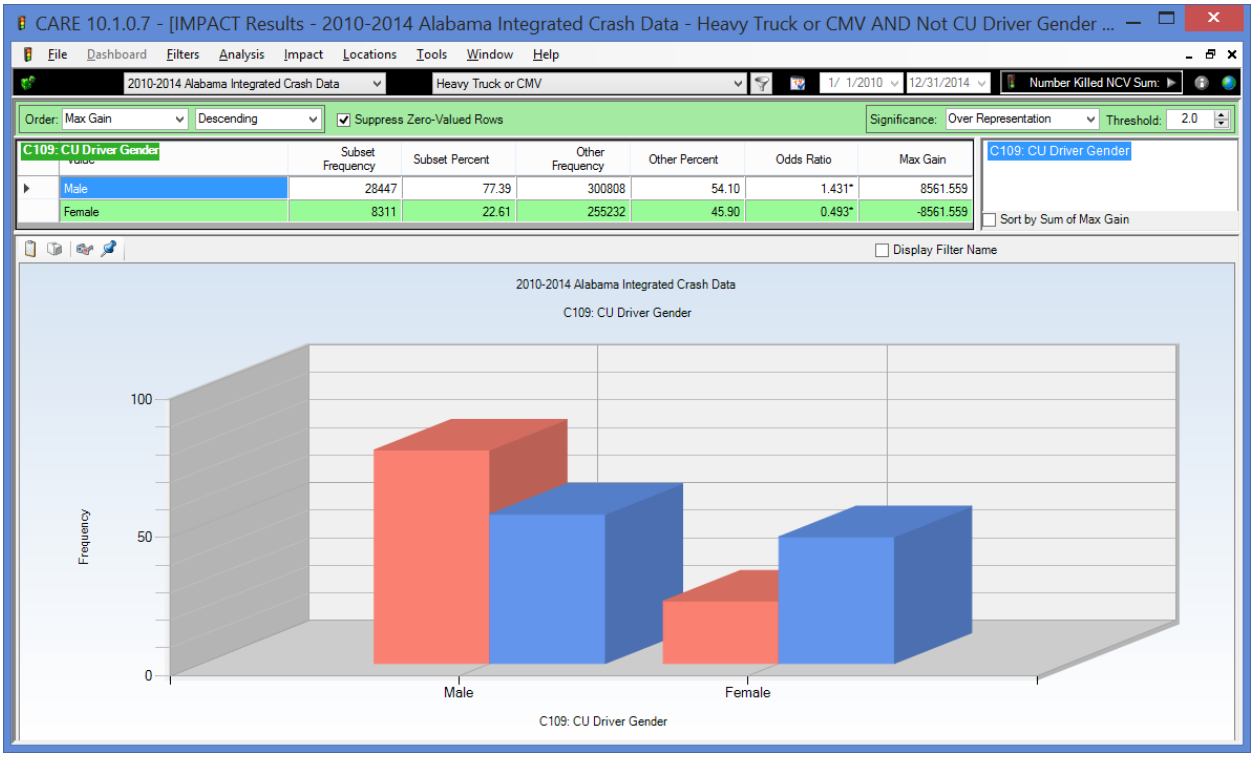
Table shows those ages that are most over-represented (40-63).

C600 CU Driver Age Range (5 year intervals)

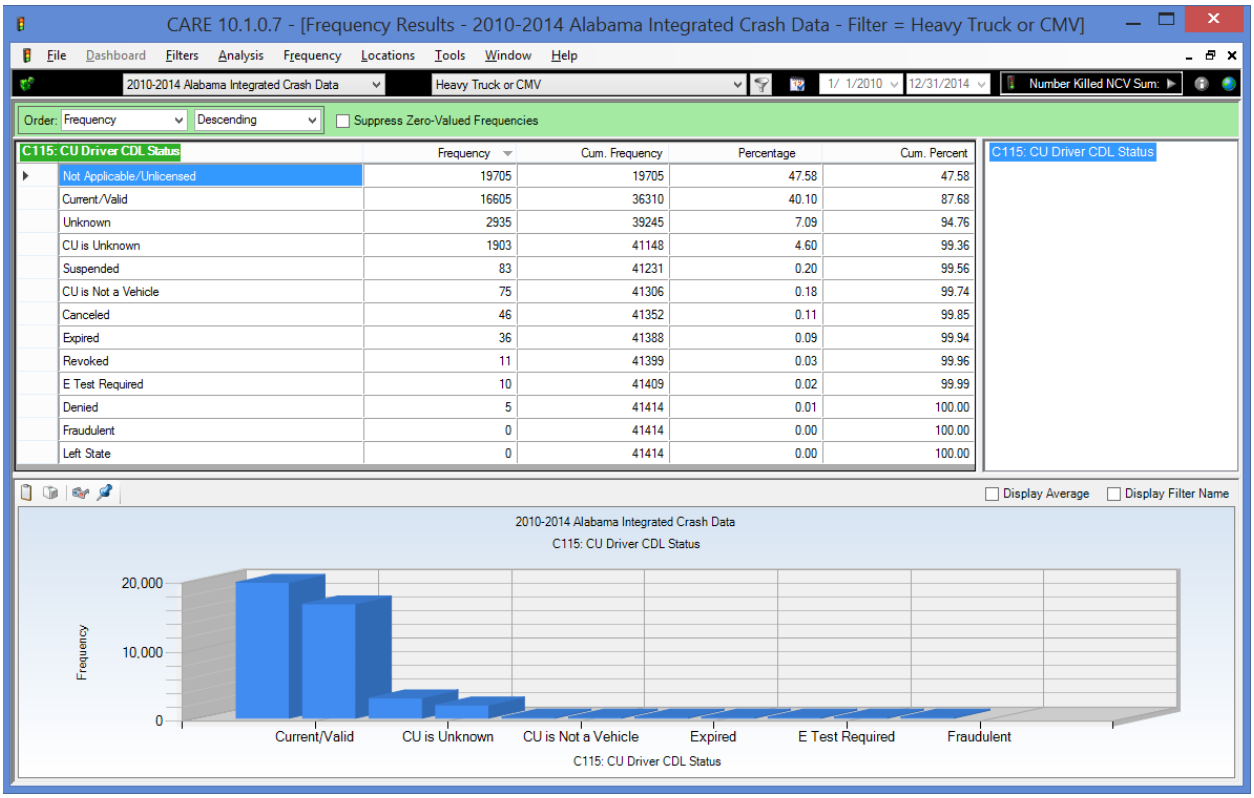


C600: CU Driver Age Range	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
16 to 20 Years	2488	6.85	103867	18.96	0.361*	-4402.547
21 to 25 Years	3288	9.05	85273	15.57	0.581*	-2369.020
26 to 30 Years	3406	9.37	60578	11.06	0.848*	-612.751
31 to 35 Years	3424	9.42	49293	9.00	1.047*	153.897
36 to 40 Years	3695	10.17	41478	7.57	1.343*	943.345
41 to 45 Years	3805	10.47	37376	6.82	1.535*	1325.472
46 to 50 Years	3992	10.99	35662	6.51	1.687*	1626.179
51 to 55 Years	3689	10.15	33333	6.09	1.668*	1477.685
56 to 60 Years	3060	8.42	28118	5.13	1.640*	1194.649
61 to 65 Years	2138	5.88	22861	4.17	1.410*	621.399
66 to 70 Years	1398	3.85	17035	3.11	1.237*	267.896
71 to 75 Years	861	2.37	12676	2.31	1.024	20.073
76 to 80 Years	573	1.58	9848	1.80	0.877*	-80.317
81 to 85 Years	338	0.93	6590	1.20	0.773*	-99.181
86 to 90 Years	155	0.43	3025	0.55	0.772*	-45.679
91 to 95 Years	26	0.07	710	0.13	0.552*	-21.101

C109 CU Driver Gender



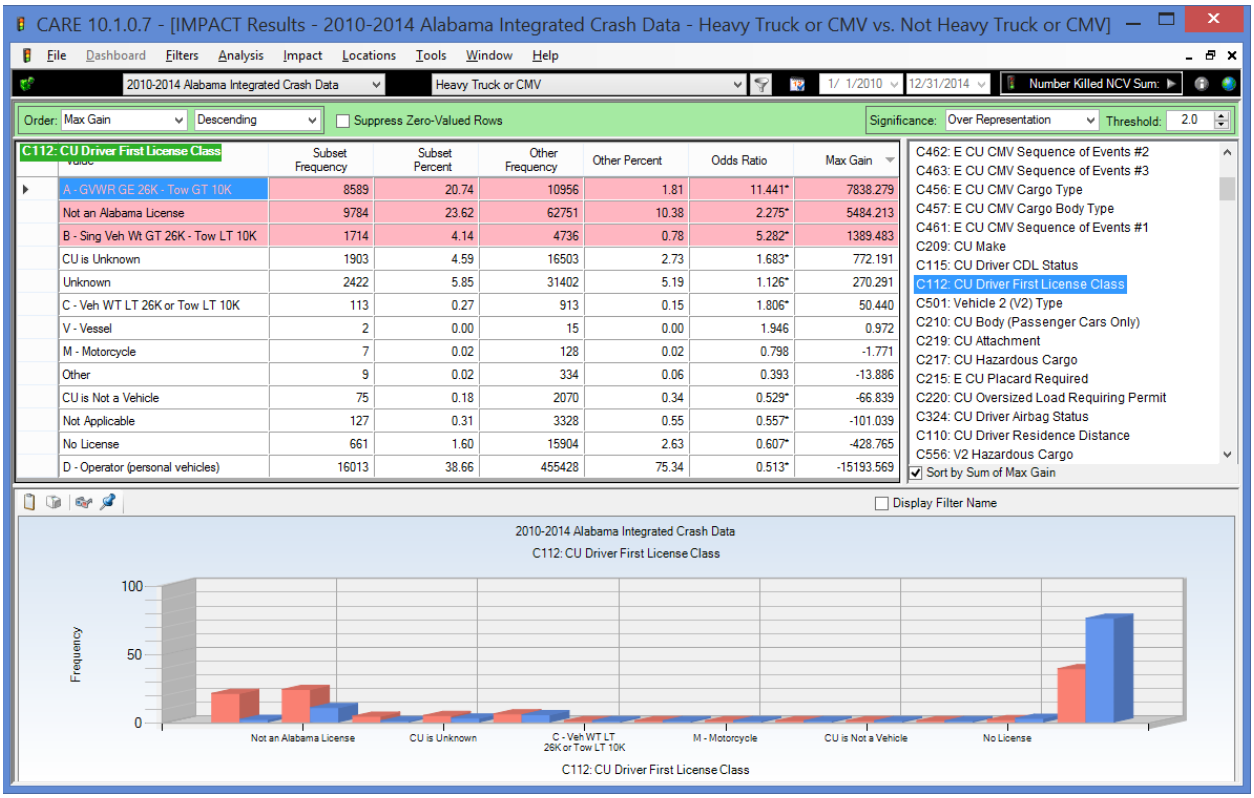
C115 CU Driver CDL Status



C115: CU Driver CDL Status	Frequency	Cum. Frequency	Percentage	Cum. Percent
Not Applicable/Unlicensed	19705	19705	47.58	47.58
Current/Valid	16605	36310	40.10	87.68
Unknown	2935	39245	7.09	94.76
CU is Unknown	1903	41148	4.60	99.36
Suspended	83	41231	0.20	99.56
CU is Not a Vehicle	75	41306	0.18	99.74
Canceled	46	41352	0.11	99.85
Expired	36	41388	0.09	99.94
Revoked	11	41399	0.03	99.96
E Test Required	10	41409	0.02	99.99
Denied	5	41414	0.01	100.00
Fraudulent	0	41414	0.00	100.00
Left State	0	41414	0.00	100.00

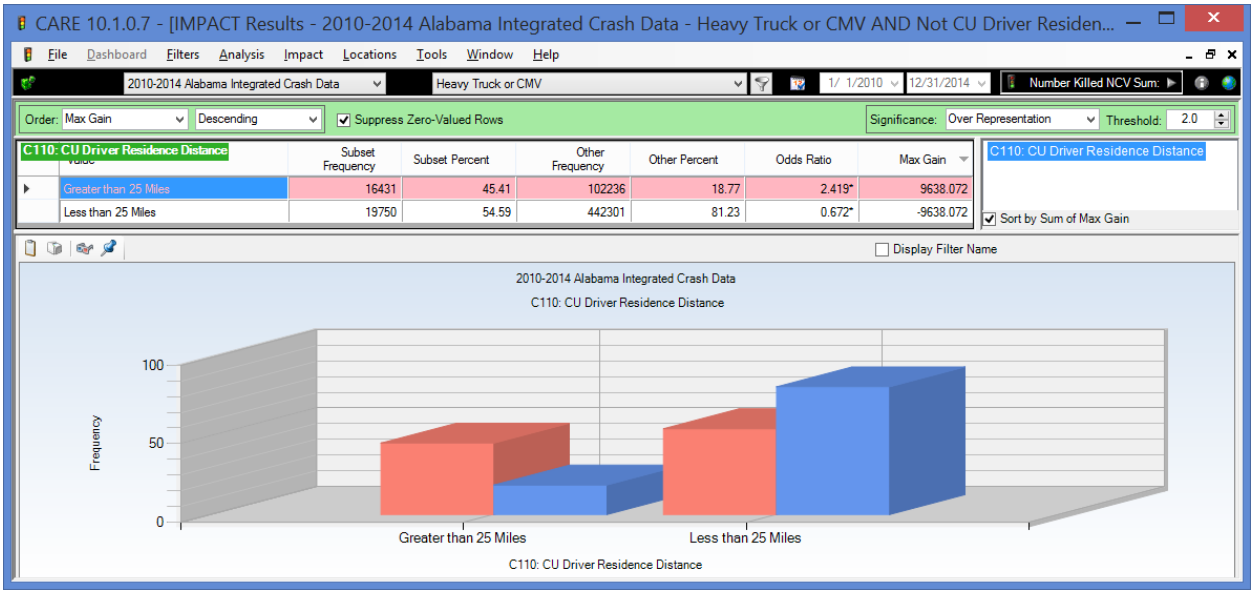
Unpruned.

C112 CU Driver First License Class



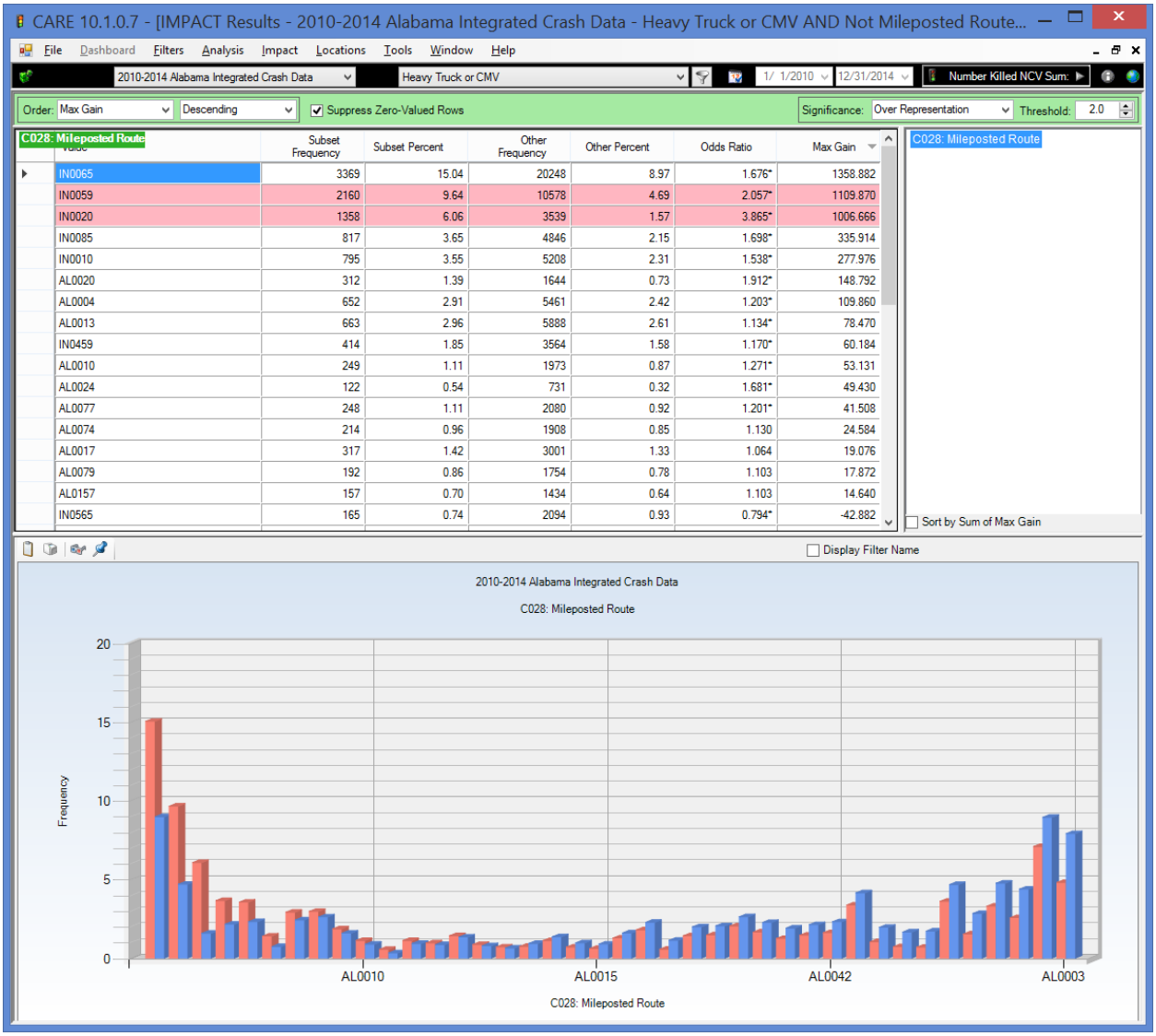
Unpruned.

C110 CU Driver Residence Distance



Roadway Characteristics

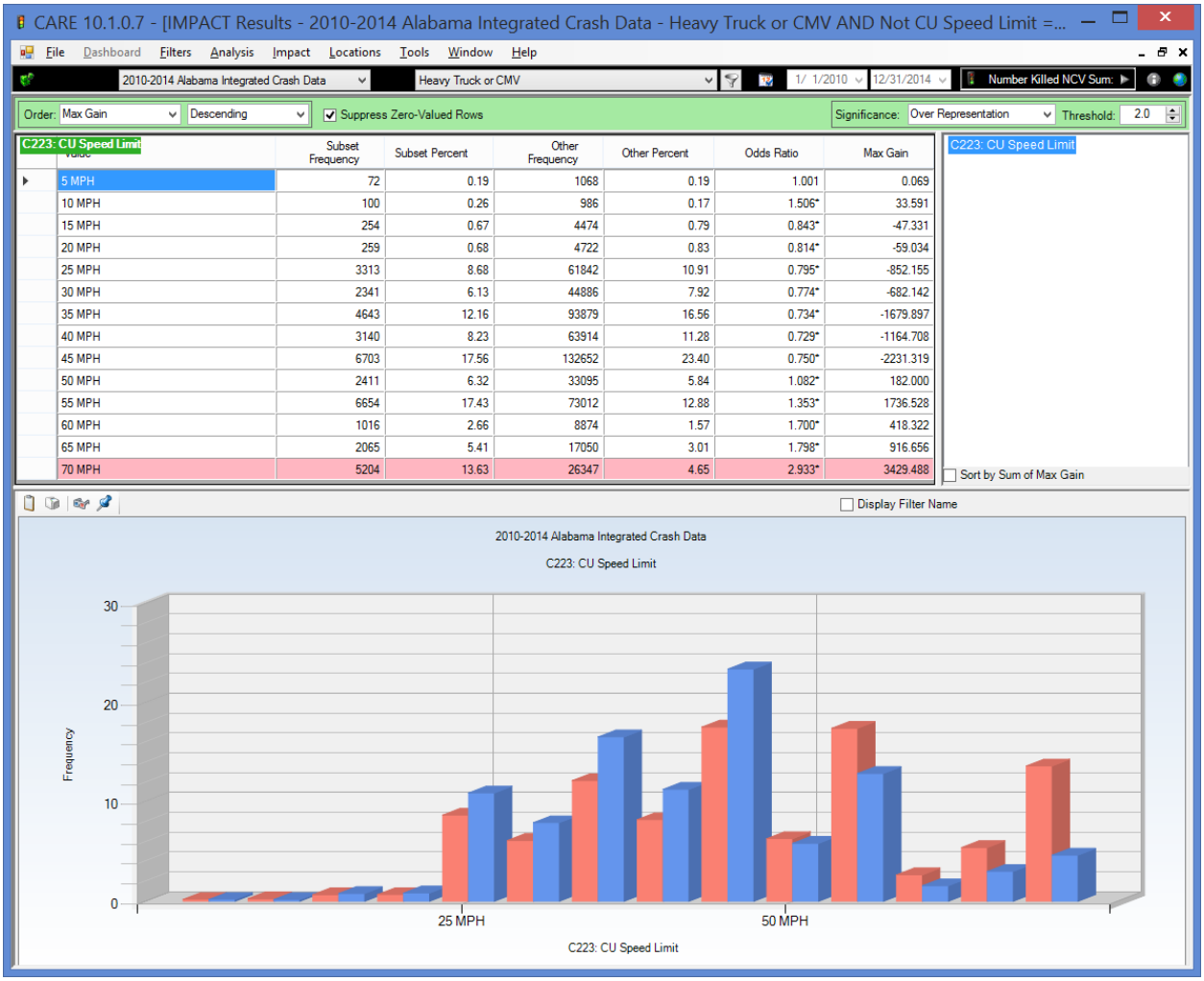
C028 Mileposted Route



C028: Mileposted Route	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
IN0065	3369	15.04	20248	8.97	1.676*	1358.882
IN0059	2160	9.64	10578	4.69	2.057*	1109.870
IN0020	1358	6.06	3539	1.57	3.865*	1006.666
IN0085	817	3.65	4846	2.15	1.698*	335.914
IN0010	795	3.55	5208	2.31	1.538*	277.976
AL0020	312	1.39	1644	0.73	1.912*	148.792
AL0004	652	2.91	5461	2.42	1.203*	109.860
AL0013	663	2.96	5888	2.61	1.134*	78.470
IN0459	414	1.85	3564	1.58	1.170*	60.184
AL0010	249	1.11	1973	0.87	1.271*	53.131
AL0024	122	0.54	731	0.32	1.681*	49.430
AL0077	248	1.11	2080	0.92	1.201*	41.508
AL0074	214	0.96	1908	0.85	1.130	24.584
AL0017	317	1.42	3001	1.33	1.064	19.076
AL0079	192	0.86	1754	0.78	1.103	17.872
AL0157	157	0.70	1434	0.64	1.103	14.640
IN0565	165	0.74	2094	0.93	0.794*	-42.882

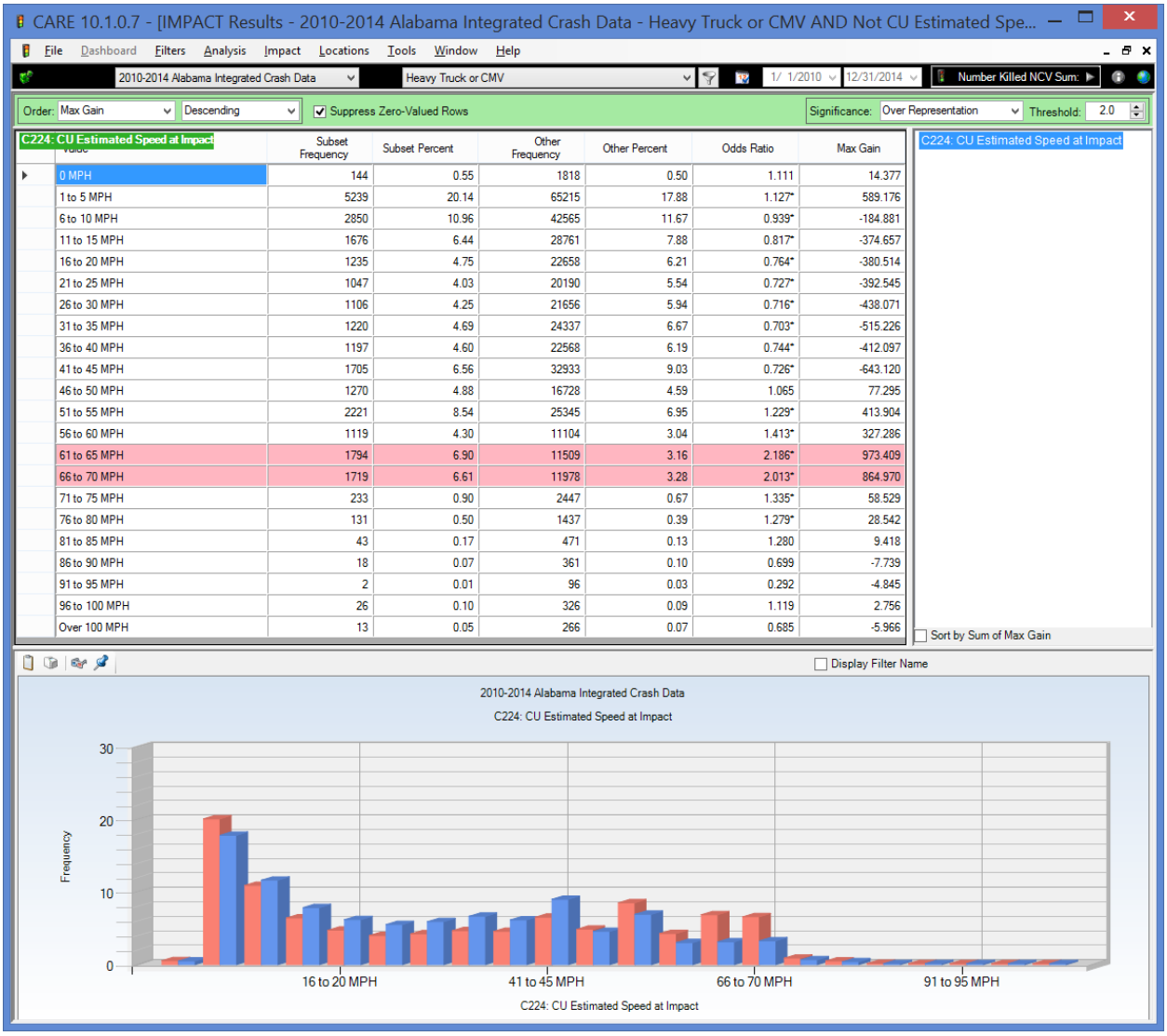
Omitted routes with less than 100 crashes – Max Gain arrangement is of the remaining roads (those with 100+ crashes). Listed are all those that were over-represented of these crashes.

C223 CU Speed Limit



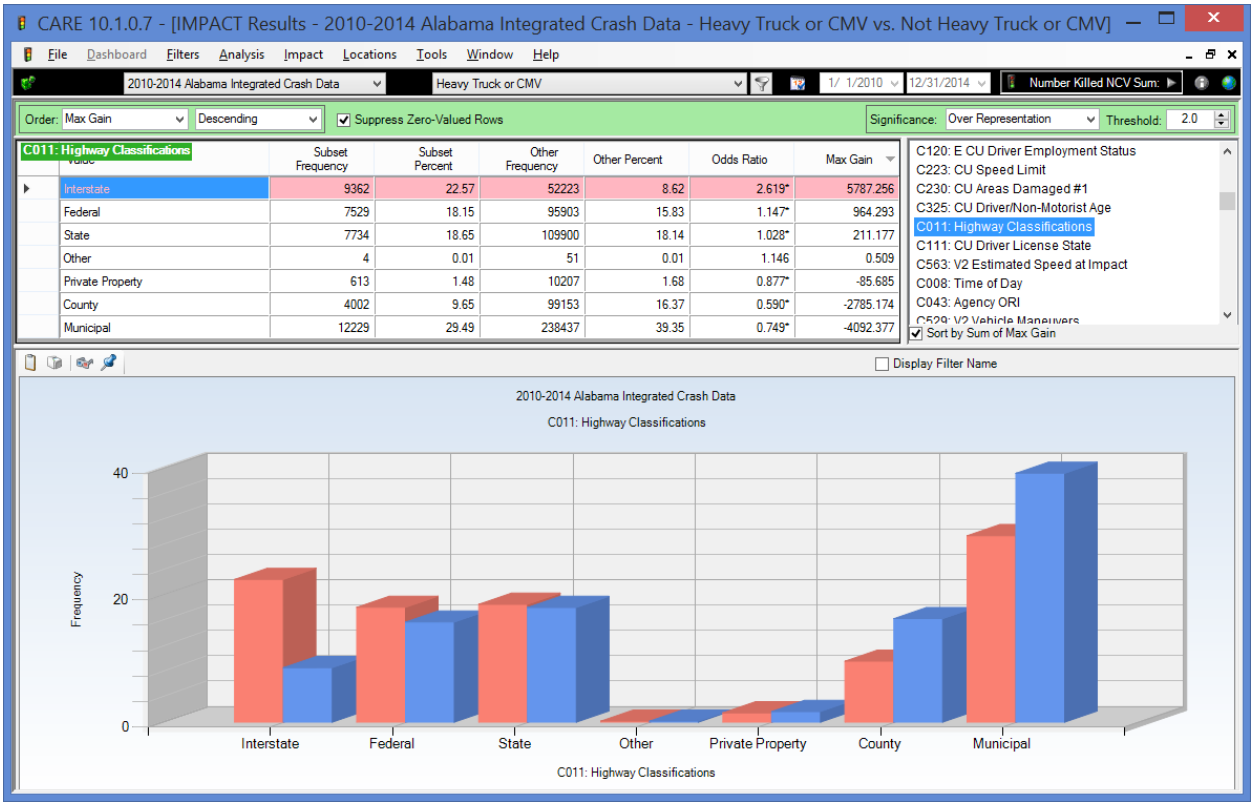
C223: CU Speed Limit Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
5 MPH	72	0.19	1068	0.19	1.001	0.069
10 MPH	100	0.26	986	0.17	1.506*	33.591
15 MPH	254	0.67	4474	0.79	0.843*	-47.331
20 MPH	259	0.68	4722	0.83	0.814*	-59.034
25 MPH	3313	8.68	61842	10.91	0.795*	-852.155
30 MPH	2341	6.13	44886	7.92	0.774*	-682.142
35 MPH	4643	12.16	93879	16.56	0.734*	-1679.897
40 MPH	3140	8.23	63914	11.28	0.729*	-1164.708
45 MPH	6703	17.56	132652	23.40	0.750*	-2231.319
50 MPH	2411	6.32	33095	5.84	1.082*	182.000
55 MPH	6654	17.43	73012	12.88	1.353*	1736.528
60 MPH	1016	2.66	8874	1.57	1.700*	418.322
65 MPH	2065	5.41	17050	3.01	1.798*	916.656
70 MPH	5204	13.63	26347	4.65	2.933*	3429.488

C224 CU Estimated Speed at Impact

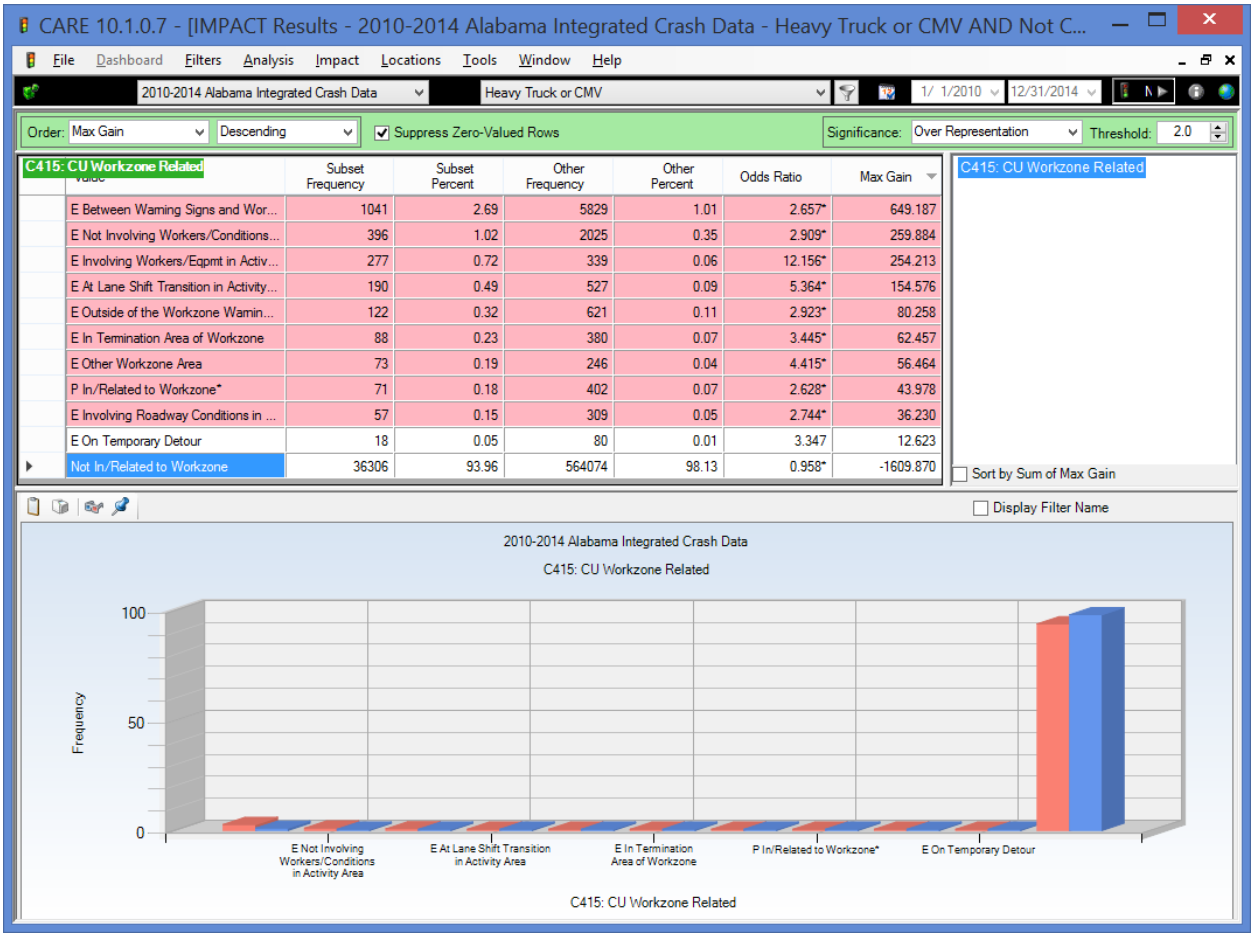


C224: CU Estimated Speed at Impact Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
0 MPH	144	0.55	1818	0.50	1.111	14.377
1 to 5 MPH	5239	20.14	65215	17.88	1.127*	589.176
6 to 10 MPH	2850	10.96	42565	11.67	0.939*	-184.881
11 to 15 MPH	1676	6.44	28761	7.88	0.817*	-374.657
16 to 20 MPH	1235	4.75	22658	6.21	0.764*	-380.514
21 to 25 MPH	1047	4.03	20190	5.54	0.727*	-392.545
26 to 30 MPH	1106	4.25	21656	5.94	0.716*	-438.071
31 to 35 MPH	1220	4.69	24337	6.67	0.703*	-515.226
36 to 40 MPH	1197	4.60	22568	6.19	0.744*	-412.097
41 to 45 MPH	1705	6.56	32933	9.03	0.726*	-643.120
46 to 50 MPH	1270	4.88	16728	4.59	1.065	77.295
51 to 55 MPH	2221	8.54	25345	6.95	1.229*	413.904
56 to 60 MPH	1119	4.30	11104	3.04	1.413*	327.286
61 to 65 MPH	1794	6.90	11509	3.16	2.186*	973.409
66 to 70 MPH	1719	6.61	11978	3.28	2.013*	864.970
71 to 75 MPH	233	0.90	2447	0.67	1.335*	58.529
76 to 80 MPH	131	0.50	1437	0.39	1.279*	28.542
81 to 85 MPH	43	0.17	471	0.13	1.280	9.418
86 to 90 MPH	18	0.07	361	0.10	0.699	-7.739
91 to 95 MPH	2	0.01	96	0.03	0.292	-4.845
96 to 100 MPH	26	0.10	326	0.09	1.119	2.756
Over 100 MPH	13	0.05	266	0.07	0.685	-5.966

C011 Highway Classification

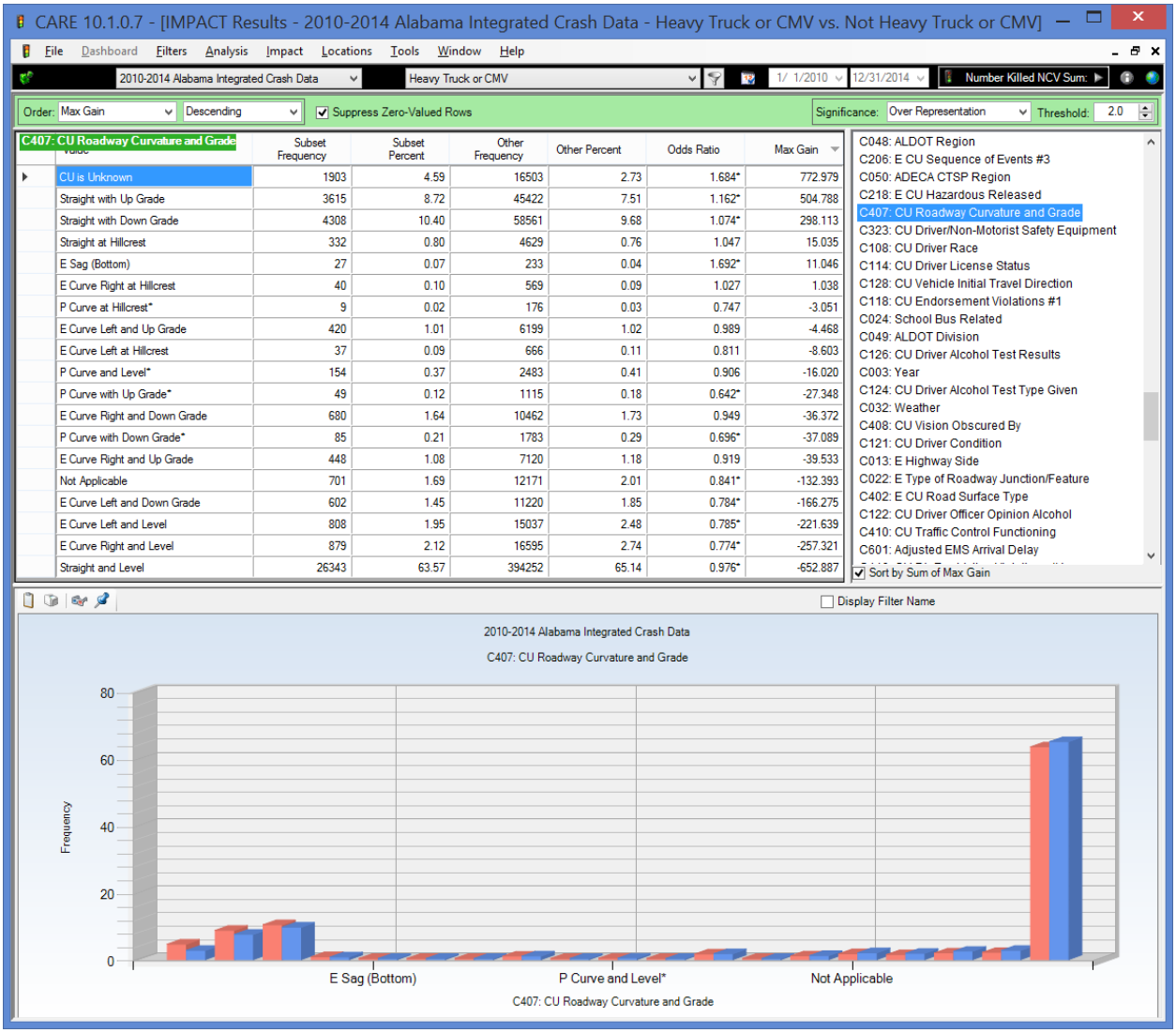


C415 CU Workzone Related



C415: CU Workzone Related	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Between Warning Signs and Wor...	1041	2.69	5829	1.01	2.657*	649.187
E Not Involving Workers/Conditions...	396	1.02	2025	0.35	2.909*	259.884
E Involving Workers/Eqpmt in Activ...	277	0.72	339	0.06	12.156*	254.213
E At Lane Shift Transition in Activity...	190	0.49	527	0.09	5.364*	154.576
E Outside of the Workzone Warnin...	122	0.32	621	0.11	2.923*	80.258
E In Termination Area of Workzone	88	0.23	380	0.07	3.445*	62.457
E Other Workzone Area	73	0.19	246	0.04	4.415*	56.464
P In/Related to Workzone*	71	0.18	402	0.07	2.628*	43.978
E Involving Roadway Conditions in ...	57	0.15	309	0.05	2.744*	36.230
E On Temporary Detour	18	0.05	80	0.01	3.347	12.623
Not In/Related to Workzone	36306	93.96	564074	98.13	0.958*	-1609.870

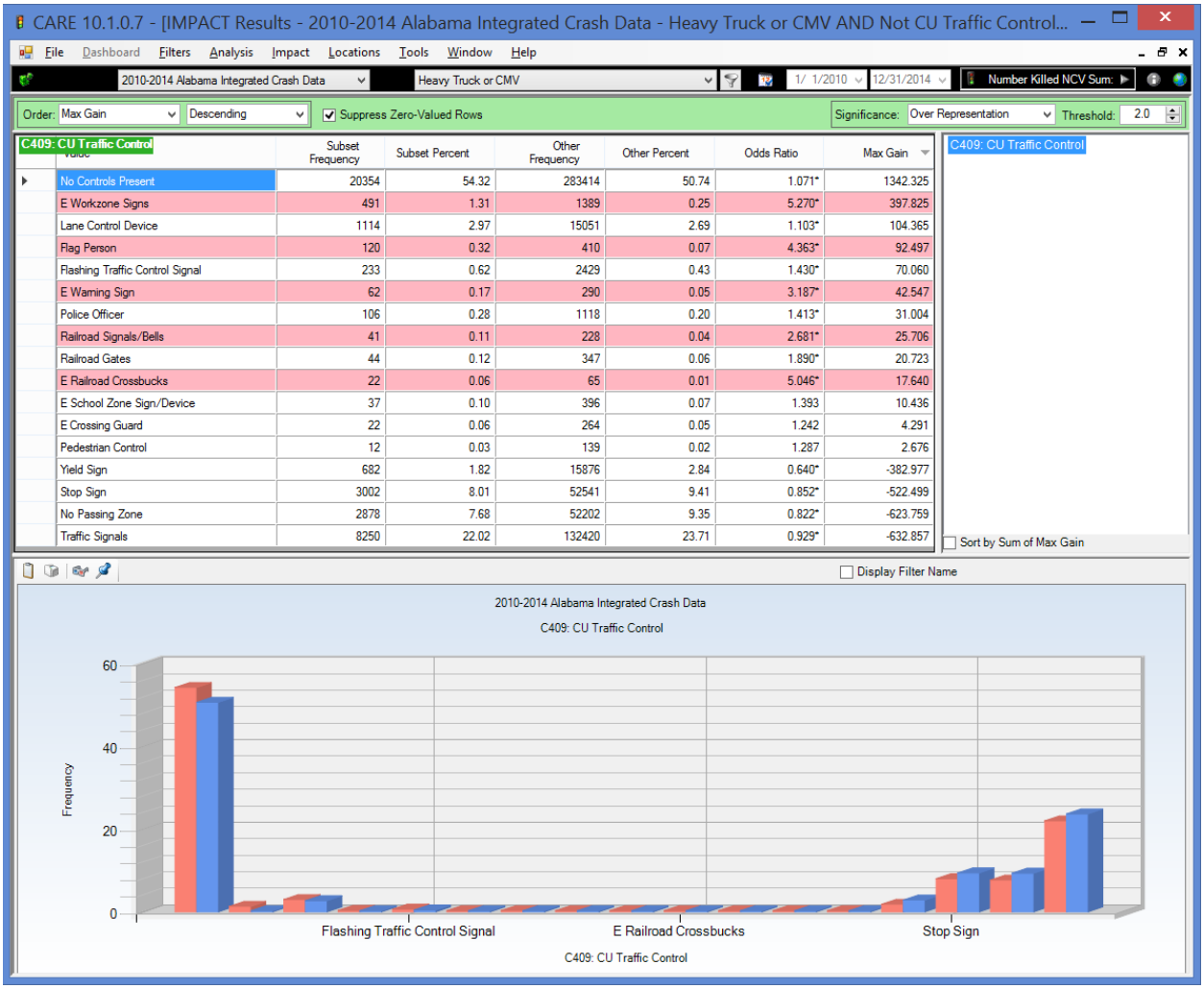
C407 CU Roadway Curvature and Grade



C407: CU Roadway Curvature and Grade	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
CU is Unknown	1903	4.59	16503	2.73	1.684*	772.979
Straight with Up Grade	3615	8.72	45422	7.51	1.162*	504.788
Straight with Down Grade	4308	10.40	58561	9.68	1.074*	298.113
Straight at Hillcrest	332	0.80	4629	0.76	1.047	15.035
E Sag (Bottom)	27	0.07	233	0.04	1.692*	11.046
E Curve Right at Hillcrest	40	0.10	569	0.09	1.027	1.038
P Curve at Hillcrest*	9	0.02	176	0.03	0.747	-3.051
E Curve Left and Up Grade	420	1.01	6199	1.02	0.989	-4.468
E Curve Left at Hillcrest	37	0.09	666	0.11	0.811	-8.603
P Curve and Level*	154	0.37	2483	0.41	0.906	-16.020
P Curve with Up Grade*	49	0.12	1115	0.18	0.642*	-27.348
E Curve Right and Down Grade	680	1.64	10462	1.73	0.949	-36.372
P Curve with Down Grade*	85	0.21	1783	0.29	0.696*	-37.089
E Curve Right and Up Grade	448	1.08	7120	1.18	0.919	-39.533
Not Applicable	701	1.69	12171	2.01	0.841*	-132.393
E Curve Left and Down Grade	602	1.45	11220	1.85	0.784*	-166.275
E Curve Left and Level	808	1.95	15037	2.48	0.785*	-221.639
E Curve Right and Level	879	2.12	16595	2.74	0.774*	-257.321
Straight and Level	26343	63.57	394252	65.14	0.976*	-652.887

C048: ALDOT Region
C206: E CU Sequence of Events #3
C050: ADECA CTSP Region
C218: E CU Hazardous Released
C407: CU Roadway Curvature and Grade
C323: CU Driver/Non-Motorist Safety Equipment
C108: CU Driver Race
C114: CU Driver License Status
C128: CU Vehicle Initial Travel Direction
C118: CU Endorsement Violations #1
C024: School Bus Related
C049: ALDOT Division
C126: CU Driver Alcohol Test Results
C003: Year
C124: CU Driver Alcohol Test Type Given
C032: Weather
C408: CU Vision Obscured By
C121: CU Driver Condition
C013: E Highway Side
C022: E Type of Roadway Junction/Feature
C402: E CU Road Surface Type
C122: CU Driver Officer Opinion Alcohol
C410: CU Traffic Control Functioning
C601: Adjusted EMS Arrival Delay

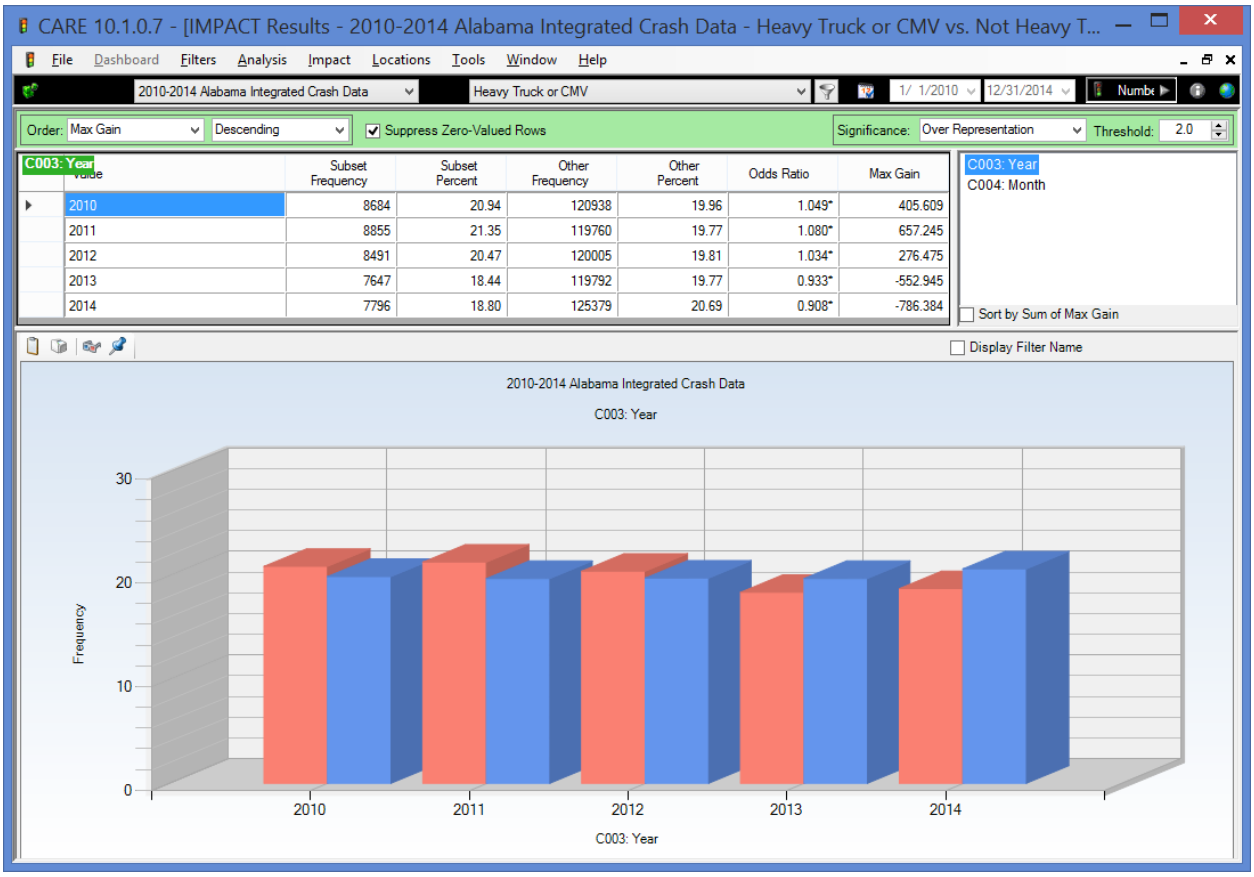
C409 CU Traffic Control (items with less than 20 occurrences excluded)



C409: CU Traffic Control	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
No Controls Present	20354	54.32	283414	50.74	1.071*	1342.325
E Workzone Signs	491	1.31	1389	0.25	5.270*	397.825
Lane Control Device	1114	2.97	15051	2.69	1.103*	104.365
Flag Person	120	0.32	410	0.07	4.363*	92.497
Flashing Traffic Control Signal	233	0.62	2429	0.43	1.430*	70.060
E Warning Sign	62	0.17	290	0.05	3.187*	42.547
Police Officer	106	0.28	1118	0.20	1.413*	31.004
Railroad Signals/Bells	41	0.11	228	0.04	2.681*	25.706
Railroad Gates	44	0.12	347	0.06	1.890*	20.723
E Railroad Crossbucks	22	0.06	65	0.01	5.046*	17.640
E School Zone Sign/Device	37	0.10	396	0.07	1.393	10.436
E Crossing Guard	22	0.06	264	0.05	1.242	4.291
Pedestrian Control	12	0.03	139	0.02	1.287	2.676
Yield Sign	682	1.82	15876	2.84	0.640*	-382.977
Stop Sign	3002	8.01	52541	9.41	0.852*	-522.499
No Passing Zone	2878	7.68	52202	9.35	0.822*	-623.759
Traffic Signals	8250	22.02	132420	23.71	0.929*	-632.857

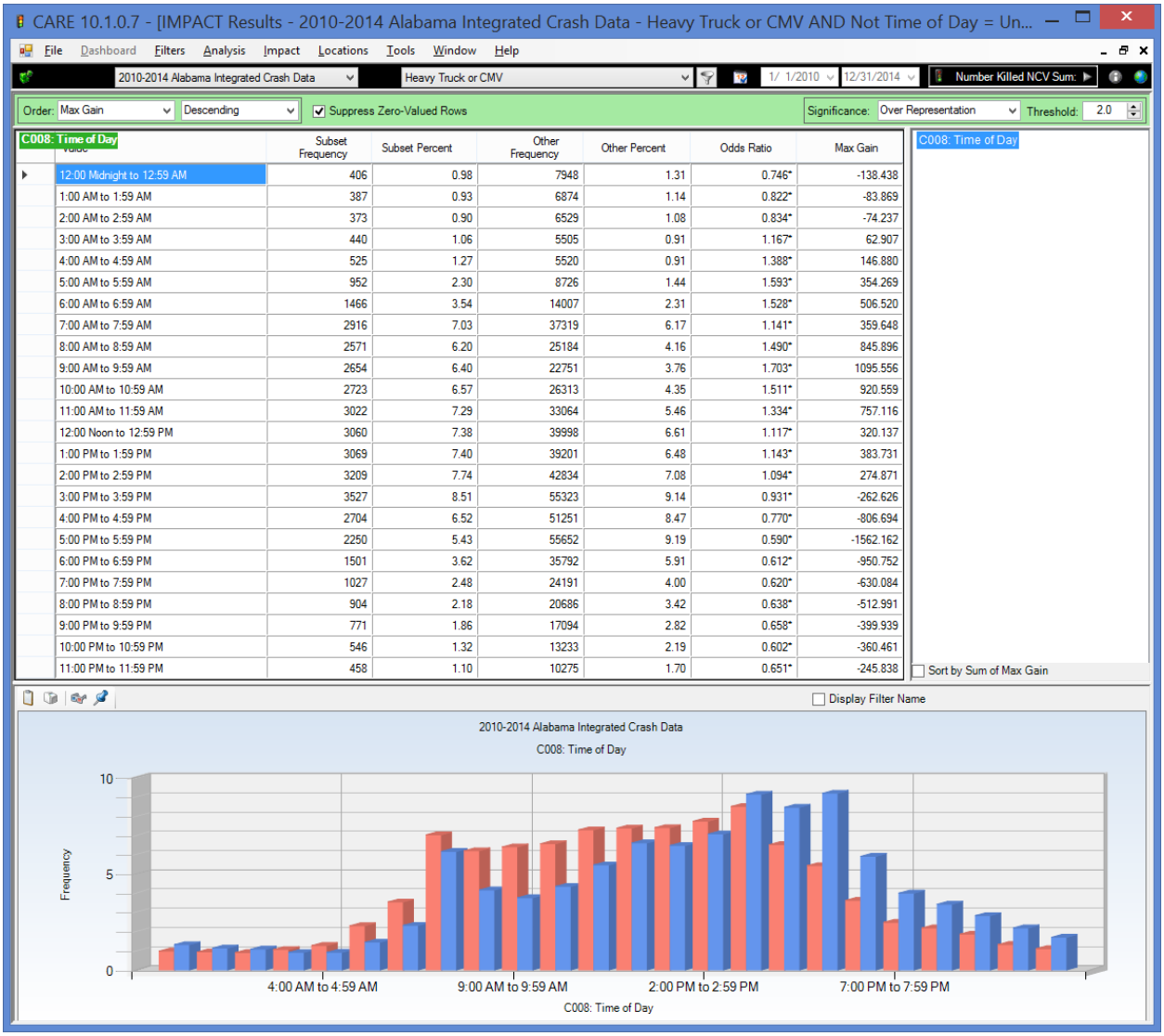
Time Factors

C003 Year



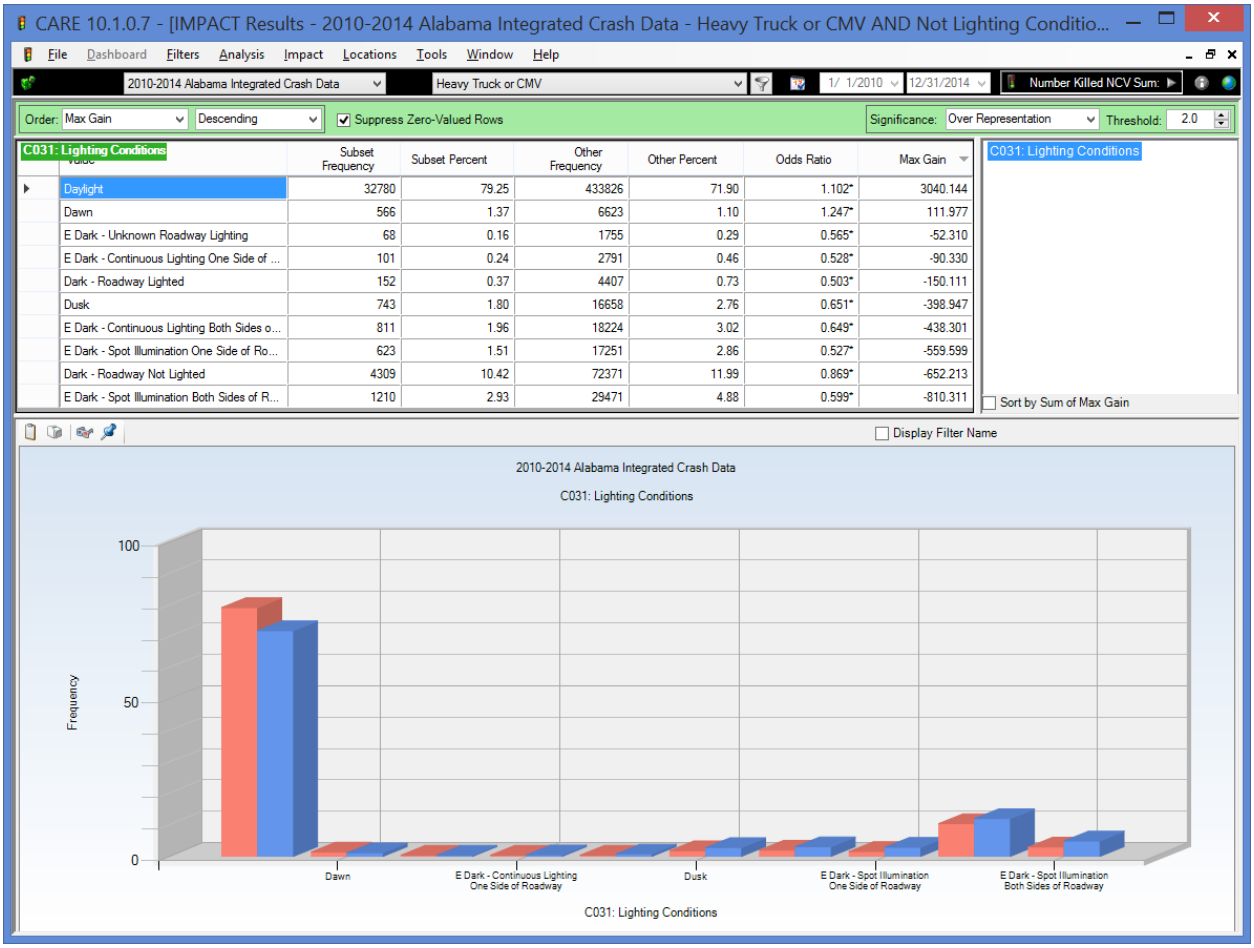
C003: Year Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
2010	8684	20.94	120938	19.96	1.049*	405.609
2011	8855	21.35	119760	19.77	1.080*	657.245
2012	8491	20.47	120005	19.81	1.034*	276.475
2013	7647	18.44	119792	19.77	0.933*	-552.945
2014	7796	18.80	125379	20.69	0.908*	-786.384

C008 Time of Day



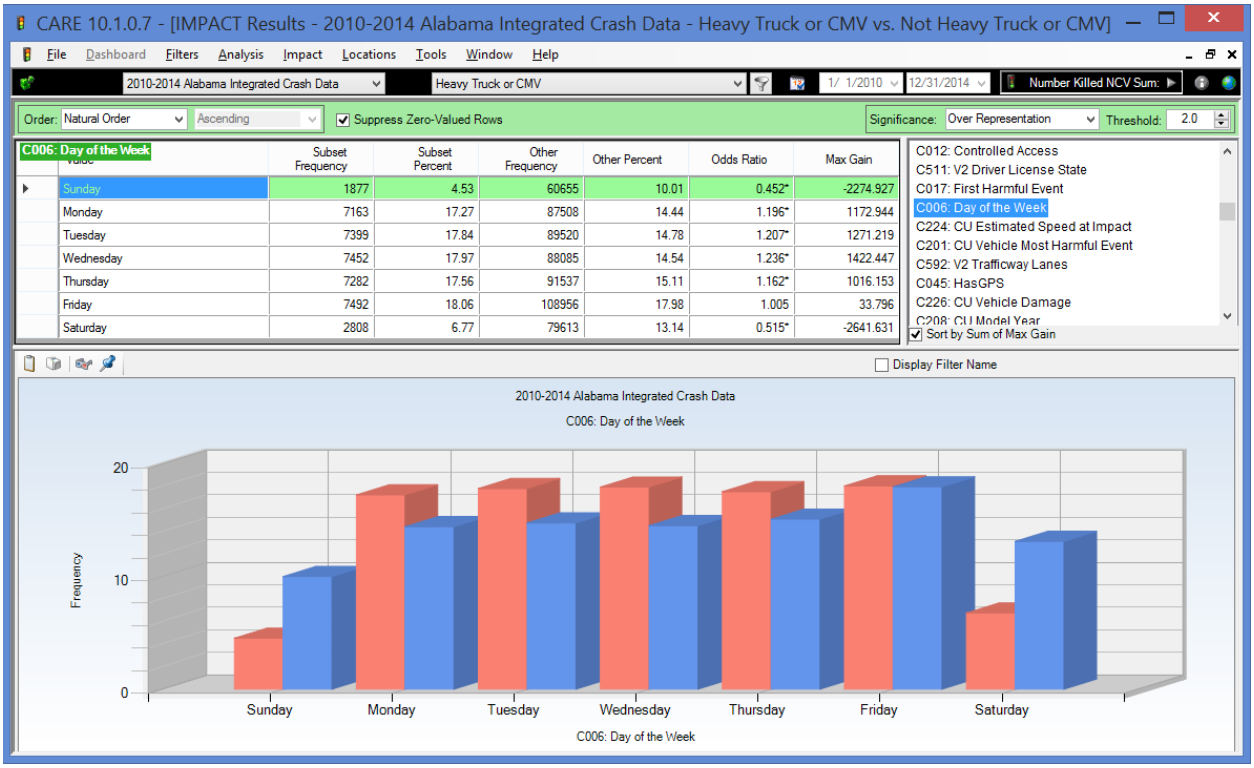
C008: Time of Day Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
12:00 Midnight to 12:59 AM	406	0.98	7948	1.31	0.746*	-138.438
1:00 AM to 1:59 AM	387	0.93	6874	1.14	0.822*	-83.869
2:00 AM to 2:59 AM	373	0.90	6529	1.08	0.834*	-74.237
3:00 AM to 3:59 AM	440	1.06	5505	0.91	1.167*	62.907
4:00 AM to 4:59 AM	525	1.27	5520	0.91	1.388*	146.880
5:00 AM to 5:59 AM	952	2.30	8726	1.44	1.593*	354.269
6:00 AM to 6:59 AM	1466	3.54	14007	2.31	1.528*	506.520
7:00 AM to 7:59 AM	2916	7.03	37319	6.17	1.141*	359.648
8:00 AM to 8:59 AM	2571	6.20	25184	4.16	1.490*	845.896
9:00 AM to 9:59 AM	2654	6.40	22751	3.76	1.703*	1095.556
10:00 AM to 10:59 AM	2723	6.57	26313	4.35	1.511*	920.559
11:00 AM to 11:59 AM	3022	7.29	33064	5.46	1.334*	757.116
12:00 Noon to 12:59 PM	3060	7.38	39998	6.61	1.117*	320.137
1:00 PM to 1:59 PM	3069	7.40	39201	6.48	1.143*	383.731
2:00 PM to 2:59 PM	3209	7.74	42834	7.08	1.094*	274.871
3:00 PM to 3:59 PM	3527	8.51	55323	9.14	0.931*	-262.626
4:00 PM to 4:59 PM	2704	6.52	51251	8.47	0.770*	-806.694
5:00 PM to 5:59 PM	2250	5.43	55652	9.19	0.590*	-1562.162
6:00 PM to 6:59 PM	1501	3.62	35792	5.91	0.612*	-950.752
7:00 PM to 7:59 PM	1027	2.48	24191	4.00	0.620*	-630.084
8:00 PM to 8:59 PM	904	2.18	20686	3.42	0.638*	-512.991
9:00 PM to 9:59 PM	771	1.86	17094	2.82	0.658*	-399.939
10:00 PM to 10:59 PM	546	1.32	13233	2.19	0.602*	-360.461
11:00 PM to 11:59 PM	458	1.10	10275	1.70	0.651*	-245.838

C031 Lighting Conditions

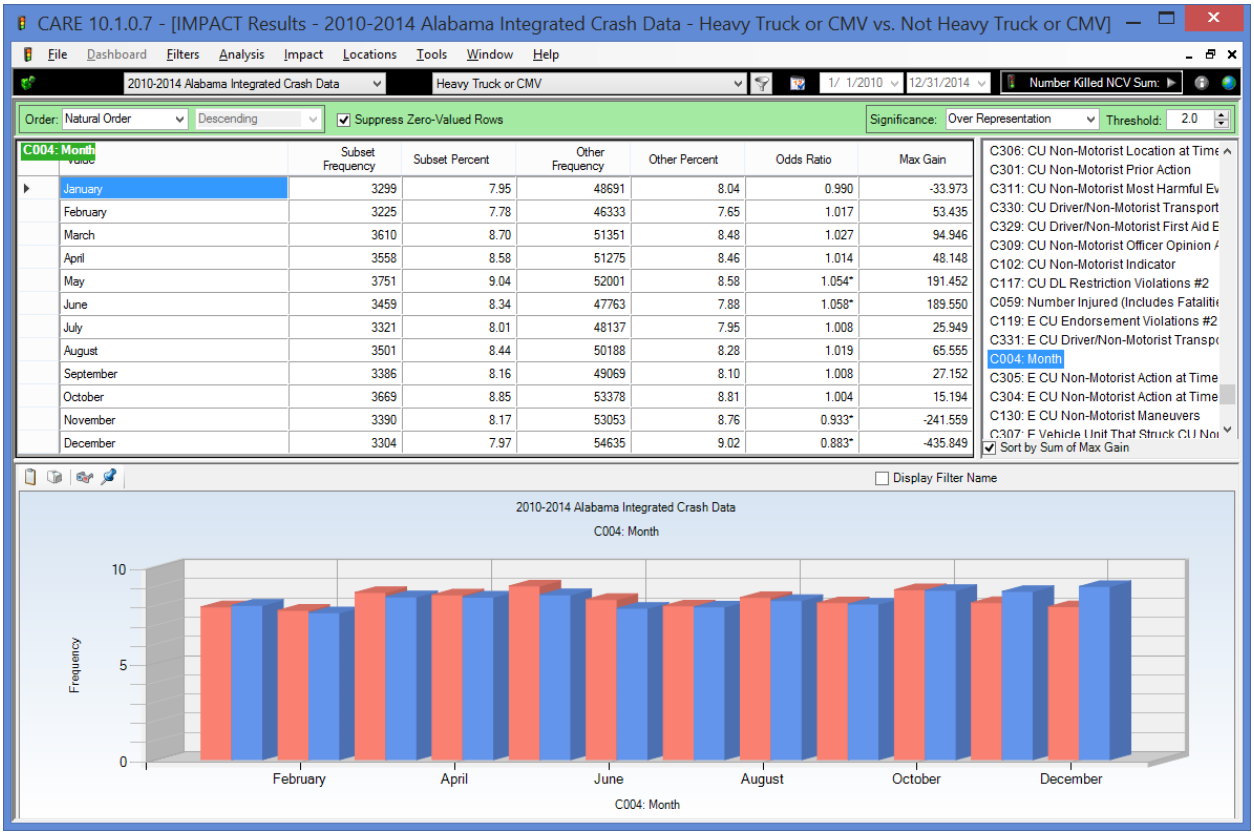


C031: Lighting Conditions Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Daylight	32780	79.25	433826	71.90	1.102*	3040.144
Dawn	566	1.37	6623	1.10	1.247*	111.977
E Dark - Unknown Roadway Lighting	68	0.16	1755	0.29	0.565*	-52.310
E Dark - Continuous Lighting One Side of ...	101	0.24	2791	0.46	0.528*	-90.330
Dark - Roadway Lighted	152	0.37	4407	0.73	0.503*	-150.111
Dusk	743	1.80	16658	2.76	0.651*	-398.947
E Dark - Continuous Lighting Both Sides o...	811	1.96	18224	3.02	0.649*	-438.301
E Dark - Spot Illumination One Side of Ro...	623	1.51	17251	2.86	0.527*	-559.599
Dark - Roadway Not Lighted	4309	10.42	72371	11.99	0.869*	-652.213
E Dark - Spot Illumination Both Sides of R...	1210	2.93	29471	4.88	0.599*	-810.311

C006 Day of the Week



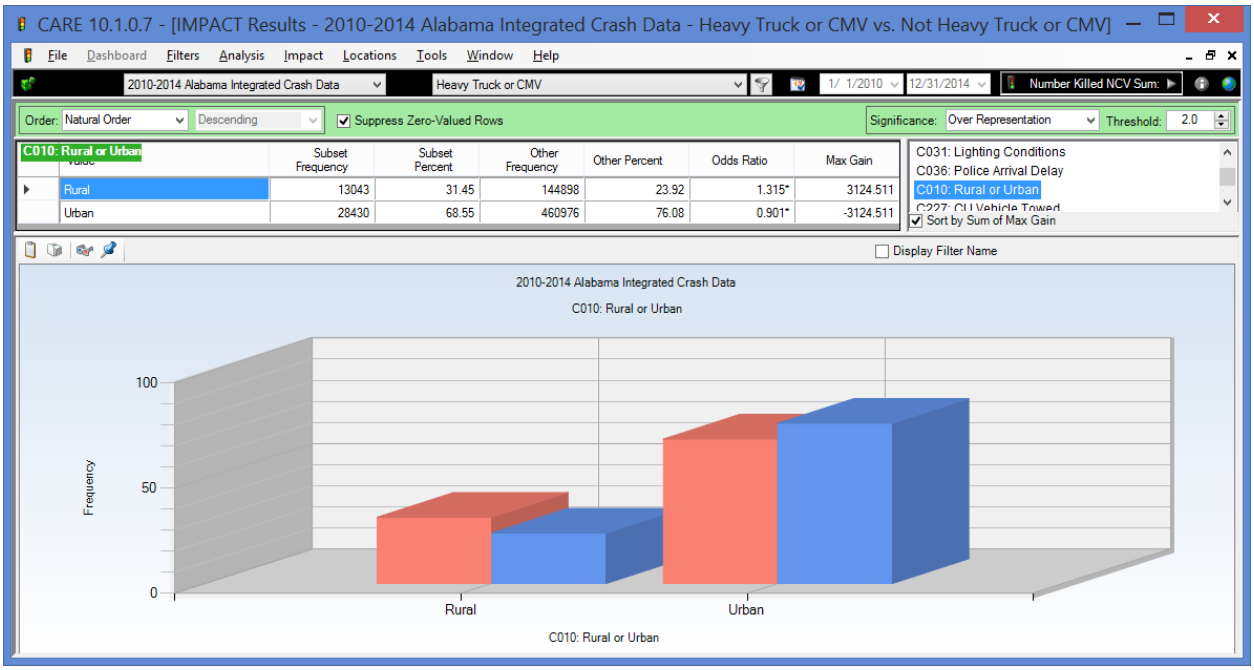
C004 Month

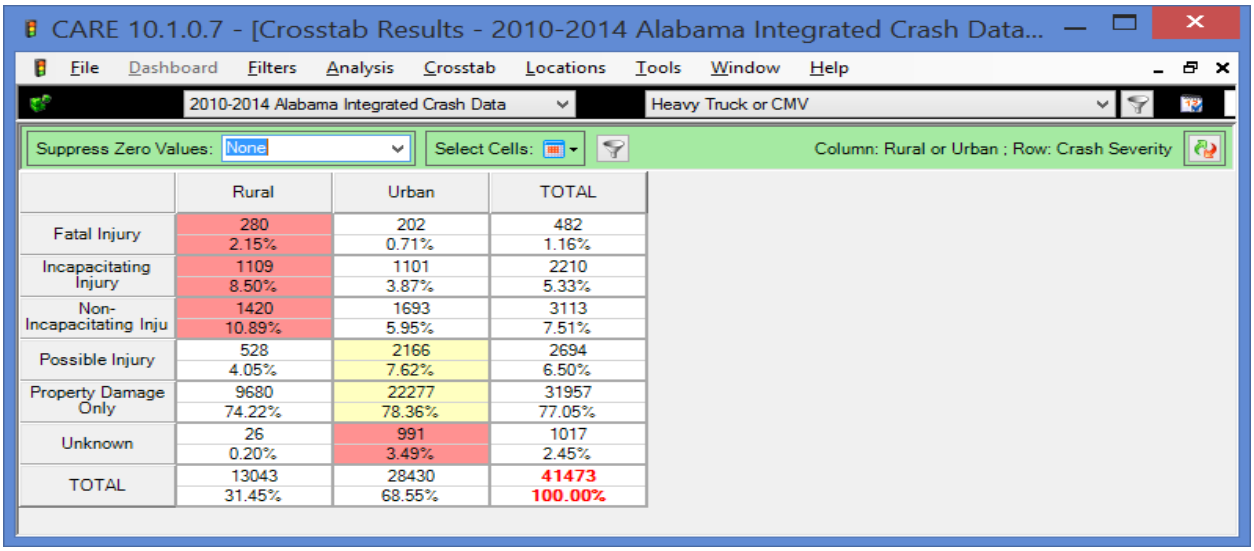


C004: Month Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
January	3299	7.95	48691	8.04	0.990	-33.973
February	3225	7.78	46333	7.65	1.017	53.435
March	3610	8.70	51351	8.48	1.027	94.946
April	3558	8.58	51275	8.46	1.014	48.148
May	3751	9.04	52001	8.58	1.054*	191.452
June	3459	8.34	47763	7.88	1.058*	189.550
July	3321	8.01	48137	7.95	1.008	25.949
August	3501	8.44	50188	8.28	1.019	65.555
September	3386	8.16	49069	8.10	1.008	27.152
October	3669	8.85	53378	8.81	1.004	15.194
November	3390	8.17	53053	8.76	0.933*	-241.559
December	3304	7.97	54635	9.02	0.883*	-435.849

Geographical Considerations

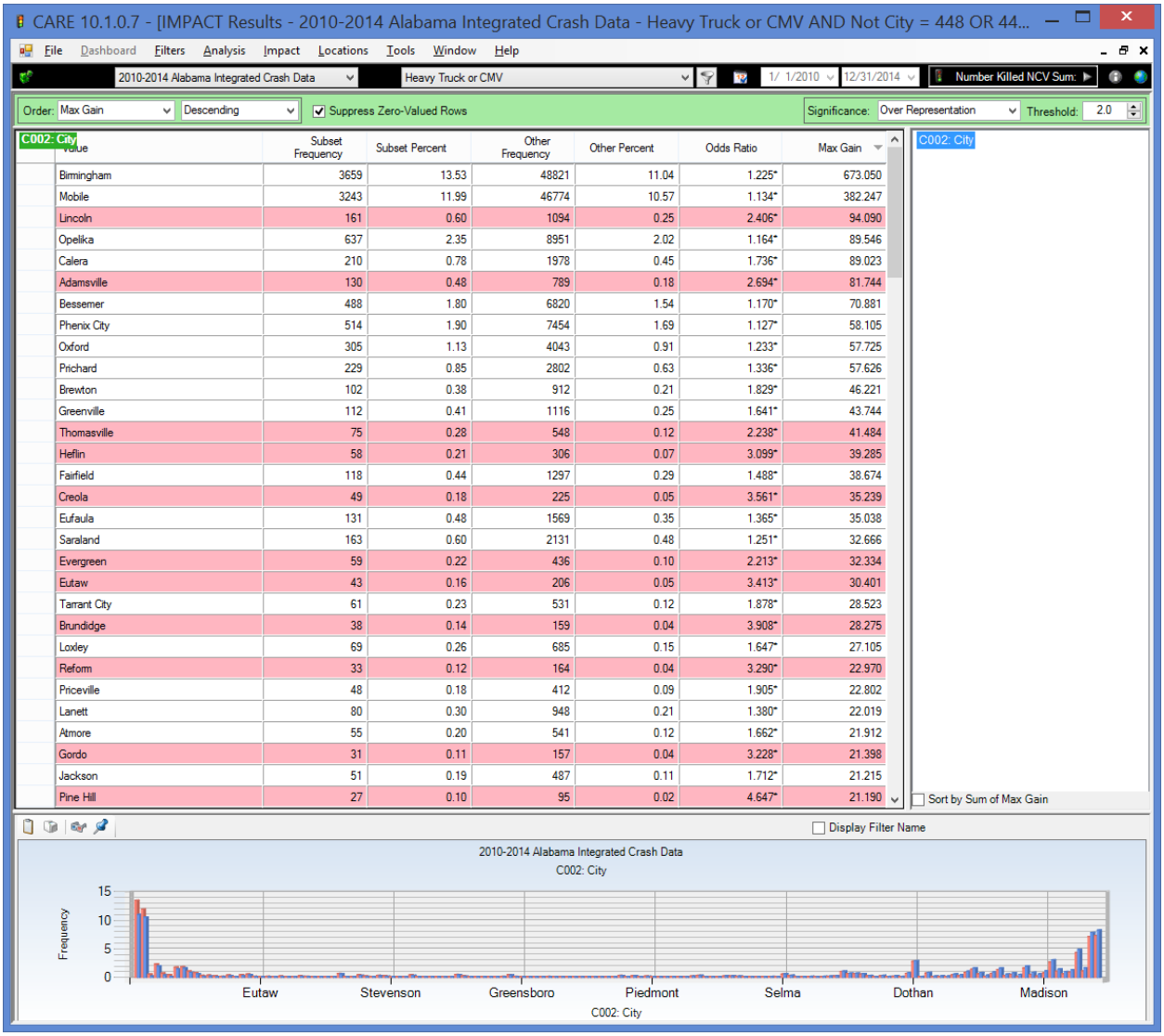
C010 Rural or Urban





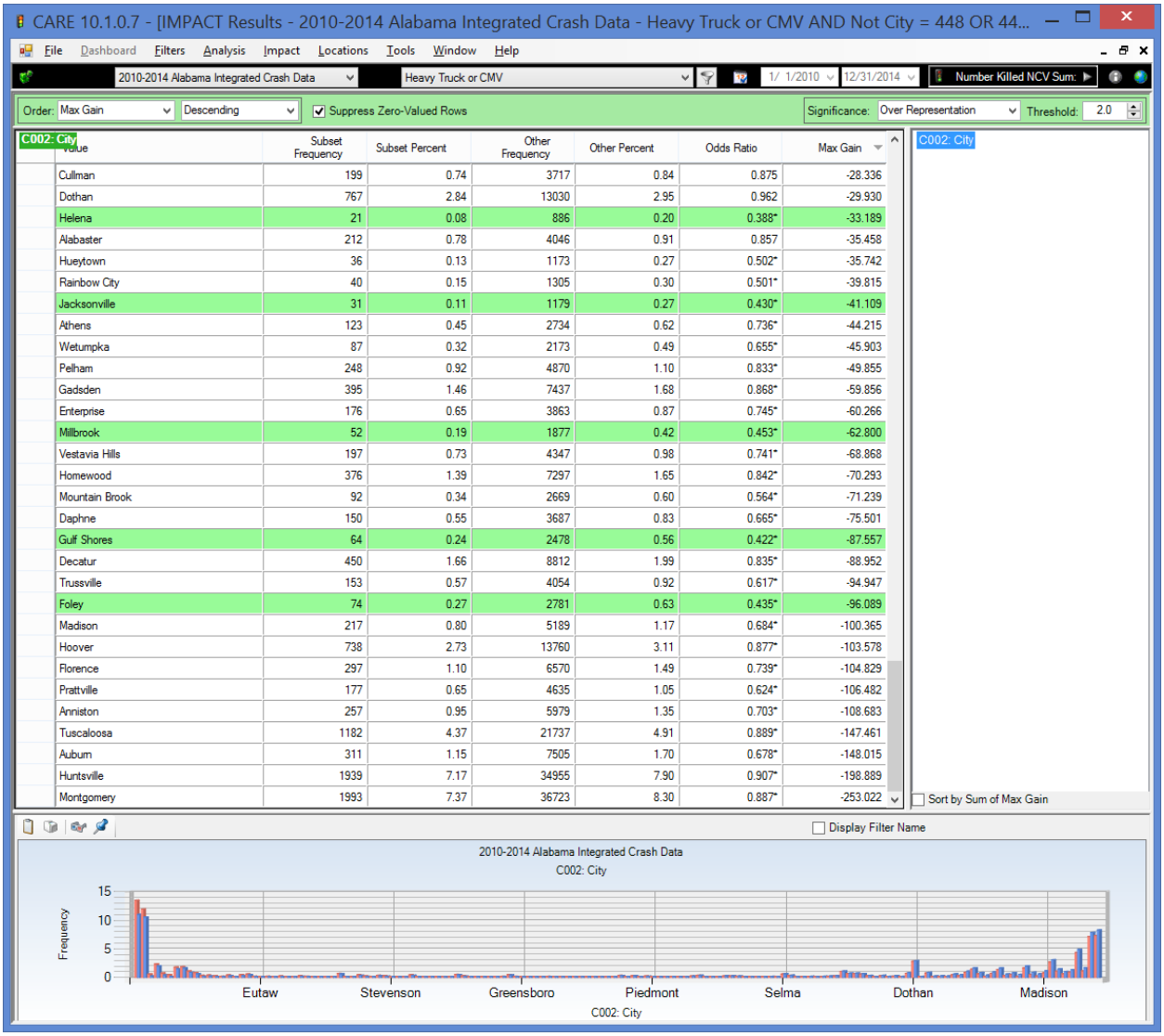
	Rural	Urban	TOTAL
Fatal Injury	280 2.15%	202 0.71%	482 1.16%
Incapacitating Injury	1109 8.50%	1101 3.87%	2210 5.33%
Non-Incapacitating Inju	1420 10.89%	1693 5.95%	3113 7.51%
Possible Injury	528 4.05%	2166 7.62%	2694 6.50%
Property Damage Only	9680 74.22%	22277 78.36%	31957 77.05%
Unknown	26 0.20%	991 3.49%	1017 2.45%
TOTAL	13043 31.45%	28430 68.55%	**41473** **100.00%**

C002 City (With the Highest Max Gains; Excluding Rural Areas and Cities < 20)



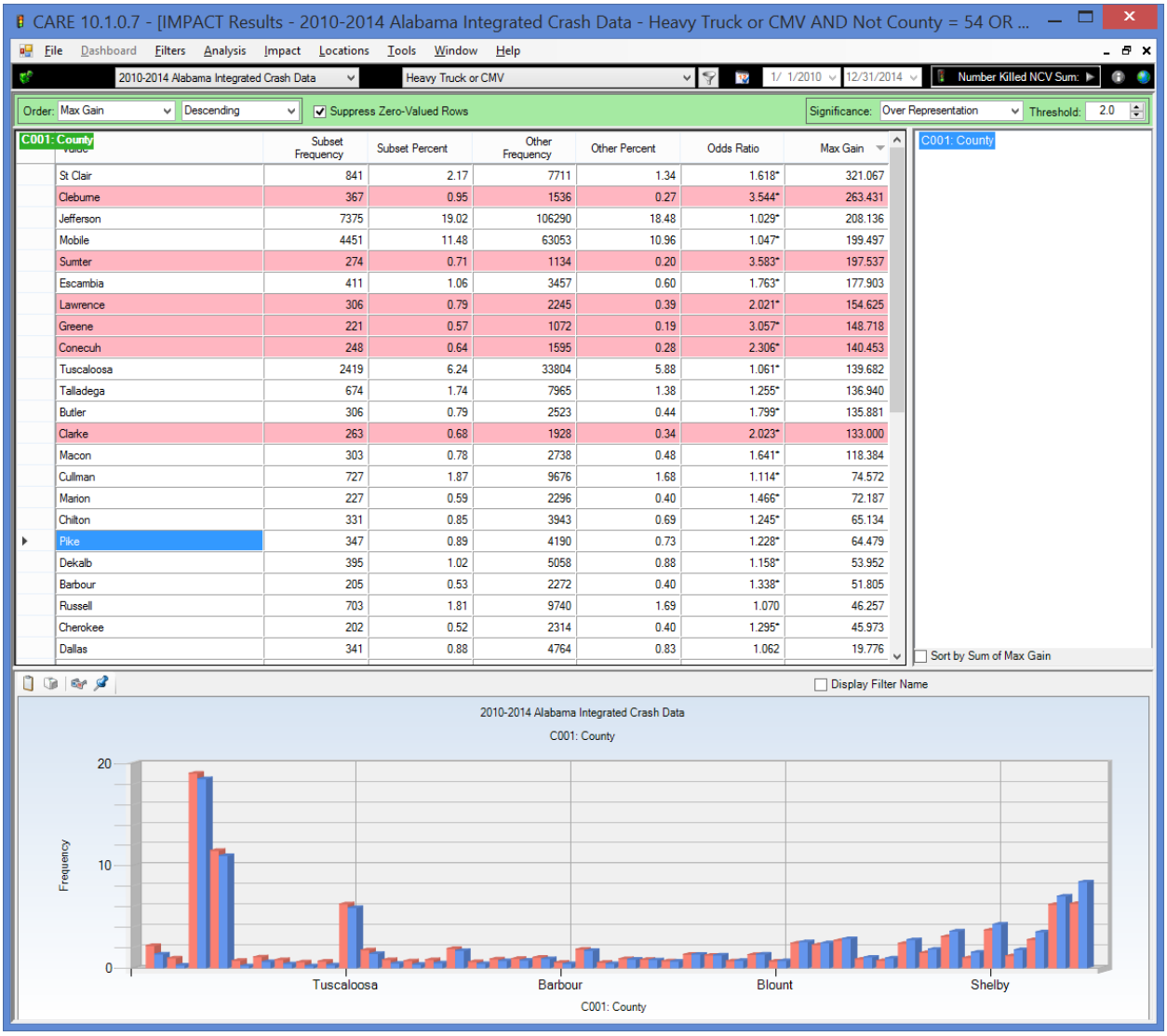
C002: City Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Birmingham	3659	13.53	48821	11.04	1.225*	673.050
Mobile	3243	11.99	46774	10.57	1.134*	382.247
Lincoln	161	0.60	1094	0.25	2.406*	94.090
Opelika	637	2.35	8951	2.02	1.164*	89.546
Calera	210	0.78	1978	0.45	1.736*	89.023
Adamsville	130	0.48	789	0.18	2.694*	81.744
Bessemer	488	1.80	6820	1.54	1.170*	70.881
Phenix City	514	1.90	7454	1.69	1.127*	58.105
Oxford	305	1.13	4043	0.91	1.233*	57.725
Prichard	229	0.85	2802	0.63	1.336*	57.626
Brewton	102	0.38	912	0.21	1.829*	46.221
Greenville	112	0.41	1116	0.25	1.641*	43.744
Thomasville	75	0.28	548	0.12	2.238*	41.484
Heflin	58	0.21	306	0.07	3.099*	39.285
Fairfield	118	0.44	1297	0.29	1.488*	38.674
Creola	49	0.18	225	0.05	3.561*	35.239
Eufaula	131	0.48	1569	0.35	1.365*	35.038
Saraland	163	0.60	2131	0.48	1.251*	32.666
Evergreen	59	0.22	436	0.10	2.213*	32.334
Eutaw	43	0.16	206	0.05	3.413*	30.401
Tarrant City	61	0.23	531	0.12	1.878*	28.523
Brundidge	38	0.14	159	0.04	3.908*	28.275
Loxley	69	0.26	685	0.15	1.647*	27.105
Reform	33	0.12	164	0.04	3.290*	22.970
Priceville	48	0.18	412	0.09	1.905*	22.802
Lanett	80	0.30	948	0.21	1.380*	22.019
Atmore	55	0.20	541	0.12	1.662*	21.912
Gordo	31	0.11	157	0.04	3.228*	21.398
Jackson	51	0.19	487	0.11	1.712*	21.215
Pine Hill	27	0.10	95	0.02	4.647*	21.190

C002 City (With the Lowest Max Gains; Excluding Rural Areas and Cities < 20)



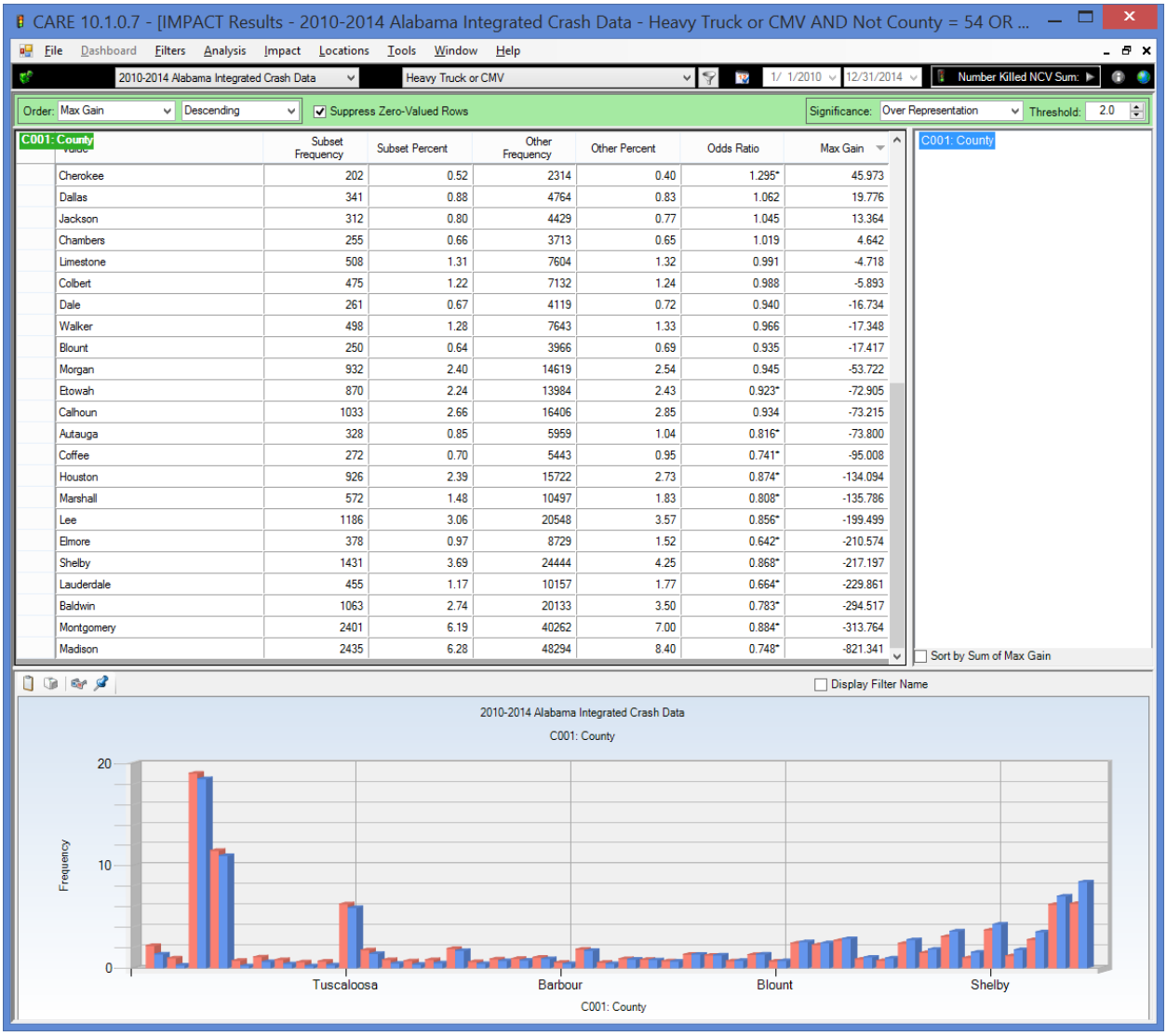
C002: City Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Cullman	199	0.74	3717	0.84	0.875	-28.336
Dothan	767	2.84	13030	2.95	0.962	-29.930
Helena	21	0.08	886	0.20	0.388*	-33.189
Alabaster	212	0.78	4046	0.91	0.857	-35.458
Hueytown	36	0.13	1173	0.27	0.502*	-35.742
Rainbow City	40	0.15	1305	0.30	0.501*	-39.815
Jacksonville	31	0.11	1179	0.27	0.430*	-41.109
Athens	123	0.45	2734	0.62	0.736*	-44.215
Wetumpka	87	0.32	2173	0.49	0.655*	-45.903
Pelham	248	0.92	4870	1.10	0.833*	-49.855
Gadsden	395	1.46	7437	1.68	0.868*	-59.856
Enterprise	176	0.65	3863	0.87	0.745*	-60.266
Millbrook	52	0.19	1877	0.42	0.453*	-62.800
Vestavia Hills	197	0.73	4347	0.98	0.741*	-68.868
Homewood	376	1.39	7297	1.65	0.842*	-70.293
Mountain Brook	92	0.34	2669	0.60	0.564*	-71.239
Daphne	150	0.55	3687	0.83	0.665*	-75.501
Gulf Shores	64	0.24	2478	0.56	0.422*	-87.557
Decatur	450	1.66	8812	1.99	0.835*	-88.952
Trussville	153	0.57	4054	0.92	0.617*	-94.947
Foley	74	0.27	2781	0.63	0.435*	-96.089
Madison	217	0.80	5189	1.17	0.684*	-100.365
Hoover	738	2.73	13760	3.11	0.877*	-103.578
Florence	297	1.10	6570	1.49	0.739*	-104.829
Prattville	177	0.65	4635	1.05	0.624*	-106.482
Anniston	257	0.95	5979	1.35	0.703*	-108.683
Tuscaloosa	1182	4.37	21737	4.91	0.889*	-147.461
Auburn	311	1.15	7505	1.70	0.678*	-148.015
Huntsville	1939	7.17	34955	7.90	0.907*	-198.889
Montgomery	1993	7.37	36723	8.30	0.887*	-253.022

C001 County (With the Highest Max Gains; Excluding counties < 200)



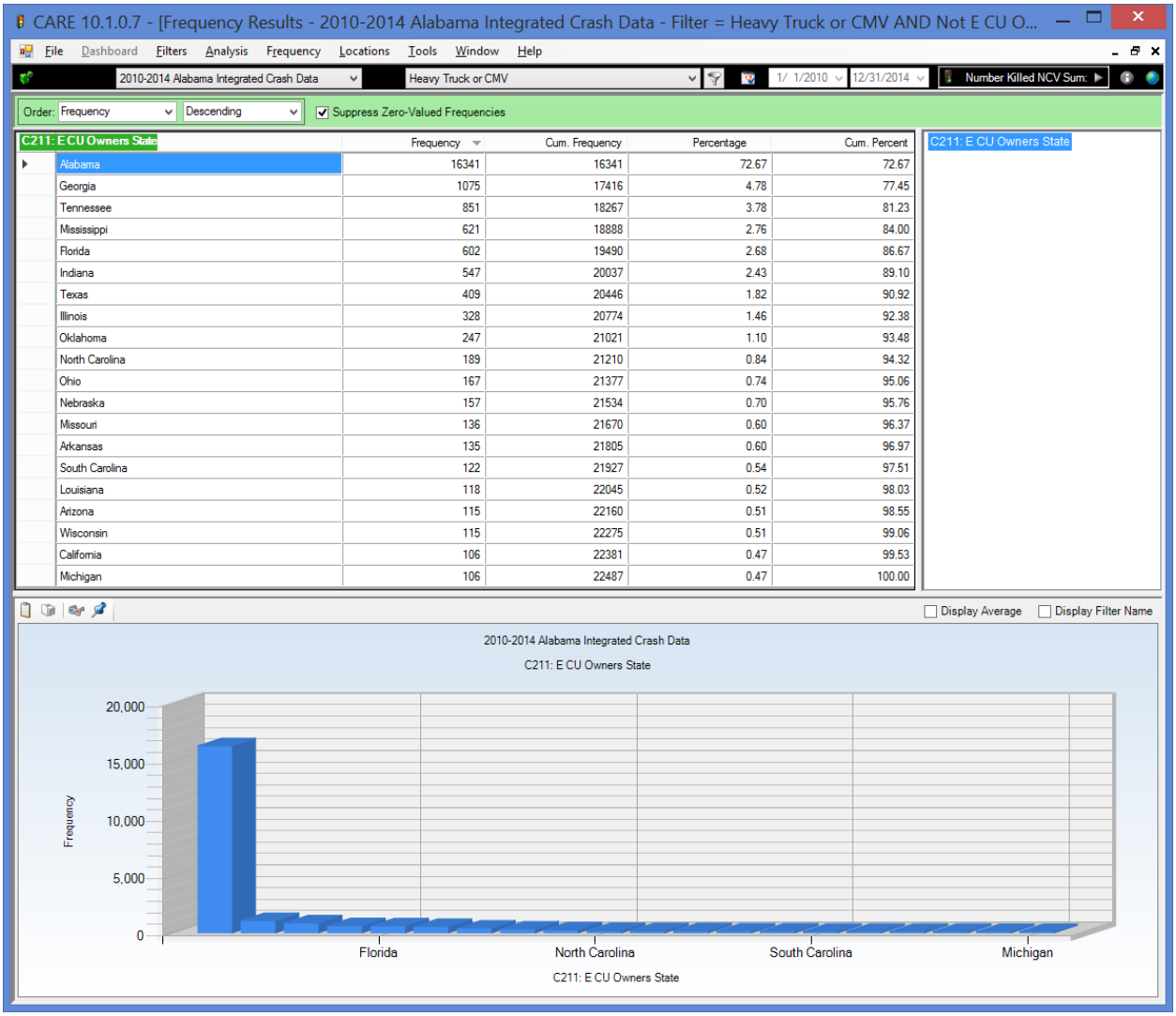
C001: County Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
St Clair	841	2.17	7711	1.34	1.618*	321.067
Clebume	367	0.95	1536	0.27	3.544*	263.431
Jefferson	7375	19.02	106290	18.48	1.029*	208.136
Mobile	4451	11.48	63053	10.96	1.047*	199.497
Sumter	274	0.71	1134	0.20	3.583*	197.537
Escambia	411	1.06	3457	0.60	1.763*	177.903
Lawrence	306	0.79	2245	0.39	2.021*	154.625
Greene	221	0.57	1072	0.19	3.057*	148.718
Conecuh	248	0.64	1595	0.28	2.306*	140.453
Tuscaloosa	2419	6.24	33804	5.88	1.061*	139.682
Talladega	674	1.74	7965	1.38	1.255*	136.940
Butler	306	0.79	2523	0.44	1.799*	135.881
Clarke	263	0.68	1928	0.34	2.023*	133.000
Macon	303	0.78	2738	0.48	1.641*	118.384
Cullman	727	1.87	9676	1.68	1.114*	74.572
Marion	227	0.59	2296	0.40	1.466*	72.187
Chilton	331	0.85	3943	0.69	1.245*	65.134
Pike	347	0.89	4190	0.73	1.228*	64.479
Dekalb	395	1.02	5058	0.88	1.158*	53.952
Barbour	205	0.53	2272	0.40	1.338*	51.805
Russell	703	1.81	9740	1.69	1.070	46.257
Cherokee	202	0.52	2314	0.40	1.295*	45.973
Dallas	341	0.88	4764	0.83	1.062	19.776

C001 County (With the Lowest Max Gains; Excluding counties < 200)



C001: County Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Cherokee	202	0.52	2314	0.40	1.295*	45.973
Dallas	341	0.88	4764	0.83	1.062	19.776
Jackson	312	0.80	4429	0.77	1.045	13.364
Chambers	255	0.66	3713	0.65	1.019	4.642
Limestone	508	1.31	7604	1.32	0.991	-4.718
Colbert	475	1.22	7132	1.24	0.988	-5.893
Dale	261	0.67	4119	0.72	0.940	-16.734
Walker	498	1.28	7643	1.33	0.966	-17.348
Blount	250	0.64	3966	0.69	0.935	-17.417
Morgan	932	2.40	14619	2.54	0.945	-53.722
Etowah	870	2.24	13984	2.43	0.923*	-72.905
Calhoun	1033	2.66	16406	2.85	0.934	-73.215
Autauga	328	0.85	5959	1.04	0.816*	-73.800
Coffee	272	0.70	5443	0.95	0.741*	-95.008
Houston	926	2.39	15722	2.73	0.874*	-134.094
Marshall	572	1.48	10497	1.83	0.808*	-135.786
Lee	1186	3.06	20548	3.57	0.856*	-199.499
Elmore	378	0.97	8729	1.52	0.642*	-210.574
Shelby	1431	3.69	24444	4.25	0.868*	-217.197
Lauderdale	455	1.17	10157	1.77	0.664*	-229.861
Baldwin	1063	2.74	20133	3.50	0.783*	-294.517
Montgomery	2401	6.19	40262	7.00	0.884*	-313.764
Madison	2435	6.28	48294	8.40	0.748*	-821.341

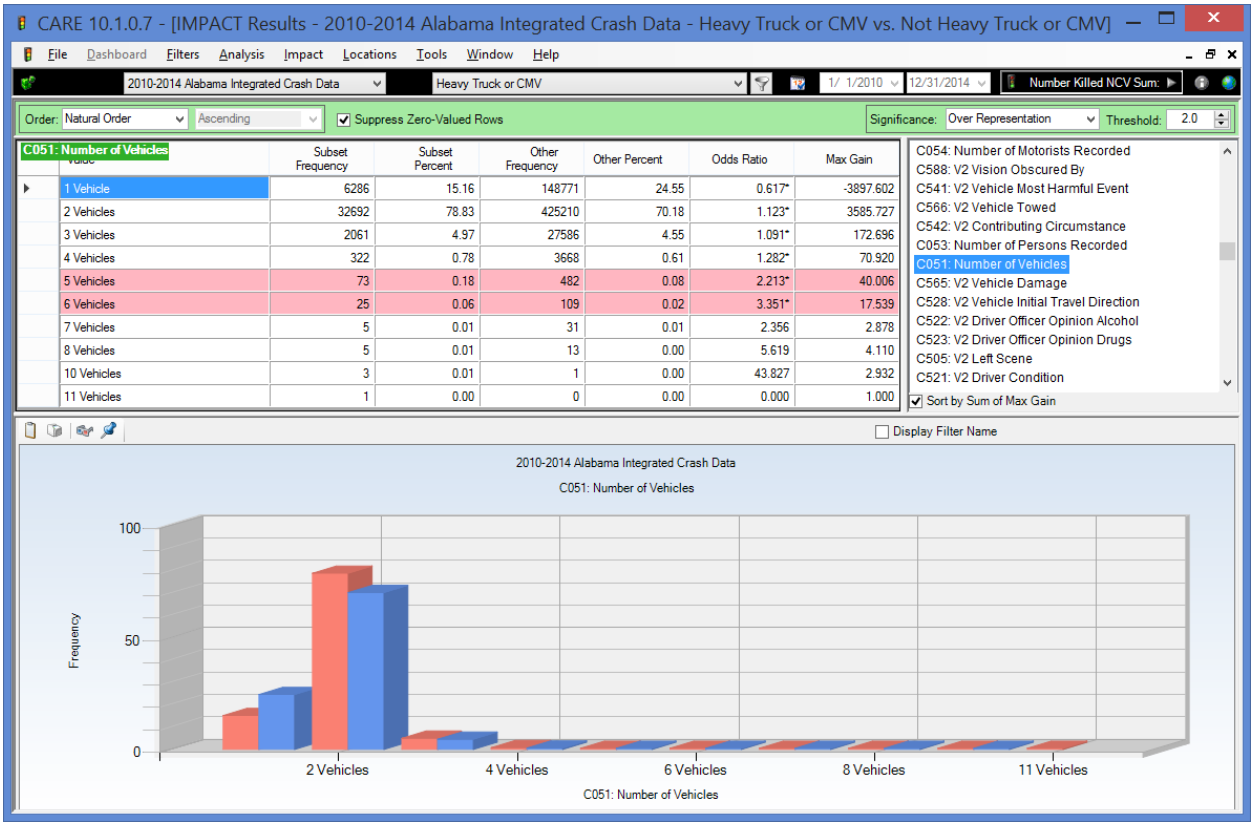
C211 E CU Owners State



C211: E CU Owners State	Frequency	Cum. Frequency	Percentage	Cum. Percent
Alabama	16341	16341	72.67	72.67
Georgia	1075	17416	4.78	77.45
Tennessee	851	18267	3.78	81.23
Mississippi	621	18888	2.76	84.00
Florida	602	19490	2.68	86.67
Indiana	547	20037	2.43	89.10
Texas	409	20446	1.82	90.92
Illinois	328	20774	1.46	92.38
Oklahoma	247	21021	1.10	93.48
North Carolina	189	21210	0.84	94.32
Ohio	167	21377	0.74	95.06
Nebraska	157	21534	0.70	95.76
Missouri	136	21670	0.60	96.37
Arkansas	135	21805	0.60	96.97
South Carolina	122	21927	0.54	97.51
Louisiana	118	22045	0.52	98.03
Arizona	115	22160	0.51	98.55
Wisconsin	115	22275	0.51	99.06
California	106	22381	0.47	99.53
Michigan	106	22487	0.47	100.00

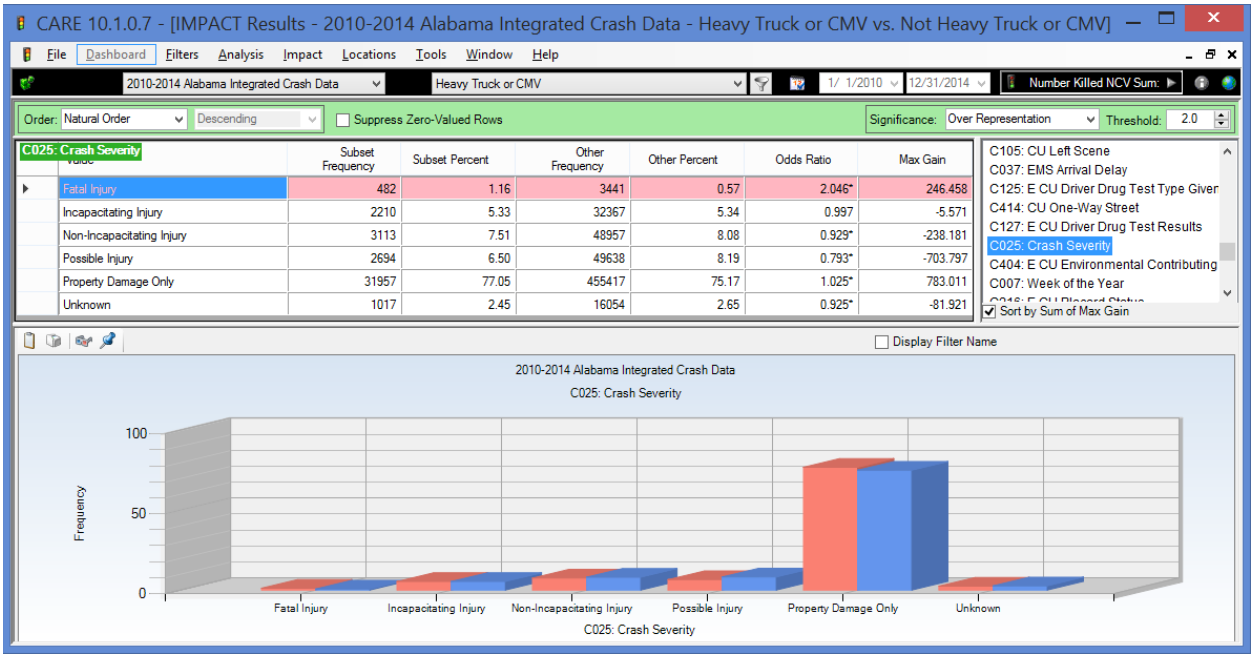
Severity Factors

C051 Number of Vehicles

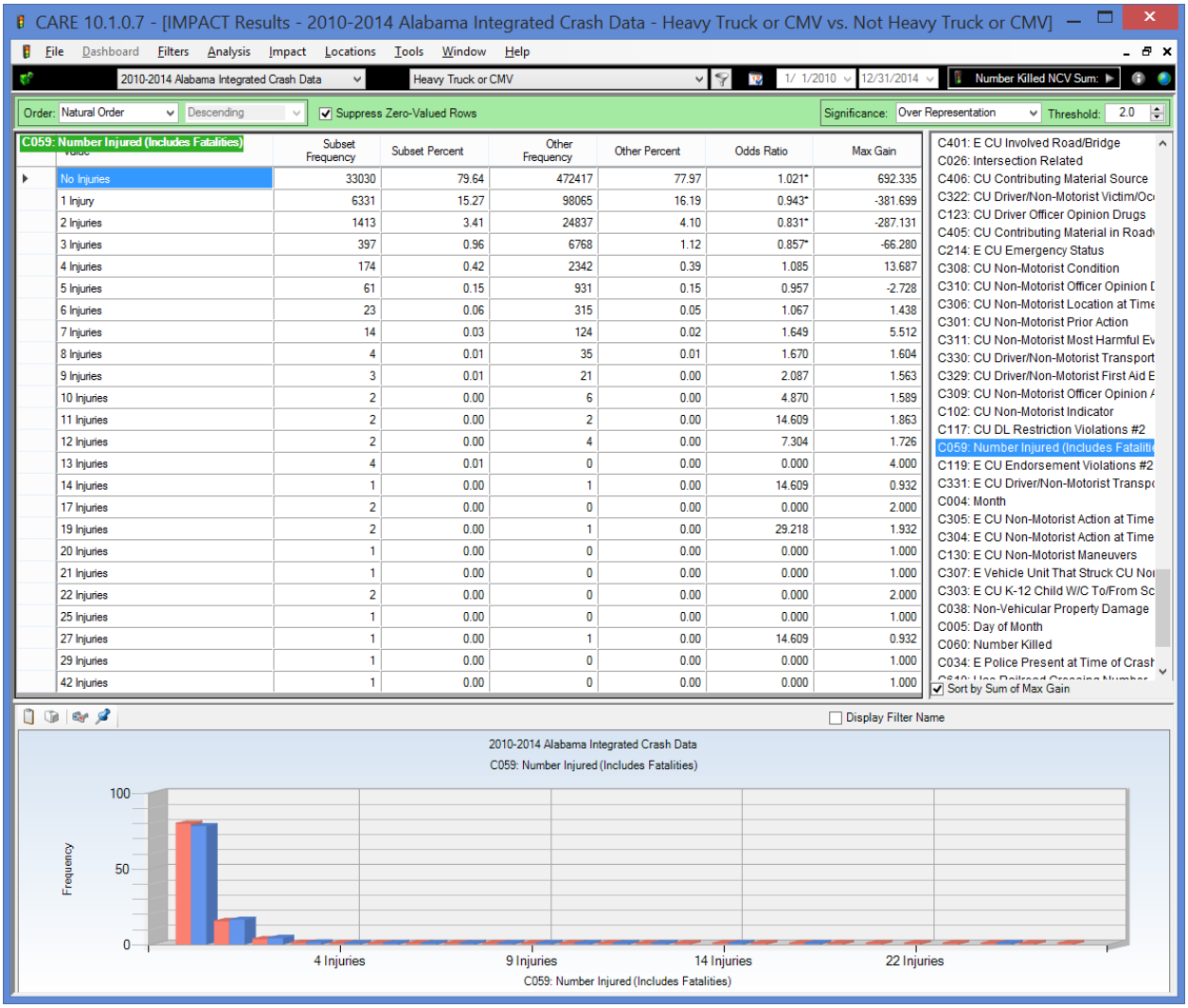


C051: Number of Vehicles	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
1 Vehicle	6286	15.16	148771	24.55	0.617*	-3897.602
2 Vehicles	32692	78.83	425210	70.18	1.123*	3585.727
3 Vehicles	2061	4.97	27586	4.55	1.091*	172.696
4 Vehicles	322	0.78	3668	0.61	1.282*	70.920
5 Vehicles	73	0.18	482	0.08	2.213*	40.006
6 Vehicles	25	0.06	109	0.02	3.351*	17.539
7 Vehicles	5	0.01	31	0.01	2.356	2.878
8 Vehicles	5	0.01	13	0.00	5.619	4.110
10 Vehicles	3	0.01	1	0.00	43.827	2.932
11 Vehicles	1	0.00	0	0.00	0.000	1.000

C026 Crash Severity

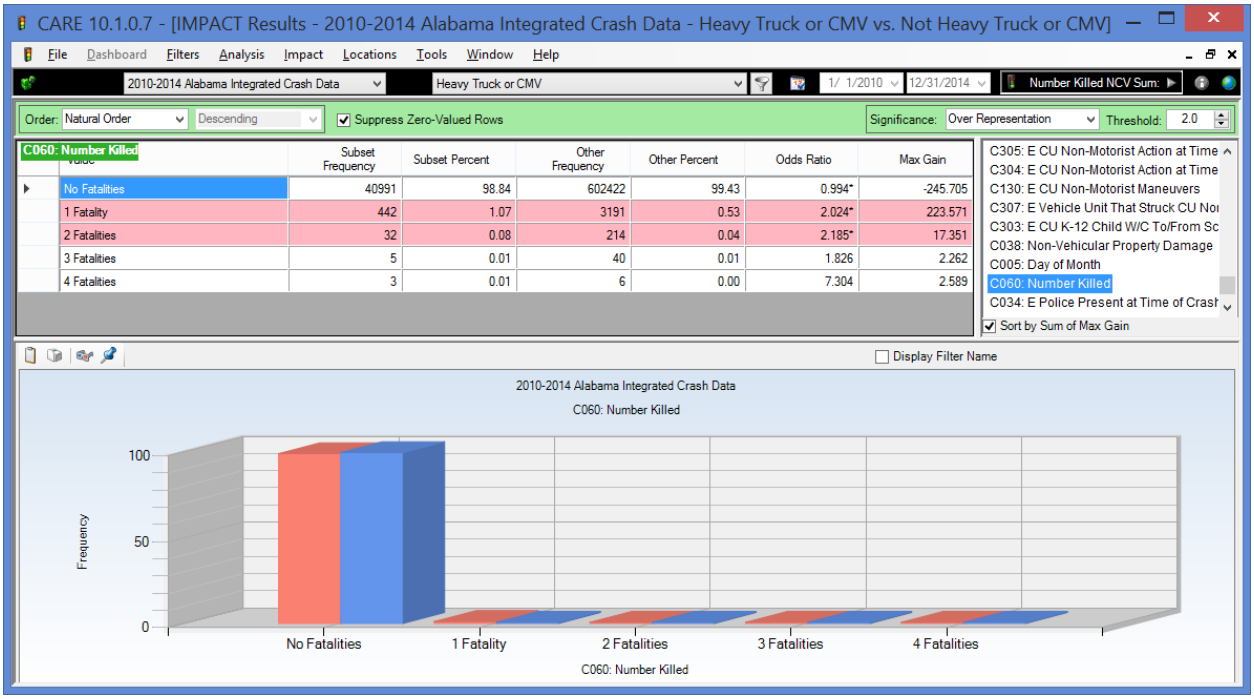


C059 Number Injured (Includes Fatalities)

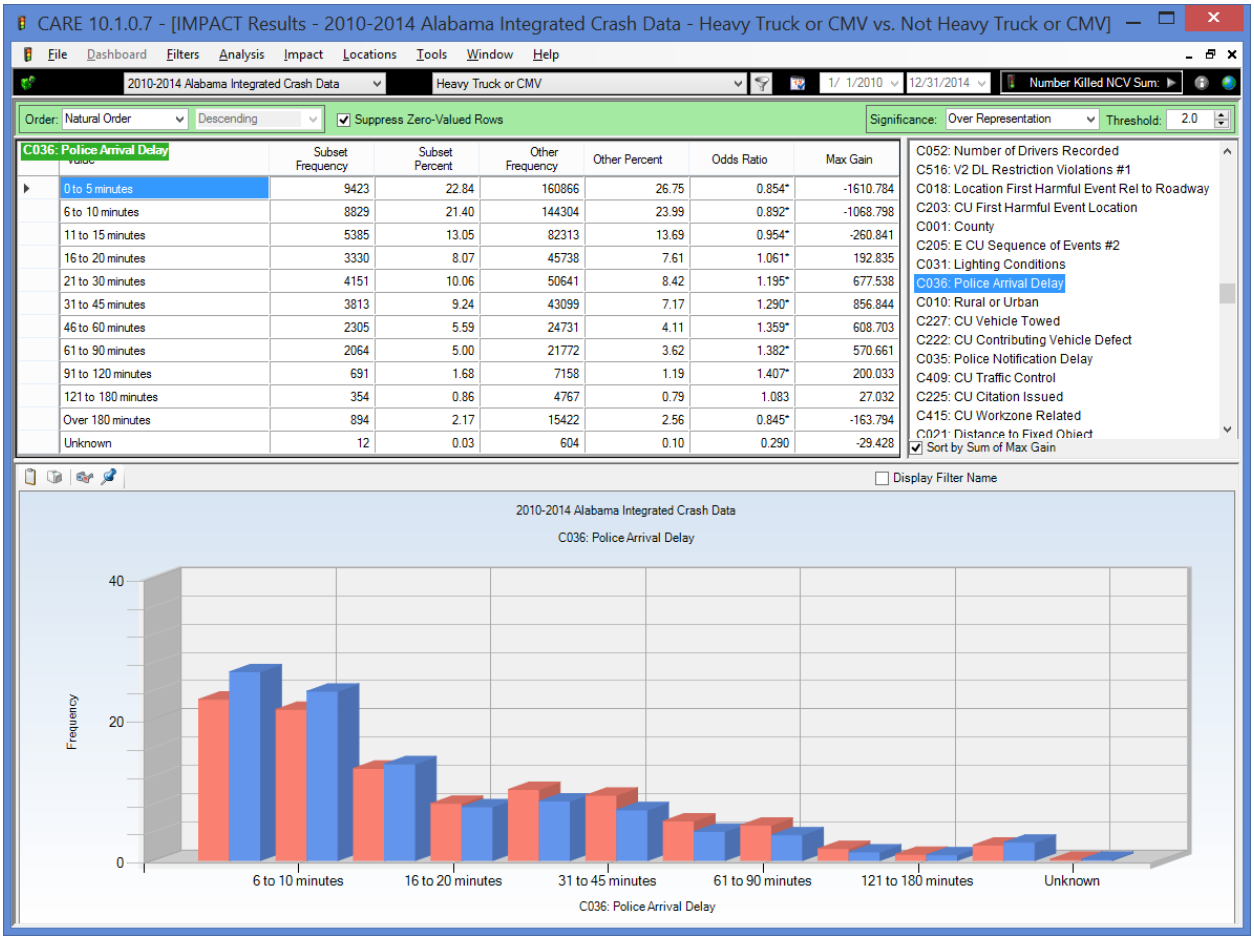


C059: Number Injured (Includes Fatalities)	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
No Injuries	33030	79.64	472417	77.97	1.021*	692.335
1 Injury	6331	15.27	98065	16.19	0.943*	-381.699
2 Injuries	1413	3.41	24837	4.10	0.831*	-287.131
3 Injuries	397	0.96	6768	1.12	0.857*	-66.280
4 Injuries	174	0.42	2342	0.39	1.085	13.687
5 Injuries	61	0.15	931	0.15	0.957	-2.728
6 Injuries	23	0.06	315	0.05	1.067	1.438
7 Injuries	14	0.03	124	0.02	1.649	5.512
8 Injuries	4	0.01	35	0.01	1.670	1.604
9 Injuries	3	0.01	21	0.00	2.087	1.563
10 Injuries	2	0.00	6	0.00	4.870	1.589
11 Injuries	2	0.00	2	0.00	14.609	1.863
12 Injuries	2	0.00	4	0.00	7.304	1.726
13 Injuries	4	0.01	0	0.00	0.000	4.000
14 Injuries	1	0.00	1	0.00	14.609	0.932
17 Injuries	2	0.00	0	0.00	0.000	2.000
19 Injuries	2	0.00	1	0.00	29.218	1.932
20 Injuries	1	0.00	0	0.00	0.000	1.000
21 Injuries	1	0.00	0	0.00	0.000	1.000
22 Injuries	2	0.00	0	0.00	0.000	2.000
25 Injuries	1	0.00	0	0.00	0.000	1.000
27 Injuries	1	0.00	1	0.00	14.609	0.932
29 Injuries	1	0.00	0	0.00	0.000	1.000
42 Injuries	1	0.00	0	0.00	0.000	1.000

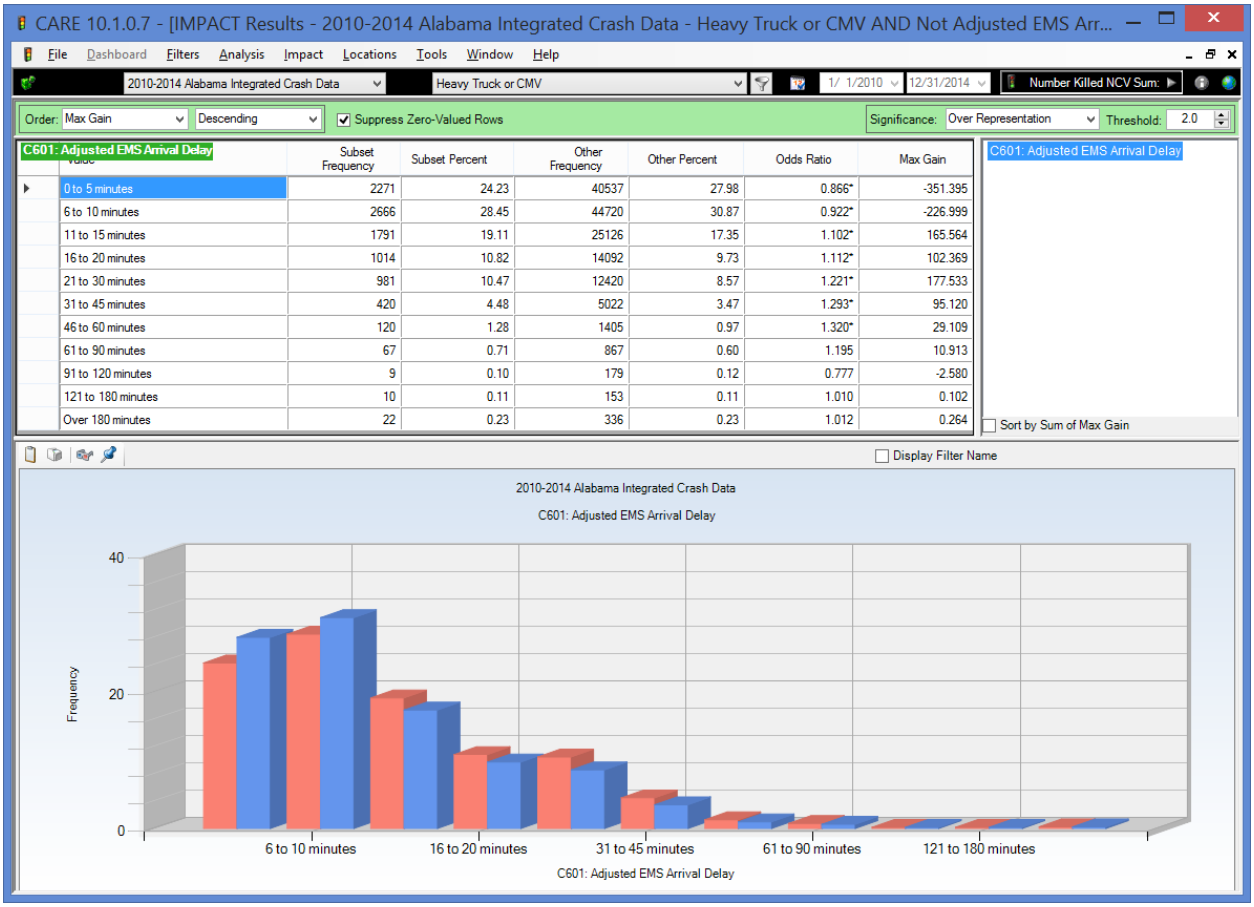
C060 Number Killed



C036 Police Arrival Delay

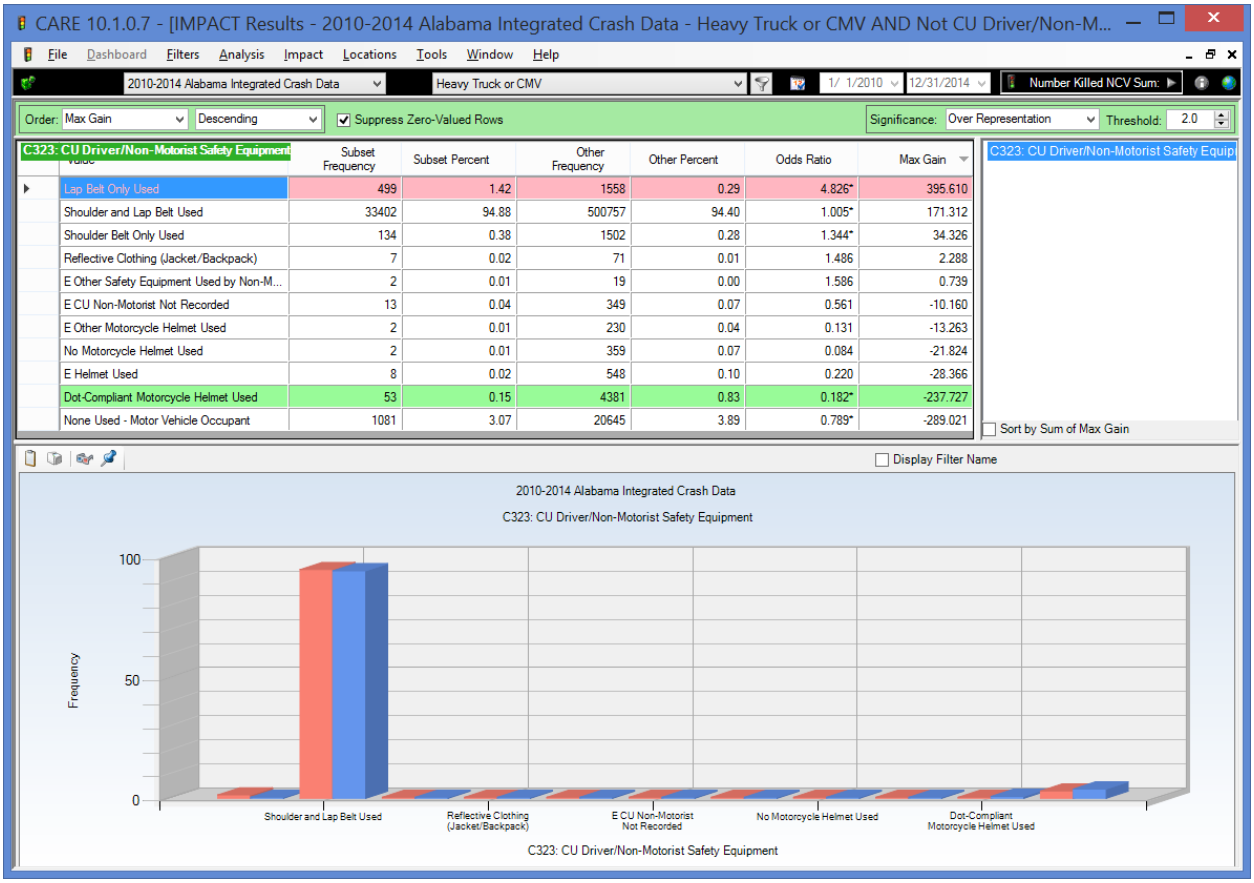


C601 Adjusted EMS Arrival Delay



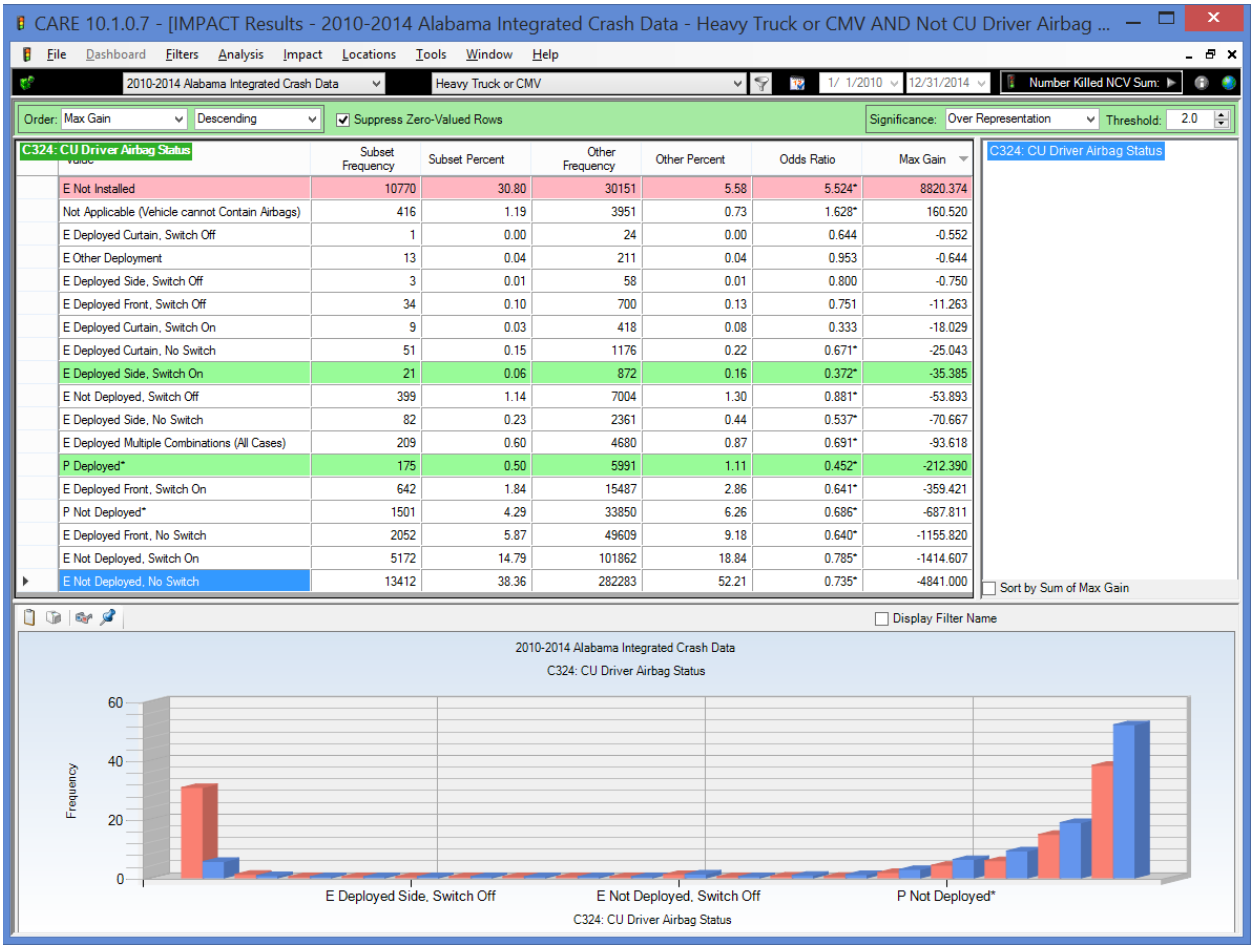
C601: Adjusted EMS Arrival Delay	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
0 to 5 minutes	2271	24.23	40537	27.98	0.866*	-351.395
6 to 10 minutes	2666	28.45	44720	30.87	0.922*	-226.999
11 to 15 minutes	1791	19.11	25126	17.35	1.102*	165.564
16 to 20 minutes	1014	10.82	14092	9.73	1.112*	102.369
21 to 30 minutes	981	10.47	12420	8.57	1.221*	177.533
31 to 45 minutes	420	4.48	5022	3.47	1.293*	95.120
46 to 60 minutes	120	1.28	1405	0.97	1.320*	29.109
61 to 90 minutes	67	0.71	867	0.60	1.195	10.913
91 to 120 minutes	9	0.10	179	0.12	0.777	-2.580
121 to 180 minutes	10	0.11	153	0.11	1.010	0.102
Over 180 minutes	22	0.23	336	0.23	1.012	0.264

C323 CU Driver Safety Equipment



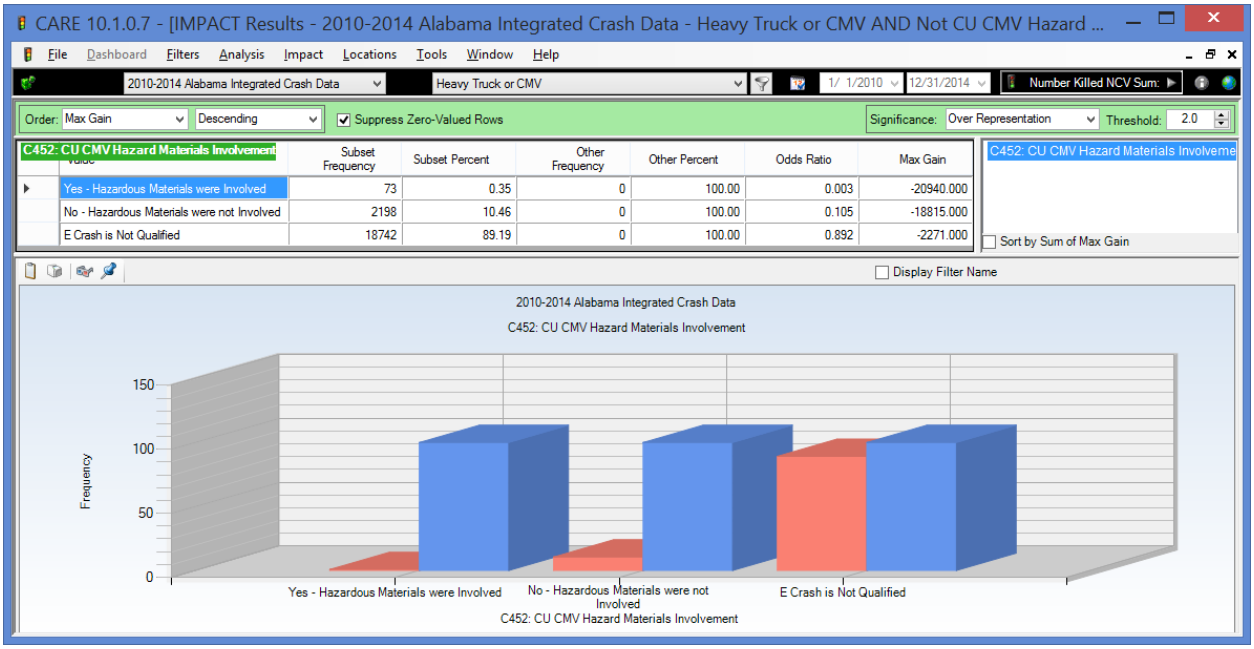
C323: CU Driver/Non-Motorist Safety Equipment	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Lap Belt Only Used	499	1.42	1558	0.29	4.826*	395.610
Shoulder and Lap Belt Used	33402	94.88	500757	94.40	1.005*	171.312
Shoulder Belt Only Used	134	0.38	1502	0.28	1.344*	34.326
Reflective Clothing (Jacket/Backpack)	7	0.02	71	0.01	1.486	2.288
E Other Safety Equipment Used by Non-M...	2	0.01	19	0.00	1.586	0.739
E CU Non-Motorist Not Recorded	13	0.04	349	0.07	0.561	-10.160
E Other Motorcycle Helmet Used	2	0.01	230	0.04	0.131	-13.263
No Motorcycle Helmet Used	2	0.01	359	0.07	0.084	-21.824
E Helmet Used	8	0.02	548	0.10	0.220	-28.366
Dot-Compliant Motorcycle Helmet Used	53	0.15	4381	0.83	0.182*	-237.727
None Used - Motor Vehicle Occupant	1081	3.07	20645	3.89	0.789*	-289.021

C324 CU Driver Airbag Status

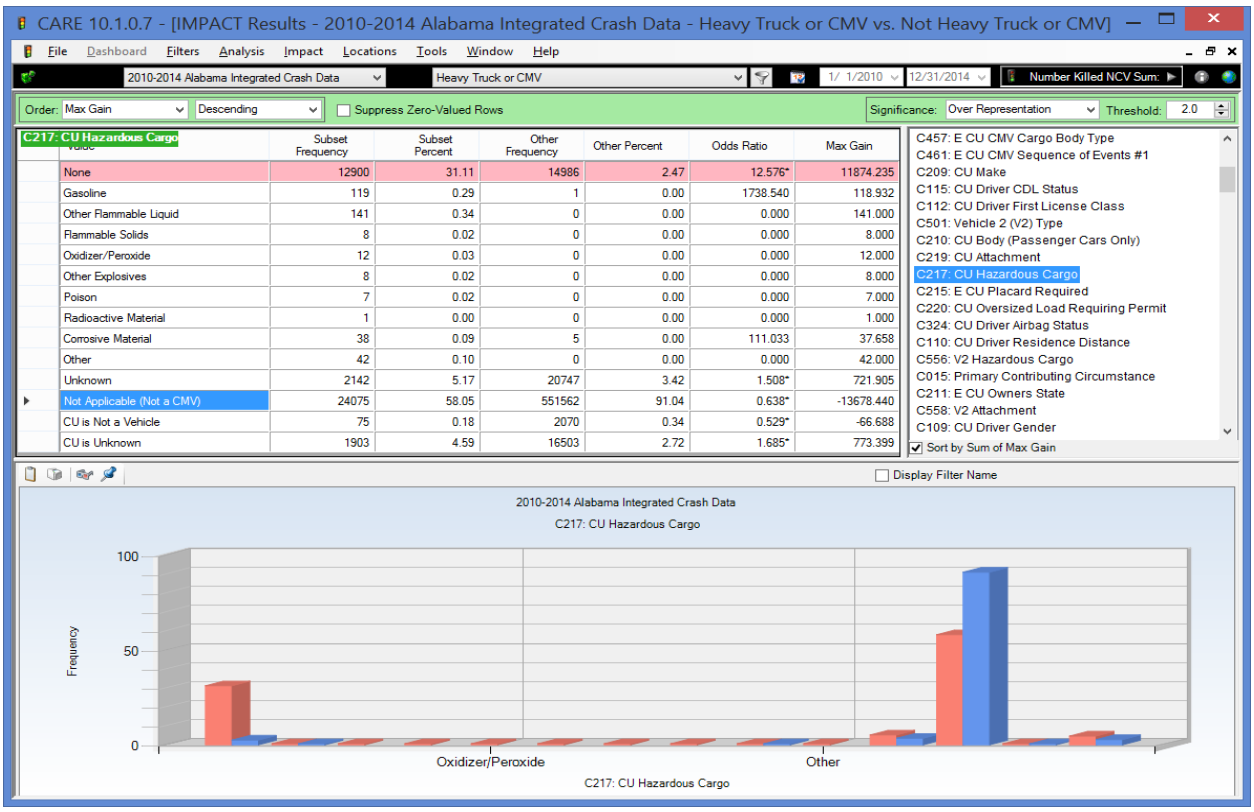


C324: CU Driver Airbag Status	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Not Installed	10770	30.80	30151	5.58	5.524*	8820.374
Not Applicable (Vehicle cannot Contain Airbags)	416	1.19	3951	0.73	1.628*	160.520
E Deployed Curtain, Switch Off	1	0.00	24	0.00	0.644	-0.552
E Other Deployment	13	0.04	211	0.04	0.953	-0.644
E Deployed Side, Switch Off	3	0.01	58	0.01	0.800	-0.750
E Deployed Front, Switch Off	34	0.10	700	0.13	0.751	-11.263
E Deployed Curtain, Switch On	9	0.03	418	0.08	0.333	-18.029
E Deployed Curtain, No Switch	51	0.15	1176	0.22	0.671*	-25.043
E Deployed Side, Switch On	21	0.06	872	0.16	0.372*	-35.385
E Not Deployed, Switch Off	399	1.14	7004	1.30	0.881*	-53.893
E Deployed Side, No Switch	82	0.23	2361	0.44	0.537*	-70.667
E Deployed Multiple Combinations (All Cases)	209	0.60	4680	0.87	0.691*	-93.618
P Deployed*	175	0.50	5991	1.11	0.452*	-212.390
E Deployed Front, Switch On	642	1.84	15487	2.86	0.641*	-359.421
P Not Deployed*	1501	4.29	33850	6.26	0.686*	-687.811
E Deployed Front, No Switch	2052	5.87	49609	9.18	0.640*	-1155.820
E Not Deployed, Switch On	5172	14.79	101862	18.84	0.785*	-1414.607
E Not Deployed, No Switch	13412	38.36	282283	52.21	0.735*	-4841.000

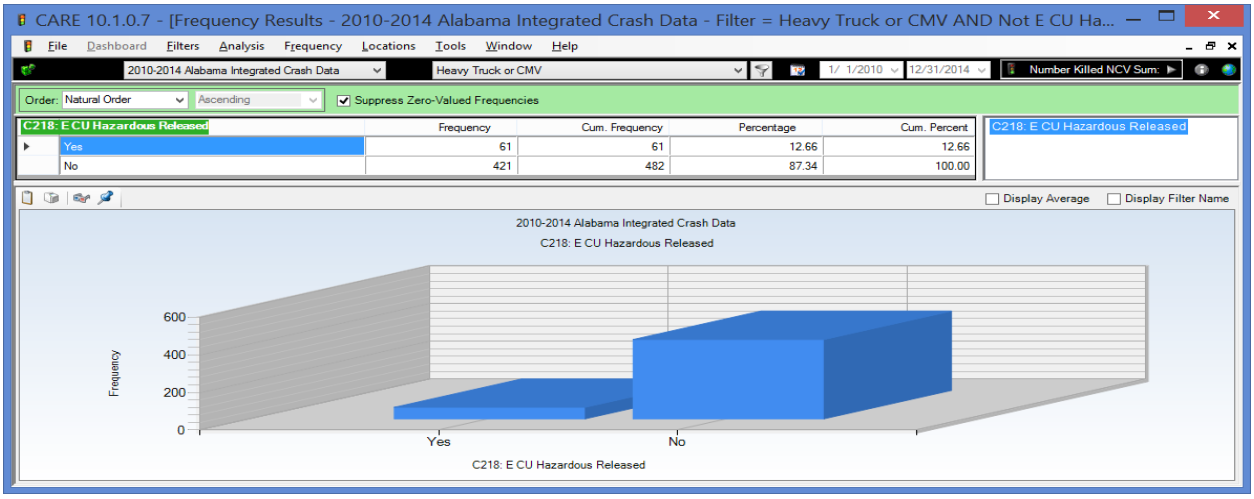
C452 CU CMV Hazardous Materials Involved



C217 CU Hazardous Cargo Type



Unpruned.



C453 by C218 Cross-tabulation

CARE 10.1.0.7 - [Crosstab Results - 2010-2014 Alabama Integrated Crash Data - Filter = Heavy Truck or C...

File Dashboard Filters Analysis Crosstab Locations Tools Window Help

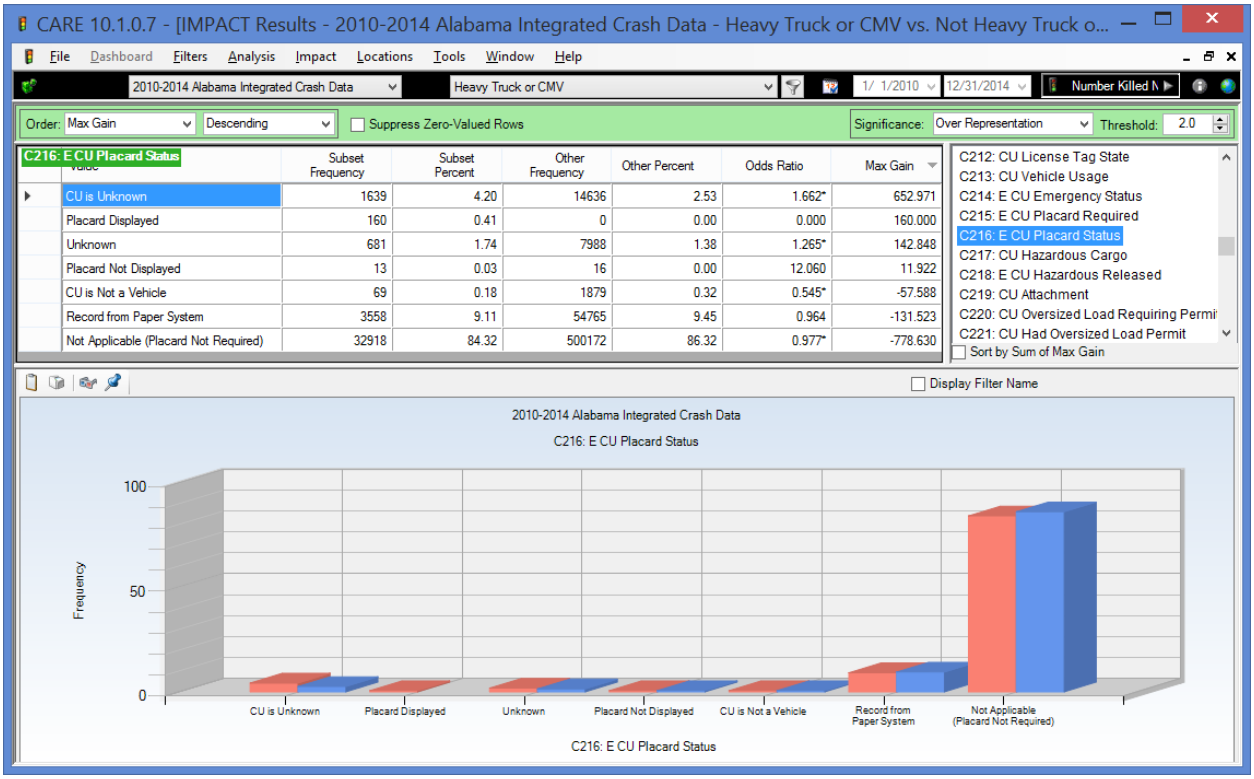
2010-2014 Alabama Integrated Crash Data | Heavy Truck or CMV | 1/ 1/2010 | 12/31/2014

Suppress Zero Values: CMV Ha | Select Cells: | Column: E CU CMV Hazard Materials Released ; Row: E CU Hazardous Released

	Yes - HazMat Released	No - No Hazardous Materi	CU is Not a CMV	CU is Unknown	Crash is Not Qualified	Record from Paper System	TOTAL
Yes	19 54.29%	2 0.17%	2 0.01%	0 0.00%	38 0.20%	0 0.00%	61 0.15%
No	0 0.00%	20 1.67%	4 0.03%	0 0.00%	392 2.09%	0 0.00%	416 1.01%
Unknown	0 0.00%	16 1.33%	565 3.55%	0 0.00%	1278 6.82%	0 0.00%	1859 4.52%
Not Applicable/No Hazardous Cargo	**16** **45.71%**	1162 96.83%	15290 95.98%	0 0.00%	17034 90.89%	0 0.00%	33502 81.51%
CU is Not a Vehicle	0 0.00%	0 0.00%	69 0.43%	0 0.00%	0 0.00%	0 0.00%	69 0.17%
CU is Unknown	0 0.00%	0 0.00%	0 0.00%	1639 100.00%	0 0.00%	0 0.00%	1639 3.99%
Record from Paper System	0 0.00%	0 0.00%	0 0.00%	0 0.00%	0 0.00%	3558 100.00%	3558 8.66%
TOTAL	35 0.09%	1200 2.92%	15930 38.76%	1639 3.99%	18742 45.60%	3558 8.66%	**41104** **100.00%**

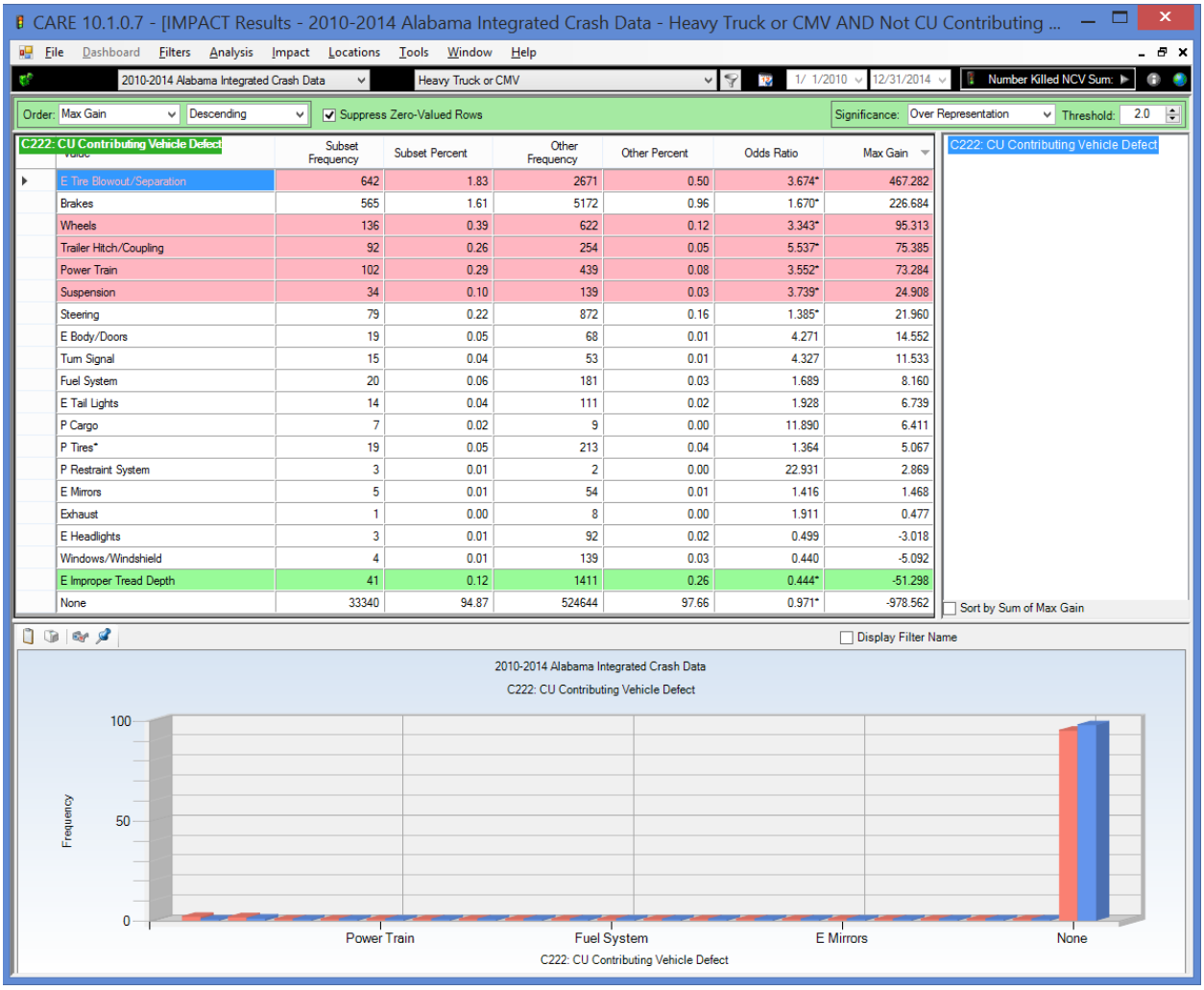
While the inconsistency between C453 and C218 is resolved by the "Crash is Not Qualified" category, the fact that twice as many hazardous materials released fall into the "Crash is Not Qualified" as fall into the qualified classification is quite troubling in that there is no record of the type of hazardous materials in these 38 crashes. This needs to be investigated and resolved. In fact, as mentioned above, most of the 450 variables could not be of any use because of the large number that we "not qualified" to have their data collected.

C216 E CU Placard Status



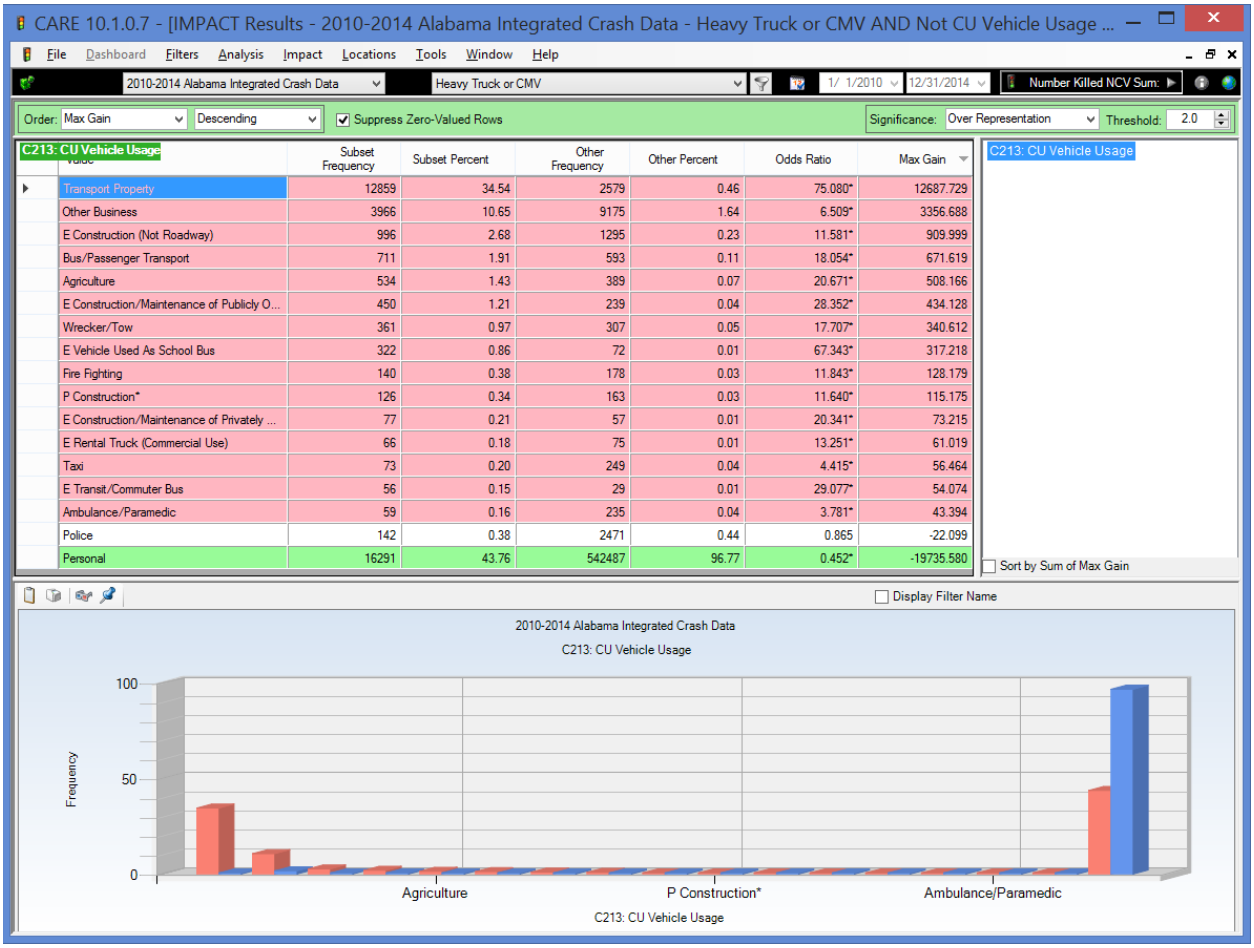
Vehicle Factors

C222 CU Contributing Vehicle Defect



C222: CU Contributing Vehicle Defect Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Tire Blowout/Separation	642	1.83	2671	0.50	3.674*	467.282
Brakes	565	1.61	5172	0.96	1.670*	226.684
Wheels	136	0.39	622	0.12	3.343*	95.313
Trailer Hitch/Coupling	92	0.26	254	0.05	5.537*	75.385
Power Train	102	0.29	439	0.08	3.552*	73.284
Suspension	34	0.10	139	0.03	3.739*	24.908
Steering	79	0.22	872	0.16	1.385*	21.960
E Body/Doors	19	0.05	68	0.01	4.271	14.552
Turn Signal	15	0.04	53	0.01	4.327	11.533
Fuel System	20	0.06	181	0.03	1.689	8.160
E Tail Lights	14	0.04	111	0.02	1.928	6.739
P Cargo	7	0.02	9	0.00	11.890	6.411
P Tires*	19	0.05	213	0.04	1.364	5.067
P Restraint System	3	0.01	2	0.00	22.931	2.869
E Mirrors	5	0.01	54	0.01	1.416	1.468
Exhaust	1	0.00	8	0.00	1.911	0.477
E Headlights	3	0.01	92	0.02	0.499	-3.018
Windows/Windshield	4	0.01	139	0.03	0.440	-5.092
E Improper Tread Depth	41	0.12	1411	0.26	0.444*	-51.298
None	33340	94.87	524644	97.66	0.971*	-978.562

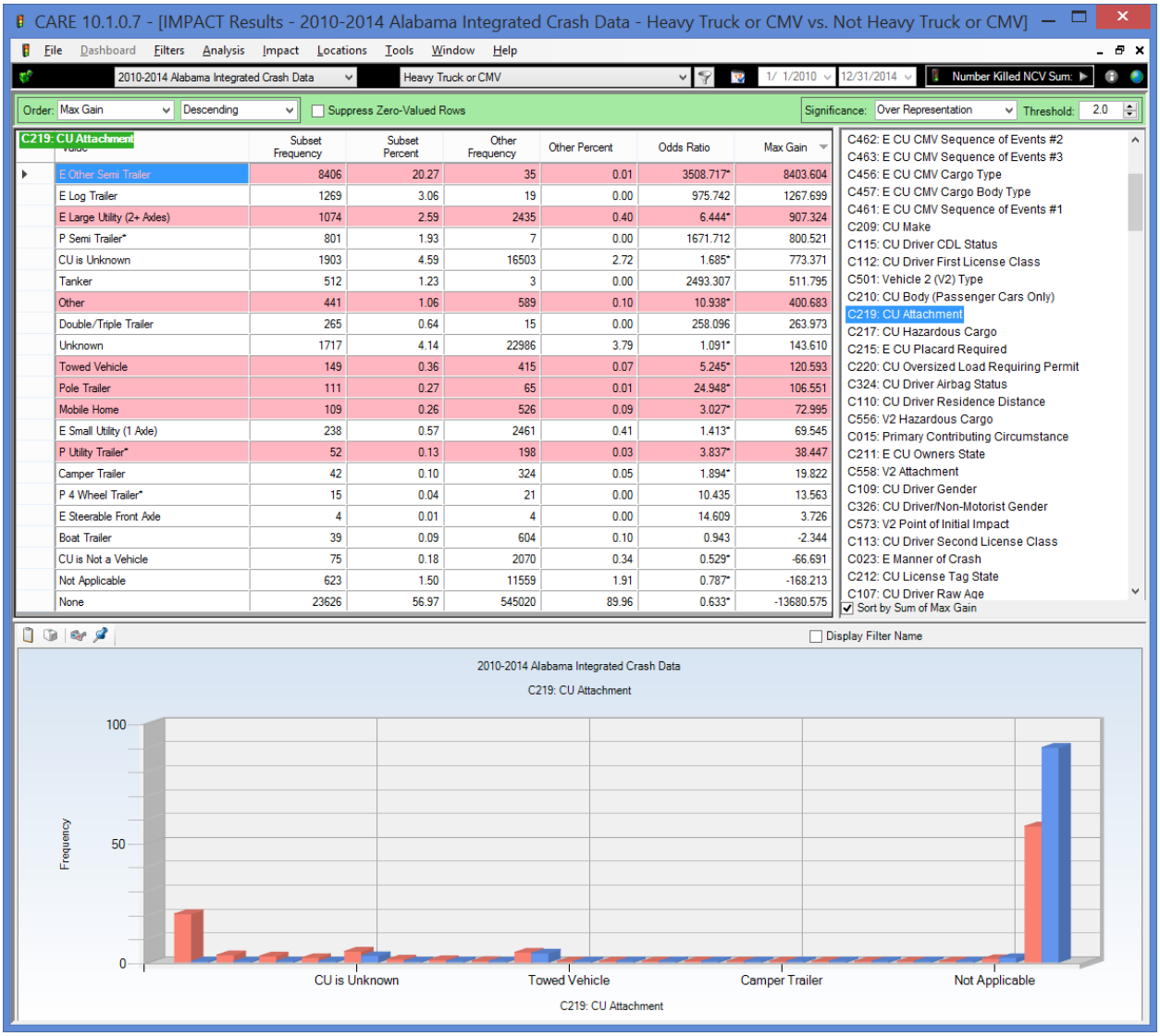
C213 CU Vehicle Usage



C213: CU Vehicle Usage	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Transport Property	12859	34.54	2579	0.46	75.080*	12687.729
Other Business	3966	10.65	9175	1.64	6.509*	3356.688
E Construction (Not Roadway)	996	2.68	1295	0.23	11.581*	909.999
Bus/Passenger Transport	711	1.91	593	0.11	18.054*	671.619
Agriculture	534	1.43	389	0.07	20.671*	508.166
E Construction/Maintenance of Publicly O...	450	1.21	239	0.04	28.352*	434.128
Wrecker/Tow	361	0.97	307	0.05	17.707*	340.612
E Vehicle Used As School Bus	322	0.86	72	0.01	67.343*	317.218
Fire Fighting	140	0.38	178	0.03	11.843*	128.179
P Construction*	126	0.34	163	0.03	11.640*	115.175
E Construction/Maintenance of Privately ...	77	0.21	57	0.01	20.341*	73.215
E Rental Truck (Commercial Use)	66	0.18	75	0.01	13.251*	61.019
Taxi	73	0.20	249	0.04	4.415*	56.464
E Transit/Commuter Bus	56	0.15	29	0.01	29.077*	54.074
Ambulance/Paramedic	59	0.16	235	0.04	3.781*	43.394
Police	142	0.38	2471	0.44	0.865	-22.099
Personal	16291	43.76	542487	96.77	0.452*	-19735.580

Excluded all types for which there were 50 or less crashes.

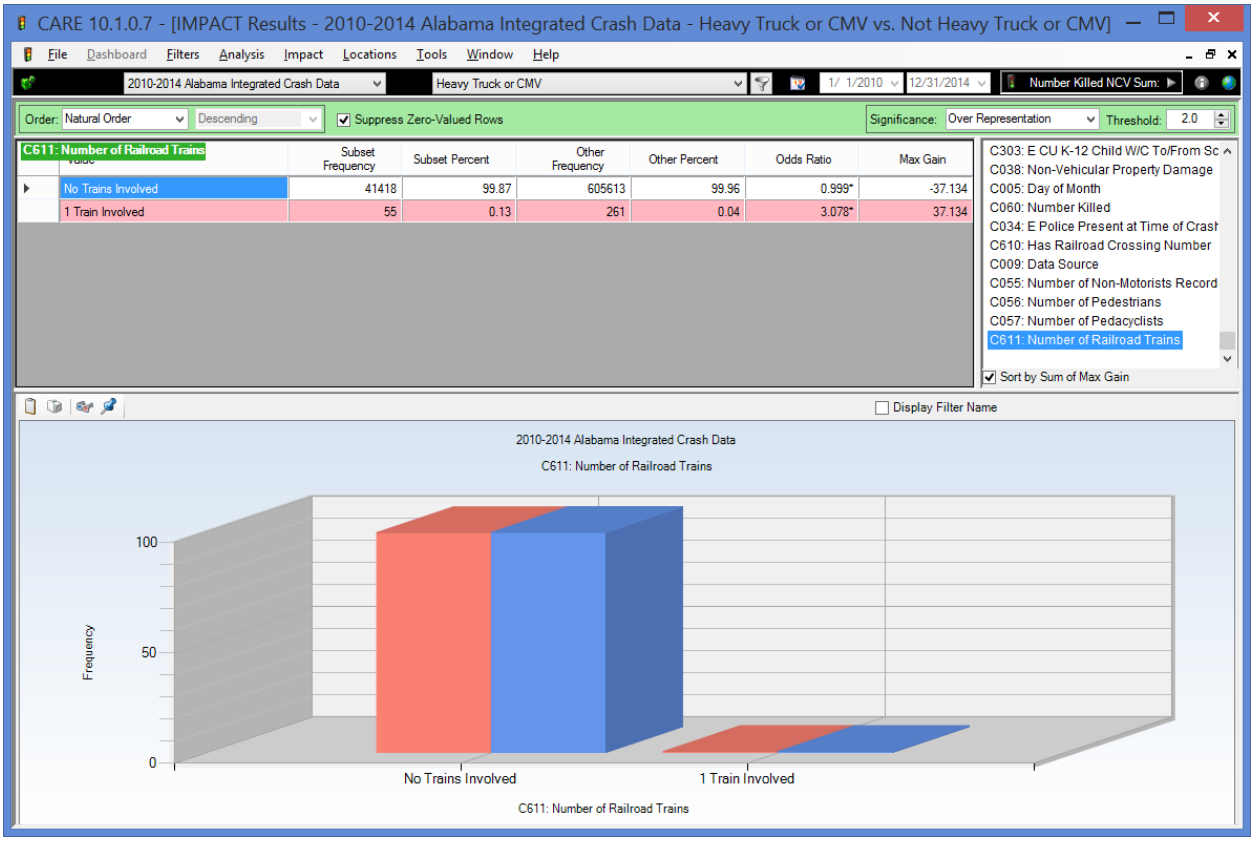
C219 CU Attachment



C219: CU Attachment Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Other Semi Trailer	8406	20.27	35	0.01	3508.717*	8403.604
E Log Trailer	1269	3.06	19	0.00	975.742	1267.699
E Large Utility (2+ Axles)	1074	2.59	2435	0.40	6.444*	907.324
P Semi Trailer*	801	1.93	7	0.00	1671.712	800.521
CU is Unknown	1903	4.59	16503	2.72	1.685*	773.371
Tanker	512	1.23	3	0.00	2493.307	511.795
Other	441	1.06	589	0.10	10.938*	400.683
Double/Triple Trailer	265	0.64	15	0.00	258.096	263.973
Unknown	1717	4.14	22986	3.79	1.091*	143.610
Towed Vehicle	149	0.36	415	0.07	5.245*	120.593
Pole Trailer	111	0.27	65	0.01	24.948*	106.551
Mobile Home	109	0.26	526	0.09	3.027*	72.995
E Small Utility (1 Axle)	238	0.57	2461	0.41	1.413*	69.545
P Utility Trailer*	52	0.13	198	0.03	3.837*	38.447
Camper Trailer	42	0.10	324	0.05	1.894*	19.822
P 4 Wheel Trailer*	15	0.04	21	0.00	10.435	13.563
E Steerable Front Axle	4	0.01	4	0.00	14.609	3.726
Boat Trailer	39	0.09	604	0.10	0.943	-2.344
CU is Not a Vehicle	75	0.18	2070	0.34	0.529*	-66.691
Not Applicable	623	1.50	11559	1.91	0.787*	-168.213
None	23626	56.97	545020	89.96	0.633*	-13680.575

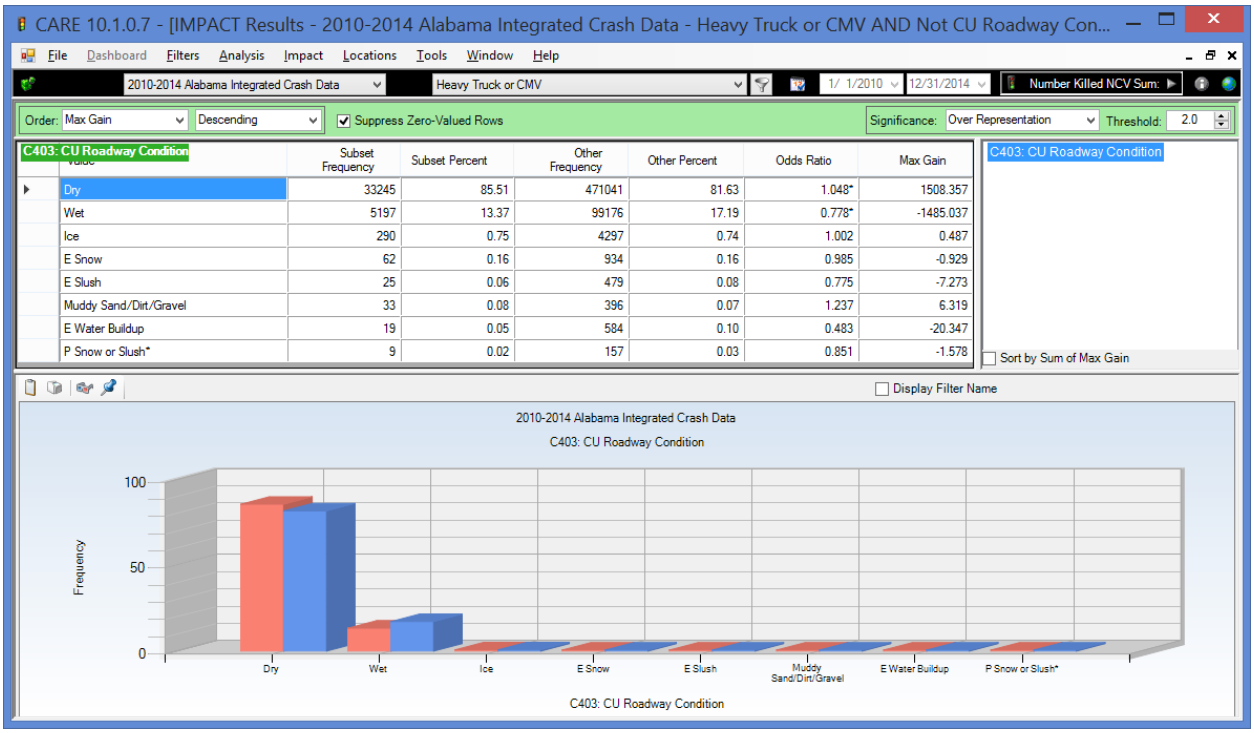
C462: E CU CMV Sequence of Events #2
C463: E CU CMV Sequence of Events #3
C456: E CU CMV Cargo Type
C457: E CU CMV Cargo Body Type
C461: E CU CMV Sequence of Events #1
C209: CU Make
C115: CU Driver CDL Status
C112: CU Driver First License Class
C501: Vehicle 2 (V2) Type
C210: CU Body (Passenger Cars Only)
C219: CU Attachment
C217: CU Hazardous Cargo
C215: E CU Placard Required
C220: CU Oversized Load Requiring Permit
C324: CU Driver Airbag Status
C110: CU Driver Residence Distance
C556: V2 Hazardous Cargo
C015: Primary Contributing Circumstance
C211: E CU Owners State
C558: V2 Attachment
C109: CU Driver Gender
C326: CU Driver/Non-Motorist Gender
C573: V2 Point of Initial Impact
C113: CU Driver Second License Class
C023: E Manner of Crash
C212: CU License Tag State
C107: CU Driver Raw Age
Sort by Sum of Max Gain

C611 Number of Railroad Trains



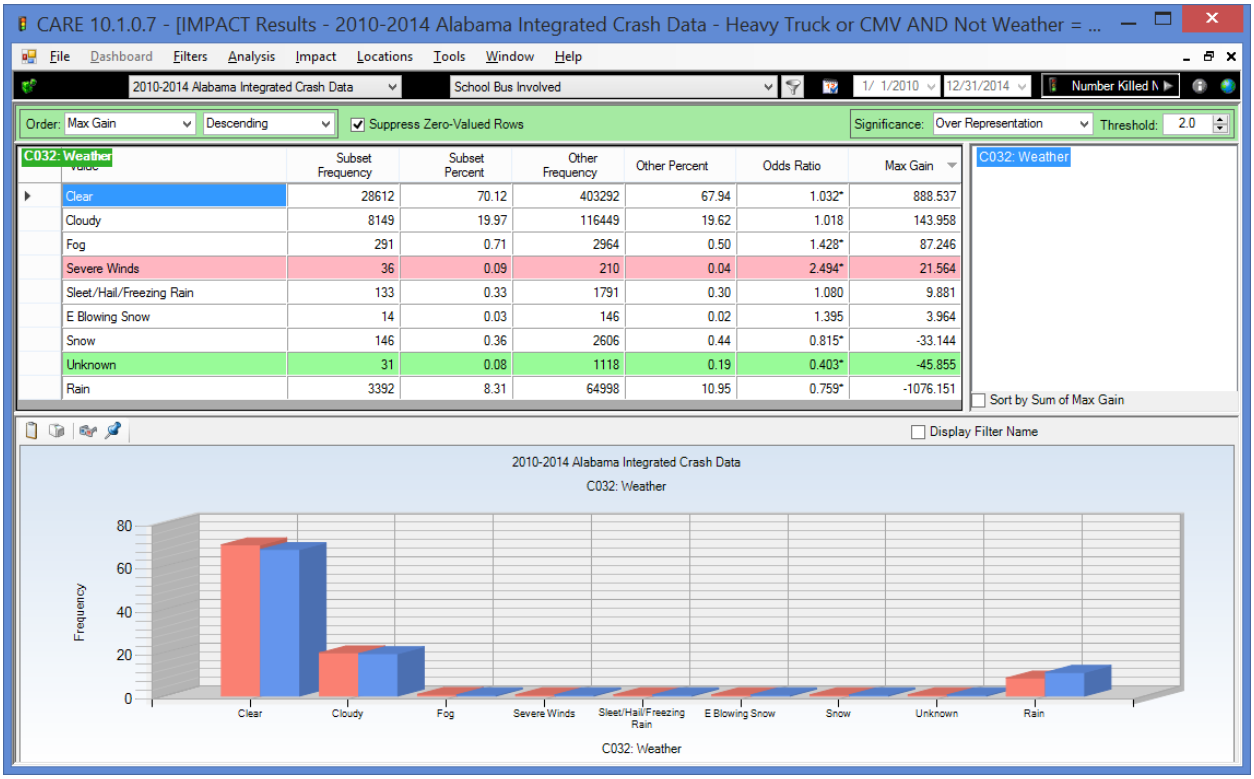
Roadway Environment

C403 CU Roadway Condition



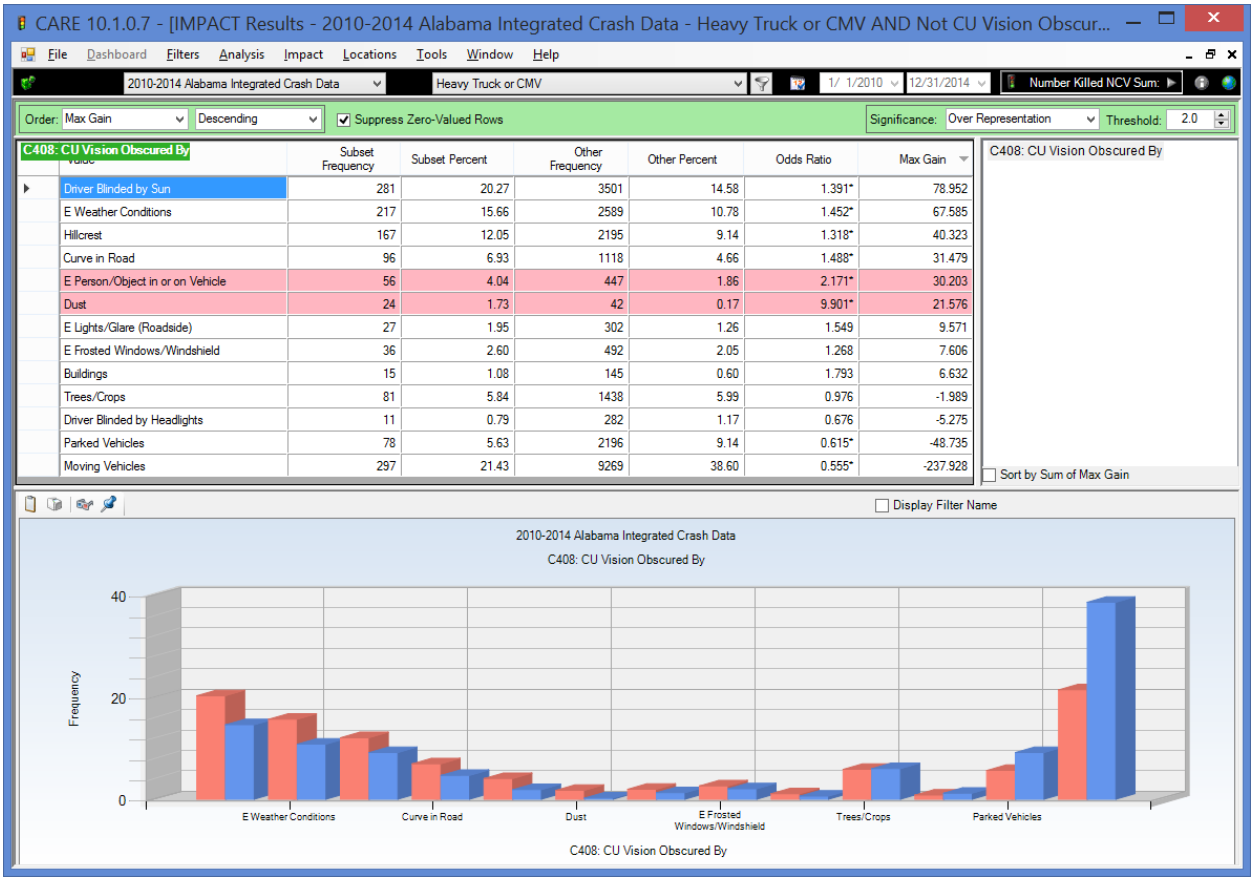
C403: CU Roadway Condition	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Dry	33245	85.51	471041	81.63	1.048*	1508.357
Wet	5197	13.37	99176	17.19	0.778*	-1485.037
Ice	290	0.75	4297	0.74	1.002	0.487
E Snow	62	0.16	934	0.16	0.985	-0.929
E Slush	25	0.06	479	0.08	0.775	-7.273
Muddy Sand/Dirt/Gravel	33	0.08	396	0.07	1.237	6.319
E Water Buildup	19	0.05	584	0.10	0.483	-20.347
P Snow or Slush*	9	0.02	157	0.03	0.851	-1.578

C032 Weather



C032: Weather Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Clear	28612	70.12	403292	67.94	1.032*	888.537
Cloudy	8149	19.97	116449	19.62	1.018	143.958
Fog	291	0.71	2964	0.50	1.428*	87.246
Severe Winds	36	0.09	210	0.04	2.494*	21.564
Sleet/Hail/Freezing Rain	133	0.33	1791	0.30	1.080	9.881
E Blowing Snow	14	0.03	146	0.02	1.395	3.964
Snow	146	0.36	2606	0.44	0.815*	-33.144
Unknown	31	0.08	1118	0.19	0.403*	-45.855
Rain	3392	8.31	64998	10.95	0.759*	-1076.151

C408 CU Vision Obscured By



C408: CU Vision Obscured By	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Driver Blinded by Sun	281	20.27	3501	14.58	1.391*	78.952
E Weather Conditions	217	15.66	2589	10.78	1.452*	67.585
Hillcrest	167	12.05	2195	9.14	1.318*	40.323
Curve in Road	96	6.93	1118	4.66	1.488*	31.479
E Person/Object in or on Vehicle	56	4.04	447	1.86	2.171*	30.203
Dust	24	1.73	42	0.17	9.901*	21.576
E Lights/Glare (Roadside)	27	1.95	302	1.26	1.549	9.571
E Frosted Windows/Windshield	36	2.60	492	2.05	1.268	7.606
Buildings	15	1.08	145	0.60	1.793	6.632
Trees/Crops	81	5.84	1438	5.99	0.976	-1.989
Driver Blinded by Headlights	11	0.79	282	1.17	0.676	-5.275
Parked Vehicles	78	5.63	2196	9.14	0.615*	-48.735
Moving Vehicles	297	21.43	9269	38.60	0.555*	-237.928