CARE IMPACT Study of
Senior Driver Caused Traffic Crashes

2017-2021 Data Updated from 2013-2017 Data Previous Study

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

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Recommended Past Studies Completed

The following highly-recommended studies are closely related to the safety of senior drivers as given in the present study.

1. **Senior Driver Lighting Issues.** Straight comparisons by time of day are skewed by the fact that older people choose to travel during the day and avoid the dark-time hours. To account for this, further comparisons were limited to the nighttime darker conditions, i.e., dark, all dark artificial lighting conditions, and also including dusk and dawn. These were compared for various attributes between the 65 and older drivers and those aged less than 65 for their crashes that occurred during these lighting conditions only. Document available upon request from brown@cs.ua.edu.

2. **Worst Days for Senior Drivers.** This summarizes the findings of a research on the subject of senior driver crash involvement times. The goal of this study was to determine the worst days, weeks, and months of the year for senior driver crash involvement, where "senior drivers" are defined to be those of age 65 years and older. This is important information to let senior drivers and in some cases care-givers know when they are more apt to be in crashes so that there is additional awareness during these times; it also had the goal to raise awareness of the problems involved in senior driver crashes in general. Document available upon request from brown@cs.ua.edu.

3. **Senior Driver IMPACT Study 2013-2017 Data.** This study is effectively the same as the current study follows the same pattern as the current one but was based on a previous five year period. It also used the age of 65 as the comparison point as opposed to 74, which has been established as the current-day break-even point for the current study. This document is available at:
   http://www.safehomealabama.gov/wp-content/uploads/2018/12/Senior-Dr-IMPACT-2013-2017-v08-1.pdf

Recommendations

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

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

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

- **Crash Characteristics**
  - Perception improvement countermeasures should be developed to address the major problem that senior drivers have with a failure to yield the right of way. The risk avoidance aspects of senior drivers lead us to the conclusion that the over-representation of this primary contributing circumstance is caused by some physical perception issues as opposed to carelessness or ignorance on their parts. Merely making older drivers aware of this as a problem could go a long way to solving it. That is, they should be trained on where to expect the need to yield. C409 showed that for intersections, the problems were at Stop Signs (83.3% more than expected) and Traffic Signals (7.5% more than expected).
  - In addition, advice should be given to senior drivers to make a conscious effort to put distance between themselves and other vehicles. Vehicles cannot crash if they are not close to each other, and this can be controlled to a large extent by drivers. When this is not possible the safest action is to gradually slow down.

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

- **Driver Characteristics**
  - Additional information should be conveyed to senior drivers on the problems of driving under the influence of their prescription drugs and in situations where they are ill.
  - Additional training would be beneficial for senior drivers operating Sport Utility Vehicles, Mini-vans, and Motor Home/Recreational Vehicles.

- **Severity Characteristics**
  - No new recommendations. There is little that can be done to increase older age survivability of crashes. The usual seatbelt promotions have been effective and older causal drivers are dramatically under-represented in being unrestrained (53.5% less than what is expected compared to the younger drivers).

- **Geographical Characteristics**
  - Issues of failure to yield the right of way should concentrate on where most of the driving is being done (and crashes incurred) by older drivers. This includes the following (1) Shopping or Business areas, (3) Residential, and Open C. Most often used roadway classifications are: Federal, State and Municipal roads.
  - Enforcement and educational programs should recognize that Senior Drivers do over 80% (81.71%) on urban as opposed to rural roads.

- **Vehicle Characteristics**
  - Training should recognize that older drivers are not necessarily avoiding larger vehicles as indicated by the following over-represented five-year frequencies: Pickups (6,442), Sport Utility Vehicles (7,588). and Mini-vans (1,268).
  - Perception problems do not disappear at railroad crossings. While only involving 15 crashes, the proportion of RR train involved crashes was about 30% (Odds Ratio 1.299) greater than the younger drivers. This indicates that senior drivers would be a good target population group for those implementing RR countermeasures.

- **Roadway Environment/Pavement Characteristics**
  - Vision problems are surfaced by C408 (Vision Obscured by), which indicates that special training attention should be given to: Blinded by Sun (317), Blinded by Headlights (45), Lights Glare (Roadside), Hillcrest (145), and Parked Vehicles (139). There are several others (see C408), but these are the most frequent. Efforts need to be made to see if these vision issues can be mitigated in some way.
  - Special attention also be valuable for countermeasure development in the particular types of intersections that are over-represented by senior drivers, as follow: 4-Way Intersections (5,176), T-Intersections (2,906), Driveway Access Intersections (498), and Business Drives (357), and Crossovers in Median (268).

Introduction and Executive Summary

The comparisons in this document are between those crashes that were *caused* by senior drivers (age 74 or older) compared to all other crashes. This enabled the characteristics for these crashes to surface so that traffic safety professionals can determine their magnitude and optimize senior driver safety programs to place emphasis on the most important factors. In many cases the comparisons led to conclusions that were expected, being well established over the years. Others were not as intuitive.

A very important general finding that confirms studies done by CAPS personnel from well over a decade ago is that senior drivers are relatively risk averse compared to younger drivers. This will be noticed in virtually all of the IMPACT comparisons presented below: the older driver red bars will be higher in those categories that generally involve lower risk. Examples include lower speeds, avoidance of late night driving, and staying out of bad weather. These, and many other categories, will be noticed as risk-avoidance.

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

- **Crash Characteristics**
    - C015. Primary Contributing Circumstanced. Failure to yield the right of way is by far the greatest senior driver primary contributing circumstance when all of it subcategories are added together.
    - C129. CU Vehicle Maneuvers. While making turns, especially left turns, are expected to be a problem for senior drivers, their under-representation in negotiating curves is not, and it can probably be explained by their caution and reduction in speed when entering dangerous curves, as compared to younger drivers.
    - C023. Manner of Crash. Over-representation in side impacts is related to the failure to yield the right of way problem. Single vehicle and rear end crashes are under-represented.
    - C201, C017. C201 - Cu Vehicle Most Harmful Event and C201 First Harmful Event. Collisions with vehicle in traffic (multi-vehicle crashes) are by far the greatest problem both from an overall numeric count (76%) and a significant over-representation in the Vehicle Most Harmful Event.
    - C203. CU First Harmful Location. Reflecting the large number of "vehicle in traffic" the vast majority of crashes occur On the Roadway as opposed to Off Roadway.
    - C052. Number of Persons Recorded. The proportion of 2-Vehicle crashes are over-represented for senior drivers by 14.2%. This is expected in that it correlates with the Failure to Yield results given above. Multiple vehicle crashes above two vehicles are generally under-represented.

- **Time Characteristics**
  - C003. Year. Year is of interest because it shows if senior crashes are increasing or decreasing over time. Clearly they are decreasing from 6,419 in 2017 to 6,386 in 2021 (0.51%). There was an increase in 2018 and a further increase in 2019. Year 2020 had its typical reduction due to the COVID pandemic, and then returned to closer to its average in 2021.
  - C004. Month. Older drivers have proportionately more problems toward the end of the year. They are significantly under-represented in April, and then there seems to be a general increase proportionately each month until they become significantly over-represented in November and December, which continues into January. Since it is known that older persons have increased problems with vision at night, the proportion of lighted hours would seem to a major causal factor. A cross-tabulation of time-of-day by month clearly bears this out, with very high over-representation in the 5:00 to 7:00 in November through February.
  - C008. Time of Day. From the results above it might be expected that the night-time hours would be over-represented for senior drivers. The results of the IMPACT show that this is clearly not the case since we would expect older drivers to be avoiding these dark hours (risk-avoidance), since most of them seem to accept their relative loss of night vision. This is clearly an example of risk avoidance. The worst hours seem to be when the daylight-saving change catches them out in the dark. Generally, the hours of 8 PM all through the night until 8 AM are significantly under-represented in senior driver crashes.
  - C031. Lighting Conditions. The results here are consistent and tend to reinforce those for C008 immediately above.
  - C006. Day of the Week. There is another reason that older drivers are under-represented in the night-time hours, especially late night and early morning. There is a very large correlation of DUI (drugs and alcohol) in the weekend times starting Friday night and ending late Sunday night and Monday morning. The under-representation of senior drivers at these times is clear evidence that they are relatively not engaged in "partying." Relatively is not absolute, as shown in the next finding.
  - Day of the Week by Tim of Day. While senior drivers are relatively under-represented in their weekend crashes compared to other drivers. However, compared to themselves, the typical DUI hours are over-represented, as shown by this time of day by day of the week crosstab. This indicates that while for the most part this would not be seen to be a serious problem, there is no doubt that there are a few senior drivers who are venturing out and probably engaging in DUI in the late-night hours. For use of alcohol and other drugs, see C122 and C123 in the general driver characteristics section.

- **Driver Characteristics**
  - C107. CU Driver Raw Age Frequency Distribution. The filter in effect forced all causal drivers to be in the 74 or greater range. Notice how they diminish exponentially from age 74, 3570 (11.33%) down to age 98, 19 (0.06%), with 99 showing all '99 or higher' to be 253 (0.8%).
  - C121. CU Driver Condition. See this result for the alternatives within this attribute. Senior drivers are clearly over-represented in the Physical Impairment and Illness categories. "Under the Influence of Alcohol/Drugs" was also significantly under-represented, where the proportion is only 0.45%, which is 0.140% of that of the younger drivers. These results are further confirmed in the two following IMPACT findings: C122 and C123. A counterintuitive result it that the overall Apparently Normal for senior drivers is significantly over-represented – probably because they avoid driving while in conditions that increase crash probability.
  - C213. CU Vehicle Usage. While the vast majority (95.8%) of vehicle usages were "Personal," some of the other very significantly over-represented usages are of interest. These are, in order of their Max Gain: (1) Mobile Home/Recreational Vehicle, (2) Vehicle Used as a School Bus and (3) Agriculture.
  - C109. CU Driver Gender. The generally accepted life expectancy in developed countries is 72 for men and 79 for women. The population in Alabama estimated in 2016 was 443,560 for women and 340,991 for men, which indicates that there are about 13.1% more women than men. Nevertheless, senior men drivers have 55.51% of the crashes for this age range, which is about 11% higher than younger age proportion. One potential reason for this is that the general health and perception capabilities of senior women are superior to that of men in the older age ranges, both in term of health and risk avoidance.
    C020. Distracted Driving Officer's Opinion. Senior drivers are dramatically under-represented in being distracted by electronic devices.

- **Severity Characteristics**
  - C025. Crash Severity. All of the injury classifications (including fatal) are over-represented for senior drivers despite their typically slower speeds. This is probably due to their increased vulnerability due to age. See the next item for speed at impact.
  - C224. Estimated Speed at Impact. All speeds above 35 MPH were under-represented. It can be concluded that senior drivers avoid the risk of higher speeds, which fits the general paradigm. We mention it here to show the contrast with the crash severity results given above.
  - C038. Adjusted EMS Arrival Delay. The significant over-representation in the 0 to 5 minute category correlates well with seniors' urban driving, which is discussed next. While not as over-represented as 0-5, the 6-10 and 11-15 are also over-represented.

- **Geographical Characteristics**
  - C010. Rural or Urban. Urban crashes are significantly over-represented for senior drivers, but only by about 7.1% above expectation in comparison with the younger drivers.
  - C033. Locale. Senior drivers' crashes are over-represented in Shopping or Business areas, that being 55.11% of their crashes, which is about 22.1% higher than expected.
  - C011. Highway Classification. In order of significant over-representation: Federal (16.15%), State (21.47%) and Municipal (41.79%).

- **Vehicle Characteristics**
  - C101. CU Vehicle Type. Passenger cars are about the same proportion for senior drivers as for those younger, accounting for about half of their crashes. Max Gain gives an idea of both the over-representation and the number of crashes that make up the differential in each comparison. In order of Max Gain with the highest first: Pickups (6,442), Sports Utility Vehicles (7,588), Mini-vans (1,268), and Motor Homes – RVs (77).
  - C062. Train Involved. While only accounting for about 5% of their crashes, this proportion is about 29.9% greater than the younger drivers. There can be little doubt that older drivers risk aversion is not sufficient to overcome their perception problems at railroad crossings. This fact might be of use to those whose main interest it railroad train crashes.

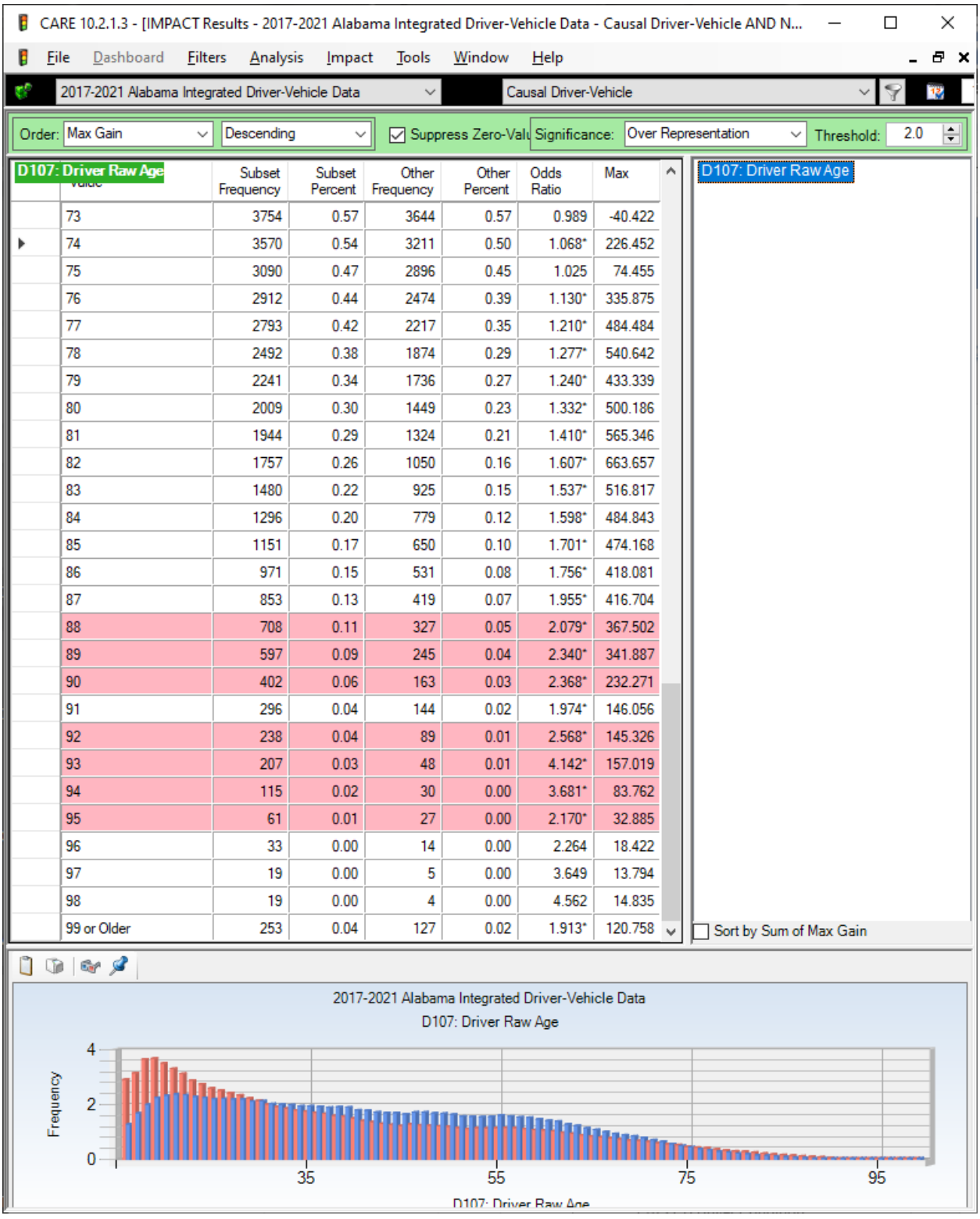
- **Roadway Environment/Pavement Characteristics**
  - C408. CU Vision Obscured by. This display has been reduced to only those crashes that had a vision obstruction listed. In order of Max Gain, the items with the greatest problems are: Driver Blinded by Sun (377), Hillcrest (145), Parked Vehicles (139), Moving Vehicles (378). and Driver Blinded by Headlights (45).
  - C022. Type of Roadway Junction. From the worst first, those with a Max Gain greater than 100 are: 4-Way Intersection (5,176), T-Intersection (2,906), Driveway Access Intersection (498), Business Drive (357), On Segment but Intersection Related (675), and Crossover in Median (268).
  - C409. CU Traffic Control. The most significantly over-represented items were Stop Sign (81.6% more than expected) and Traffic Signals (6.6% more than expected). Clearly the largest problem for senior drivers is stop signs, but there were 15 items over-represented.

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

Senior Age Break-Even Point
(Age at which Older Drivers Begin to Cause More than Expected Crashes)

This preliminary step is important to determine what constitutes a "senior driver." In the past the age of 65 was generally assumed. However, the extended longevity in recent years casts some doubt on this arbitrary number. We reasoned that it would be an improvement to determine the age point at which older drivers cause more crashes than those in which they are victims. This age was determined by the IMPACT on the next page which compares for each age those crashes that were caused against those not caused. The break-even point was 74. Ages 74 and older were all over-represented in being the causal driver, most of which were statistically significant. Those aged 88-95 had odds ratios greater than two, indicating that they were causing twice as many crashes as those in which they were the victims.

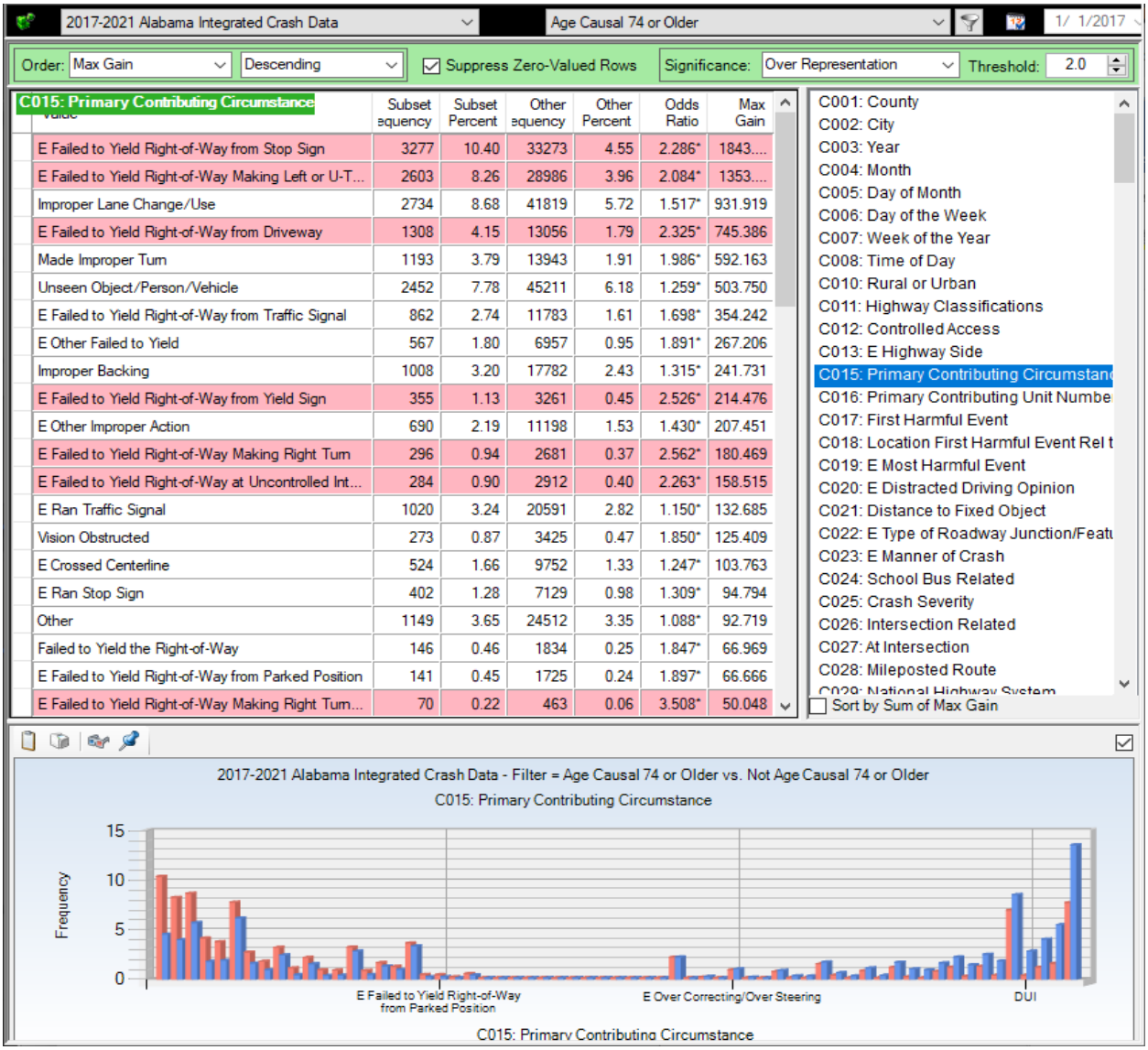
What about drivers aged 65 through 73? Recognize that what we are doing in concentrating on ages 74 and above is to look at the extreme issues that could face any older age, even those less than 65. These issues should not be ignored for drivers less than 74, but it should be realized that aging brings about different issues in different people. Our goal here is to focus on those that are the most critical for all aging drivers.



D107: Driver Raw Age Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max
73	3754	0.57	3644	0.57	0.989	-40.422
74	3570	0.54	3211	0.50	1.068*	226.452
75	3090	0.47	2896	0.45	1.025	74.455
76	2912	0.44	2474	0.39	1.130*	335.875
77	2793	0.42	2217	0.35	1.210*	484.484
78	2492	0.38	1874	0.29	1.277*	540.642
79	2241	0.34	1736	0.27	1.240*	433.339
80	2009	0.30	1449	0.23	1.332*	500.186
81	1944	0.29	1324	0.21	1.410*	565.346
82	1757	0.26	1050	0.16	1.607*	663.657
83	1480	0.22	925	0.15	1.537*	516.817
84	1296	0.20	779	0.12	1.598*	484.843
85	1151	0.17	650	0.10	1.701*	474.168
86	971	0.15	531	0.08	1.756*	418.081
87	853	0.13	419	0.07	1.955*	416.704
88	708	0.11	327	0.05	2.079*	367.502
89	597	0.09	245	0.04	2.340*	341.887
90	402	0.06	163	0.03	2.368*	232.271
91	296	0.04	144	0.02	1.974*	146.056
92	238	0.04	89	0.01	2.568*	145.326
93	207	0.03	48	0.01	4.142*	157.019
94	115	0.02	30	0.00	3.681*	83.762
95	61	0.01	27	0.00	2.170*	32.885
96	33	0.00	14	0.00	2.264	18.422
97	19	0.00	5	0.00	3.649	13.794
98	19	0.00	4	0.00	4.562	14.835
99 or Older	253	0.04	127	0.02	1.913*	120.758

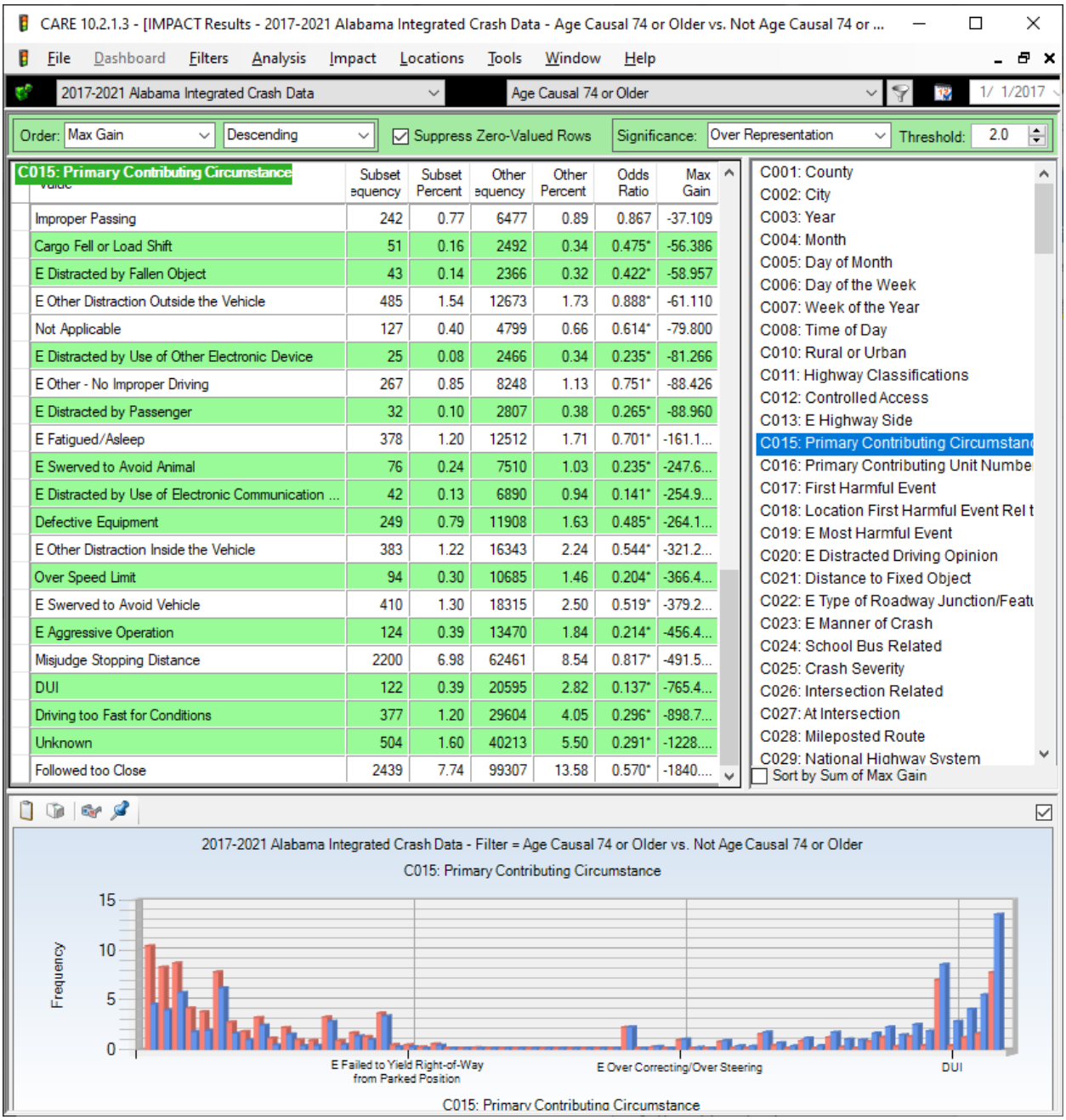
Crash Characteristics

C015 Primary Contributing Circumstance – Most Overrepresented



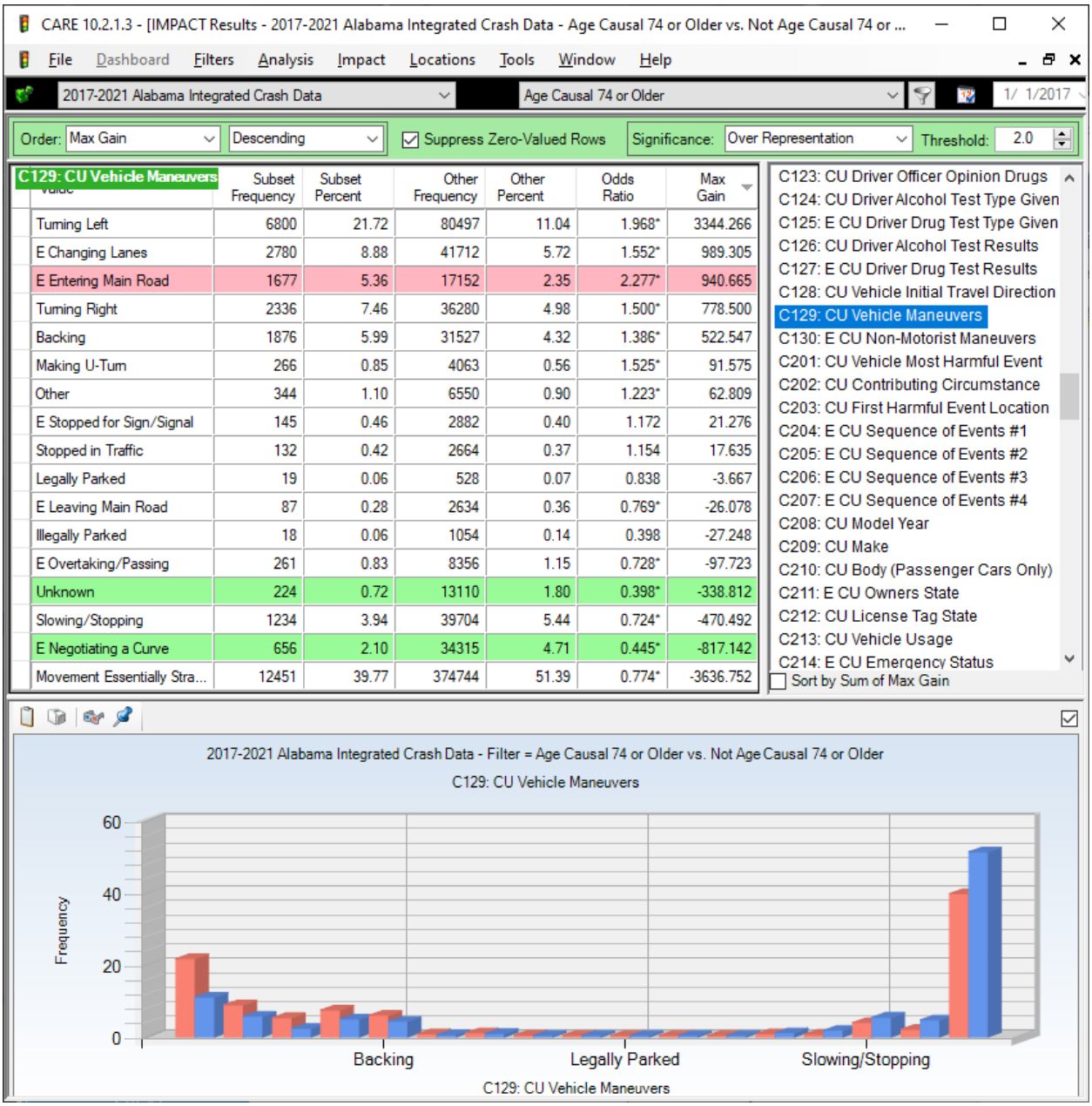
The display above includes all items with a Max Gain in excess of 50. It also includes the ten different "Failed to Yield …" categories, of which seven had at least an Odds Ratio of 2, indicating that the older subset had over twice the proportion as the younger subset. Summing the ten Failed to Yield items gives 4,235 crashes, which is 14.6% of all older driver crashes, and thus collectively these would be the greatest concern as far as Primary Contributing Circumstances.

C015 Primary Contributing Circumstance – Most Underrepresented



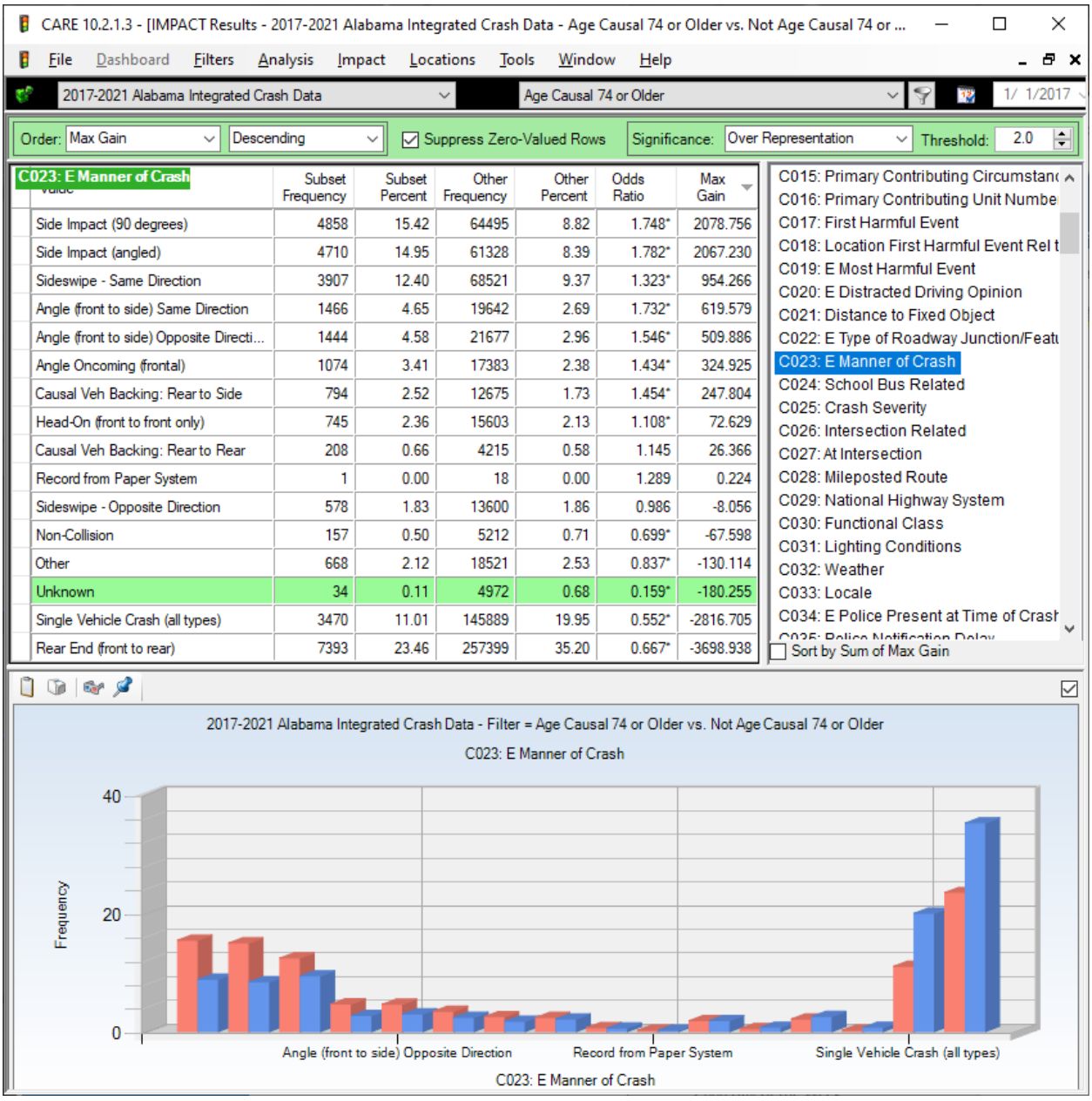
These results begin to show the difference between the senior driver and those under 74 years of age. The major difference is in those categories related to speed, impairment (DUI) and distractions. Risk avoidance is obviously the reason for superior senior driver performance. We ask the reader to be looking for this major aspect in most of the differences

C129 CU Vehicle Maneuvers



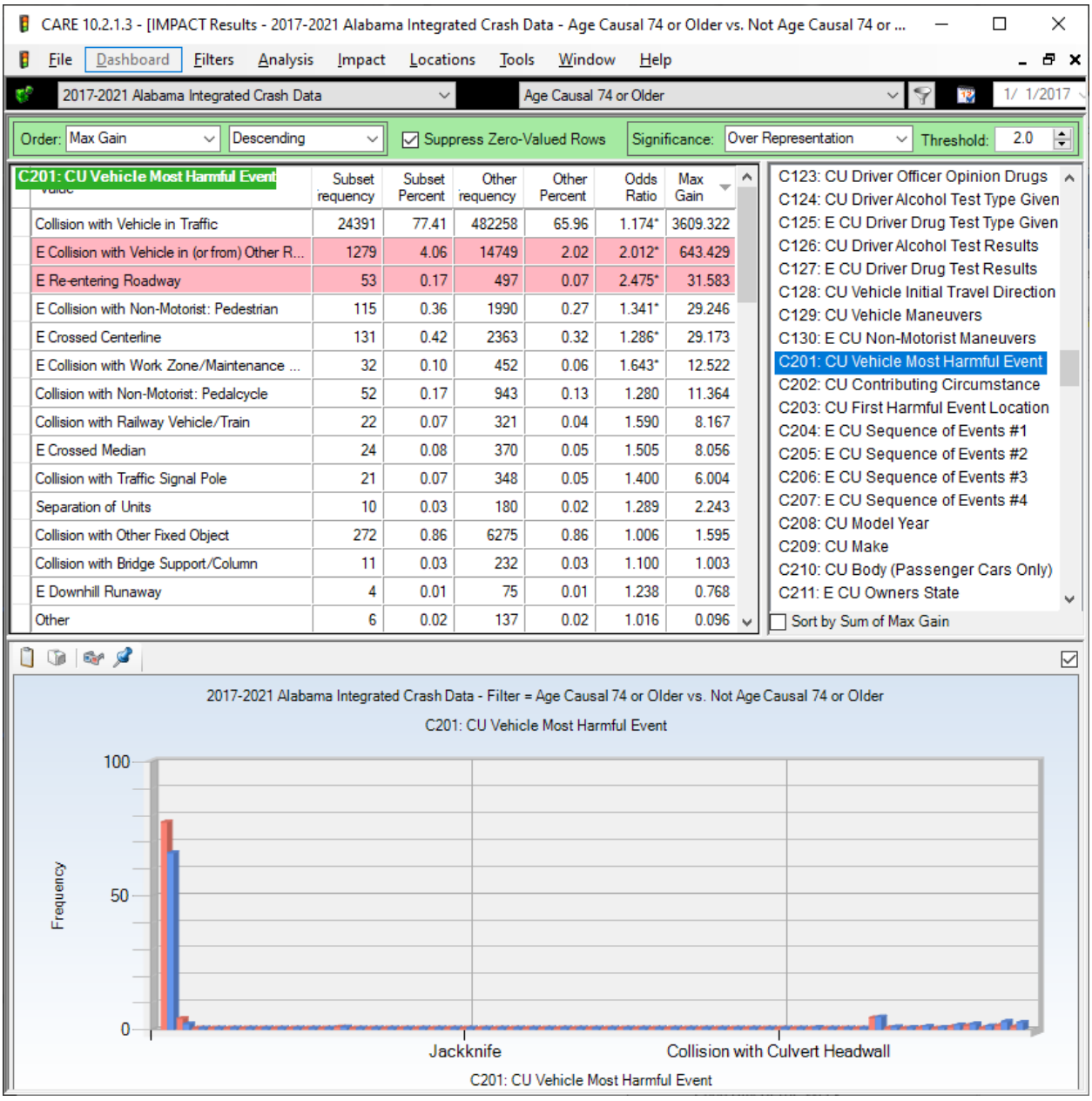
As expected, senior drivers have many more problems in situations where turns are involved, left turns being about three times the problem of right turns. However, negotiating curves was highly under-represented, probably because of their caution and reduction of speed in going into dangerous curves.

C023 Manner of Crash



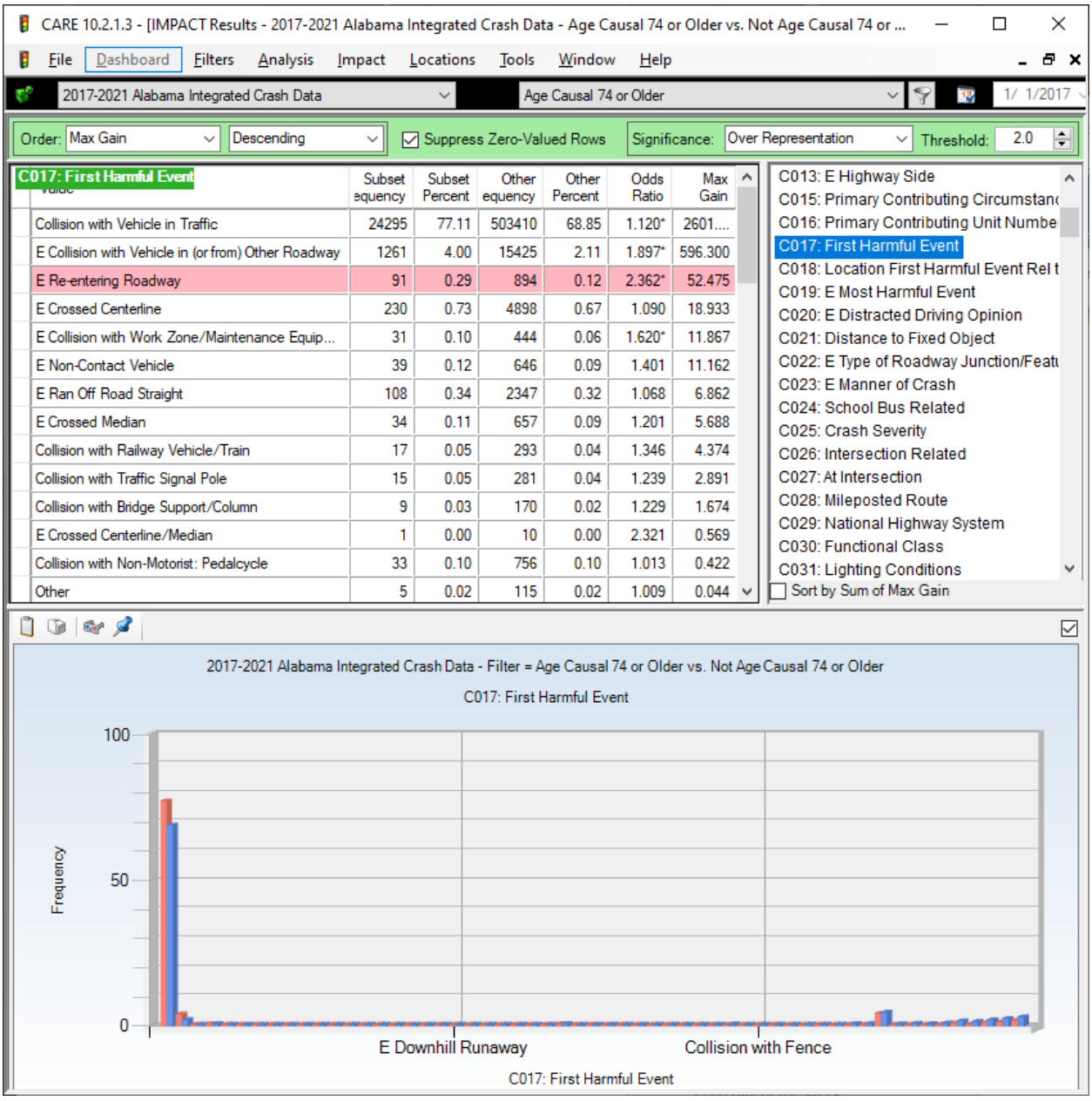
It seems certain that older drivers have a problem seeing vehicles in their blind spots. It is hopeful that the Advanced Driver Assistance Systems (ADAS) will assist in this regard as they are developed and applied to more vehicles.

C201 CU Vehicle Most Harmful Event



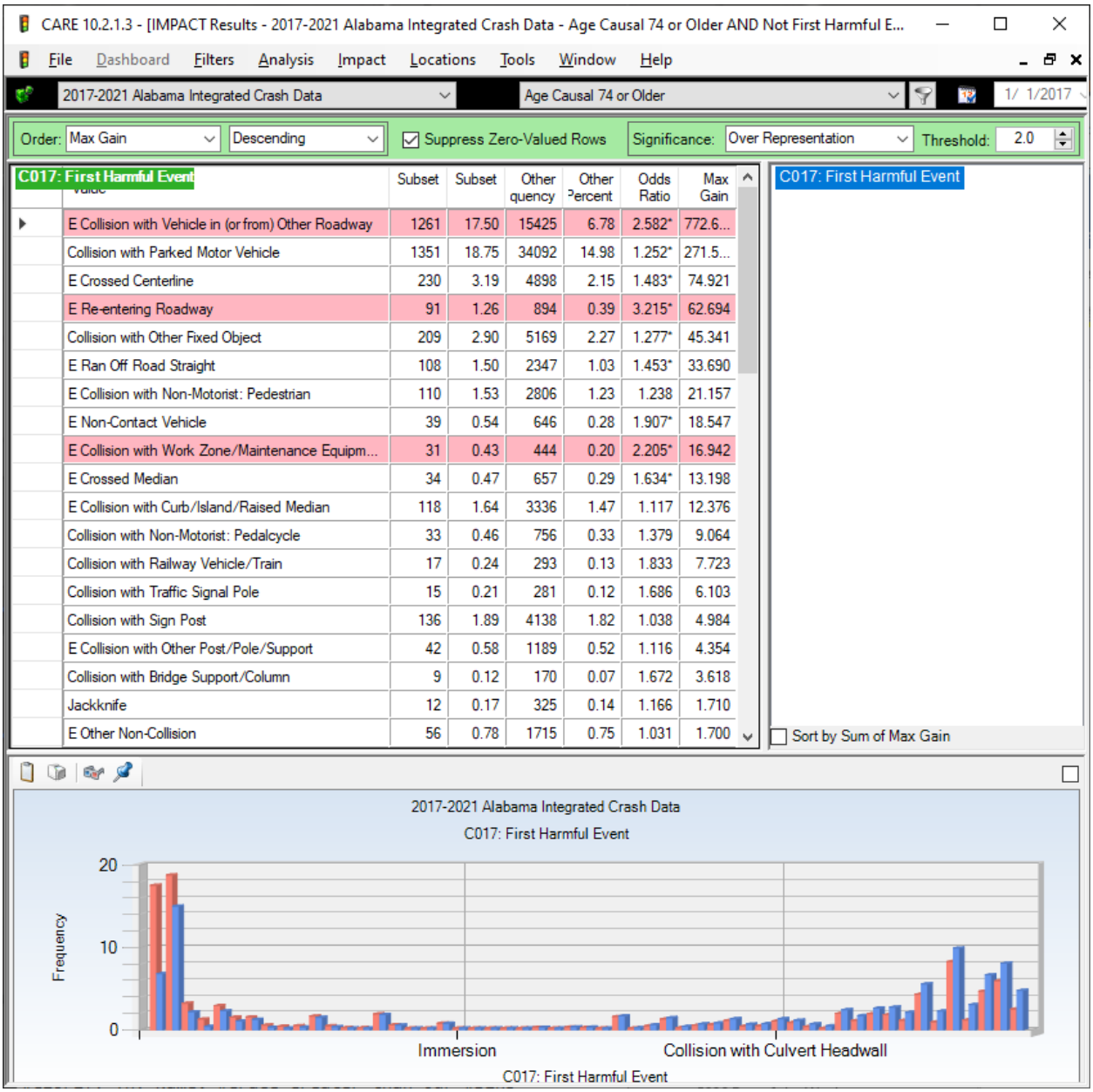
The above displays all items that are over-represented for older drivers. Over 77% of their collisions are with other vehicles.

C017 First Harmful Event



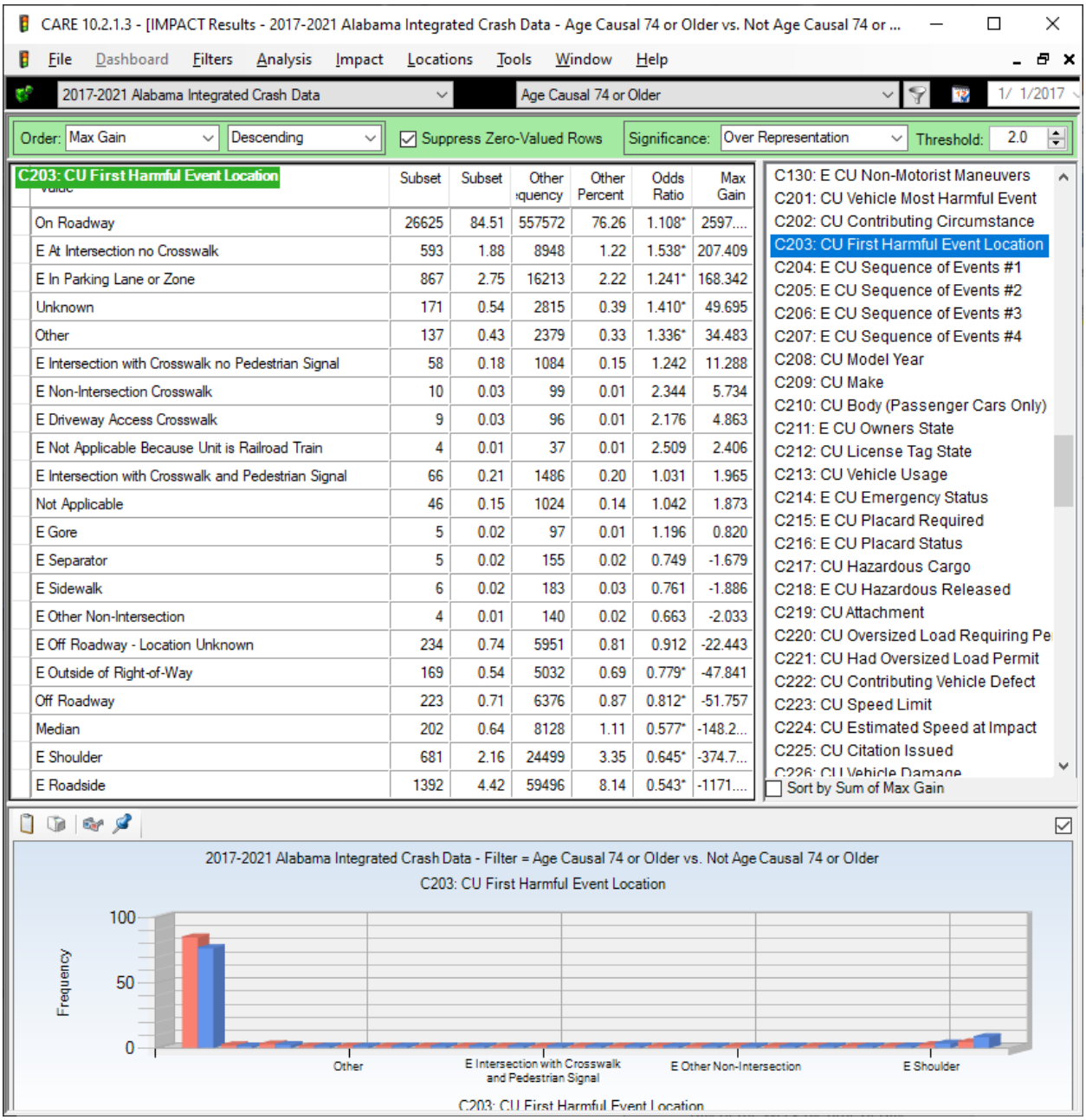
The above displays all items that are over-represented for older drivers. It is quite similar to the Most Harmful Event immediately above this one.

C017 First Harmful Event (Collision with Vehicle in Traffic Removed)



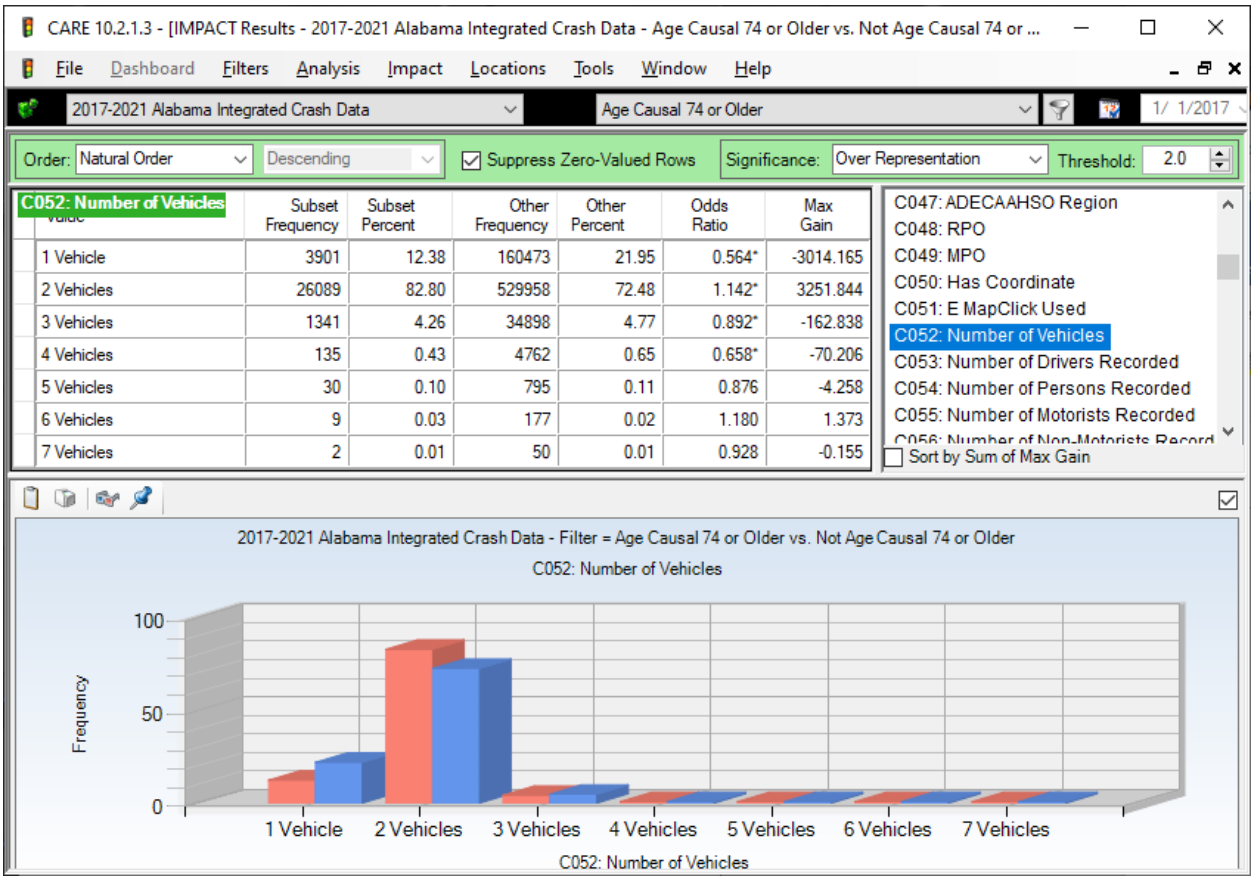
The above is for items with 50 or more crashes caused by senior drivers with the collision with vehicle in traffic removed, since it over-shadowed all other categories. This enables issues where senior drivers cause single-vehicle crashes to be identified.

C203 CU First Harmful Location



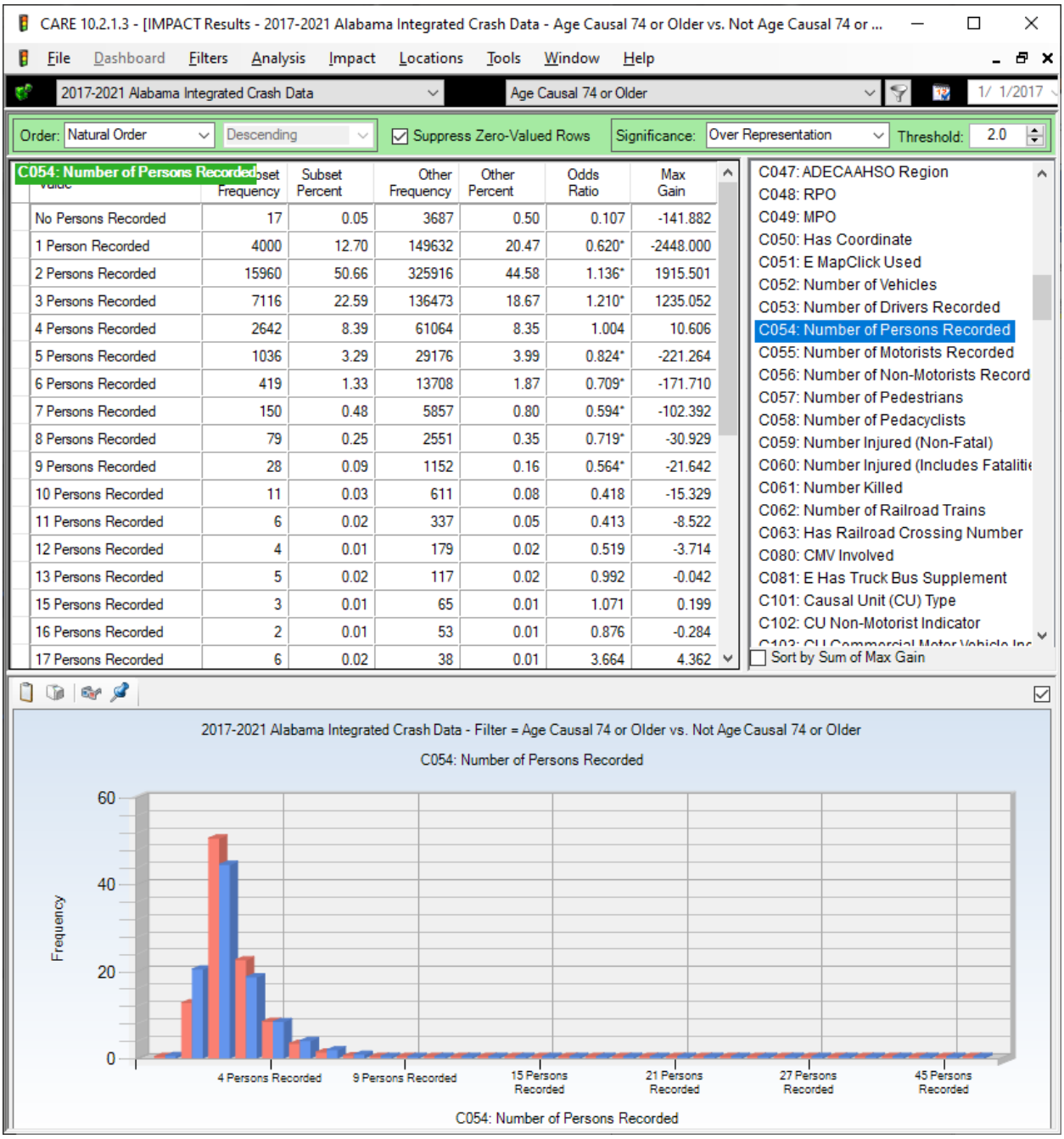
The overwhelming number of older driver crashes (84.51%) were On Roadway (as compared with 76.26% for younger drivers). The rest with three digits were In Parking Lane or Zone (867) and At Intersection no Crosswalk (593).

C052 Number of Vehicles



As indicated above, the older drivers problems are mostly with other vehicles on the roadway. They are under-represented in single-vehicle rashes with an Odds Ratio close to half (0.564). Over 82% (82.80%) are two-vehicle crashes, and the numbers drop off quickly in crashes above two vehicles.

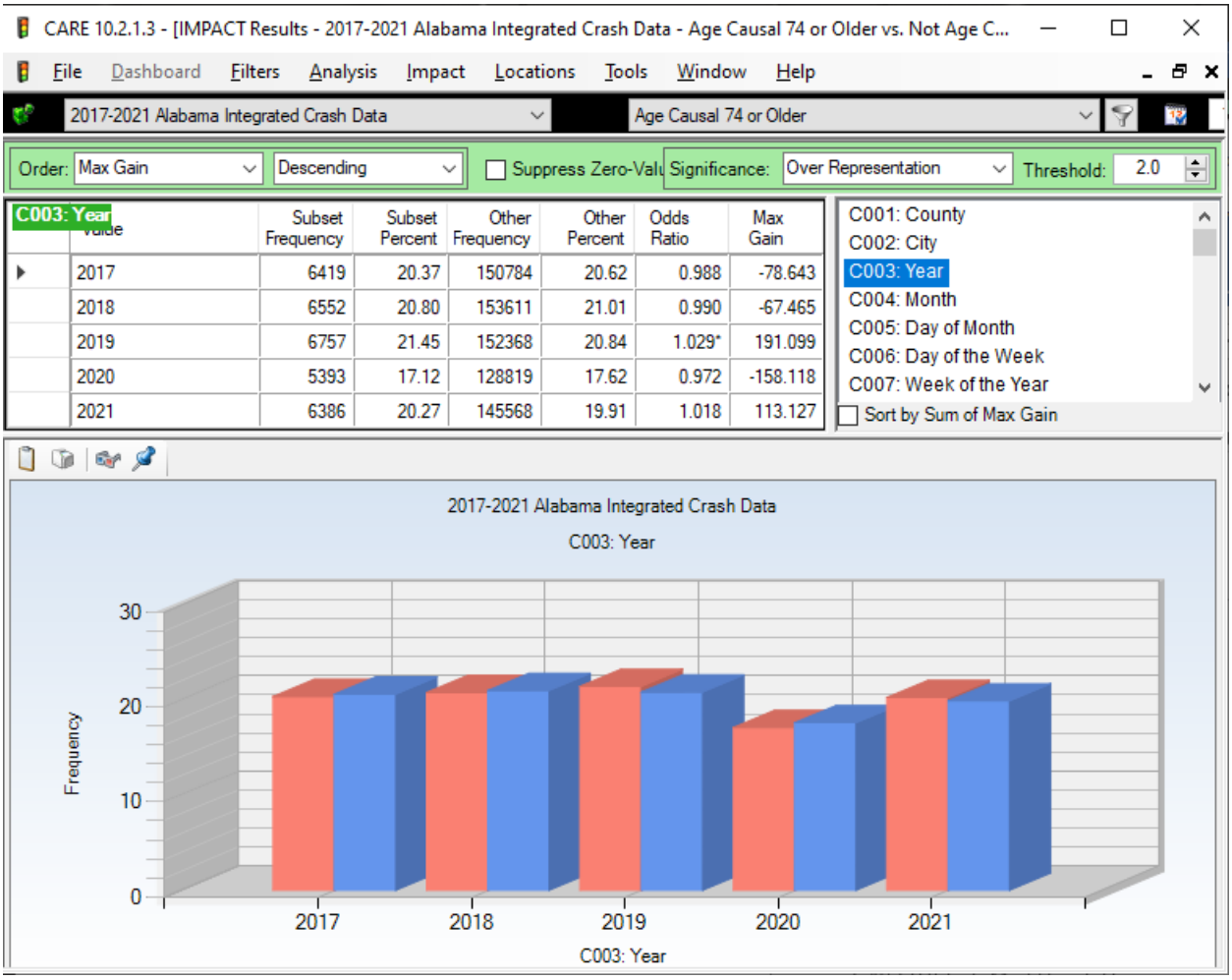
C054 Number of Persons Recorded



As indicated in the chart, the actual numbers went up to 48, indicating several crashes with buses. All above 21 were either 1 or 2. 18 had 3, 20 had 1, 21 had 3 and all the rest were 1's and 2's.

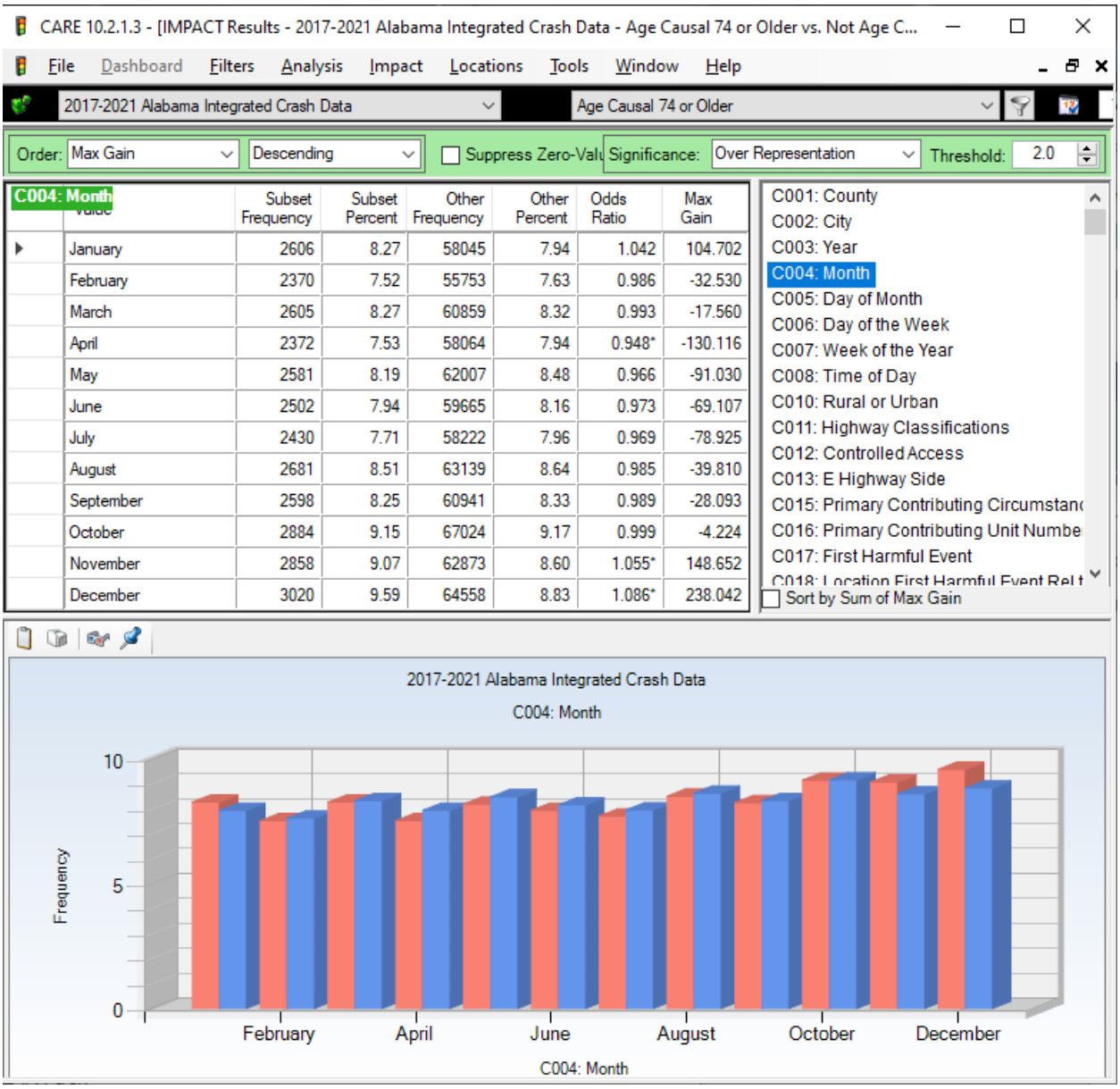
Time Characteristics

C003 Year



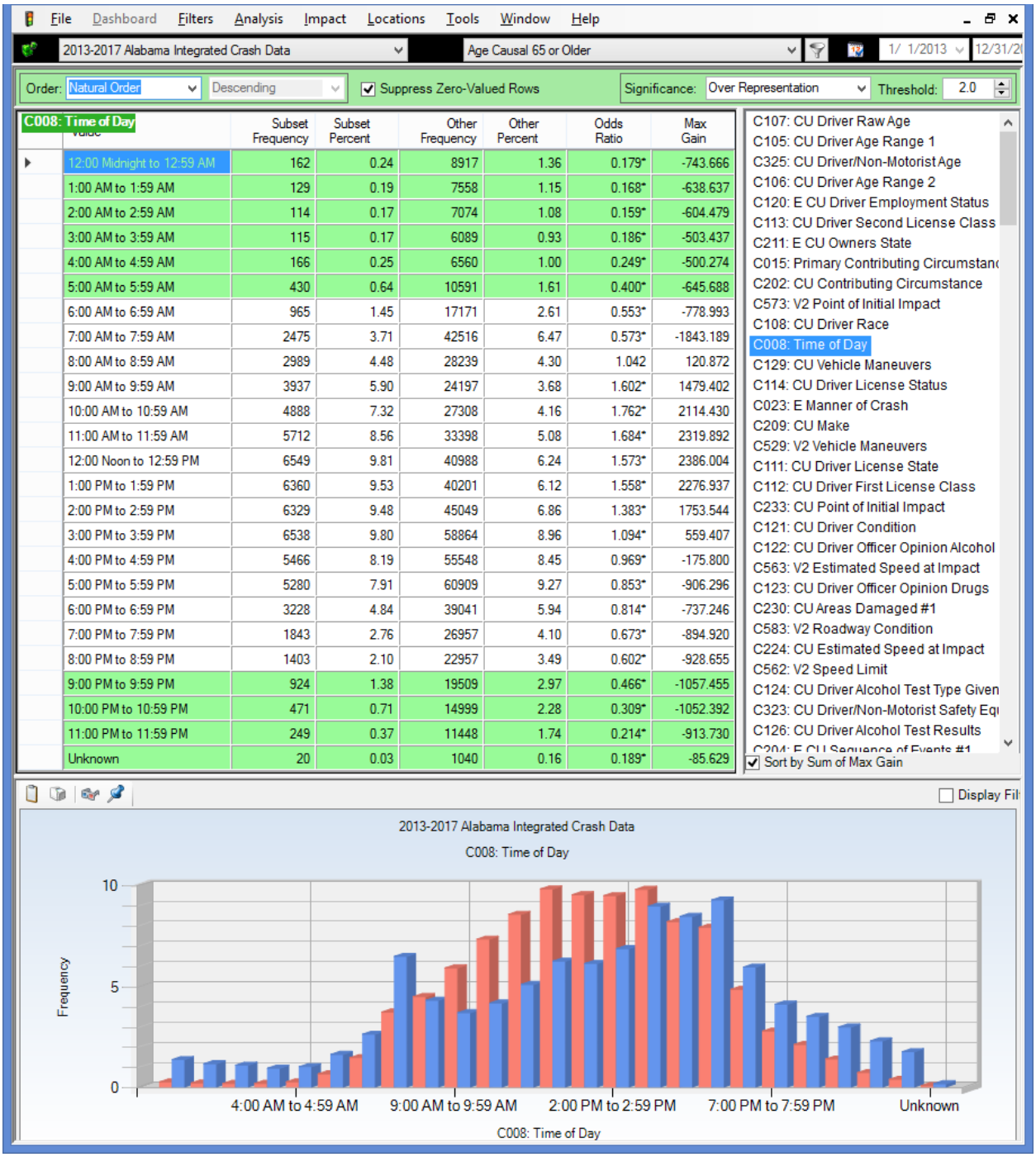
Older drivers were significantly above their expected proportion in 2019. This could have been caused by their being low on the other three years (2017, 2018 and 2020). Older drivers were under-represented in 2020, which was generally low because of the warnings given for the COVID pandemic. Both older and younger drivers were generally back to normal in 2021.

C004 Month



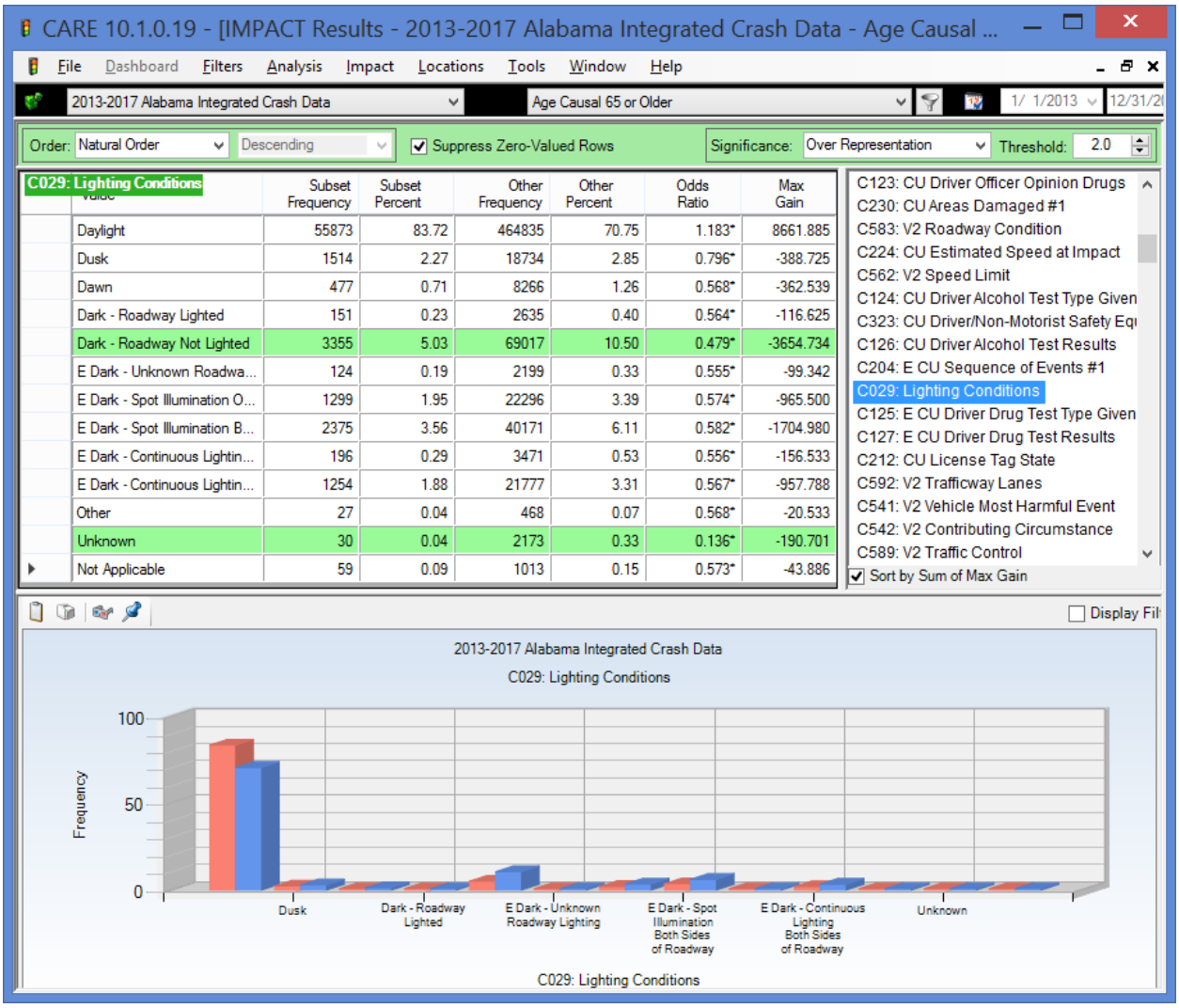
November and December are the only months that were significantly over-represented, and the only other over-representation was January. It is interesting that November and December were also the only months significantly over-represented in the 2013-2017 study. This clearly demonstrate that these months are not just random occurrences, but there are events within these months that affect older drivers. For example, the end of year holiday season may have had some effect as the older drivers head home for the holidays. This was further confirmed in the **Worst Days for Senior Drivers** study referenced above and availatle from brown@cs.ua.edu.

C008 Time of Day



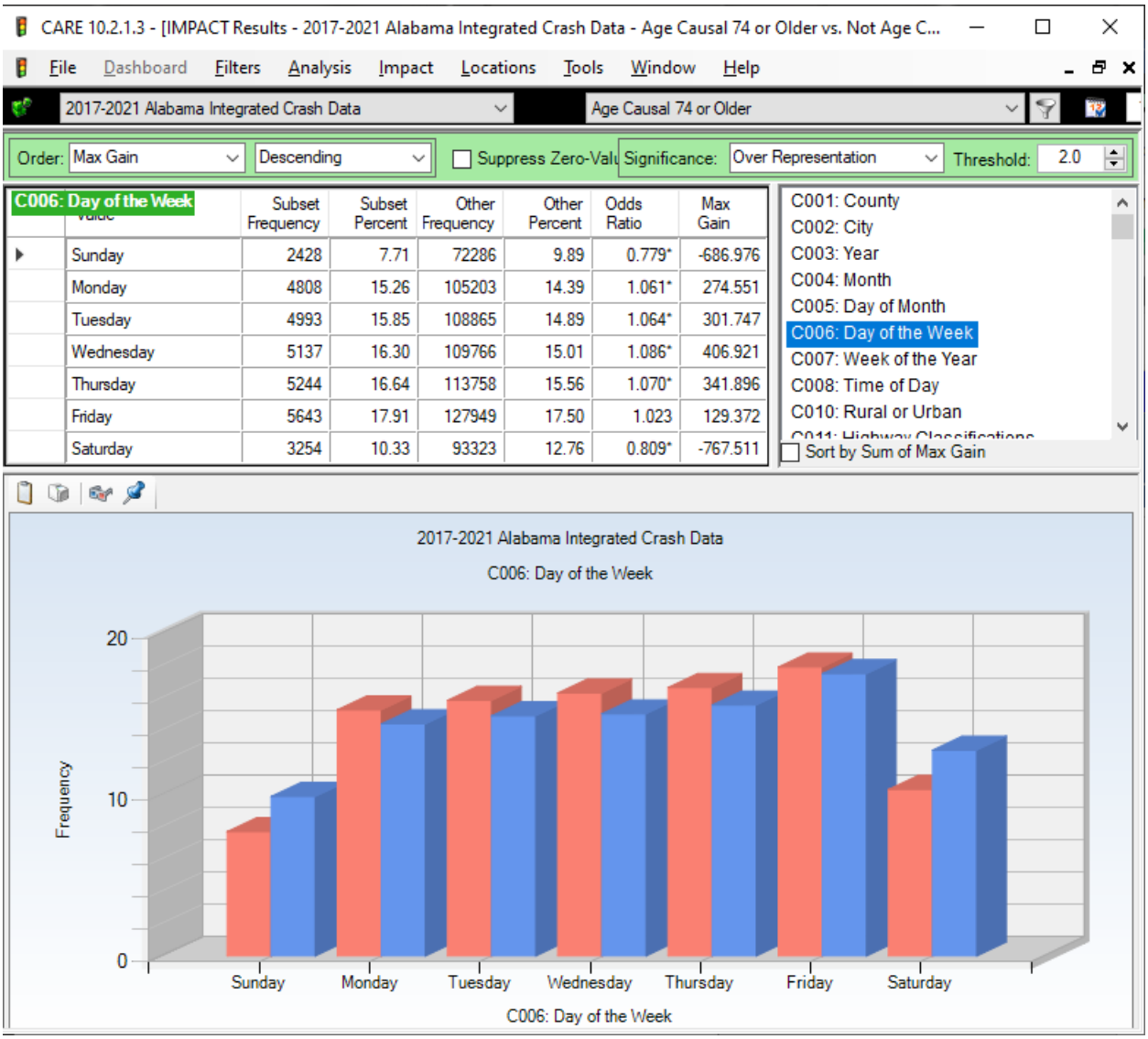
Older drivers have sight problems at night, which the display here shows they are trying to avoid. Green background indicates less than half the proportion as compared to younger drivers.

C031 Lighting Conditions



Daylight is the only significantly over-represented condition, with about 21% higher proportion than expected (Odds Ratio 1.209). All of the other conditions are dark with the possible exceptions of dusk and dawn, but these are still under-represented (Odds Ratios 0.804 and 4.79, respectively). Difference in the dark hours was not nearly as pronounced in the 2013-2017 study, which considered only drivers older than 65, not 74.

C006 Day of the Week



The day of the week distribution for the 74-year-old drivers is effectively the same as that for the 65 years from the previous study. In both cases the weekend days were significantly under-represented, and Friday was also under-represented, although not significantly. This tends to exhibit the social lives of drivers of these ages.

Day of the Week by Time of Day

CARE 10.2.1.3 - [Crosstab Results - 2017-2021 Alabama Integrated Crash Data - Filter = Age Causal 74 or Older]

File Dashboard Filters Analysis Crosstab Locations Tools Window Help

2017-2021 Alabama Integrated Crash Data | Age Causal 74 or Older | 1/ 1/2017 | 12/31/2021

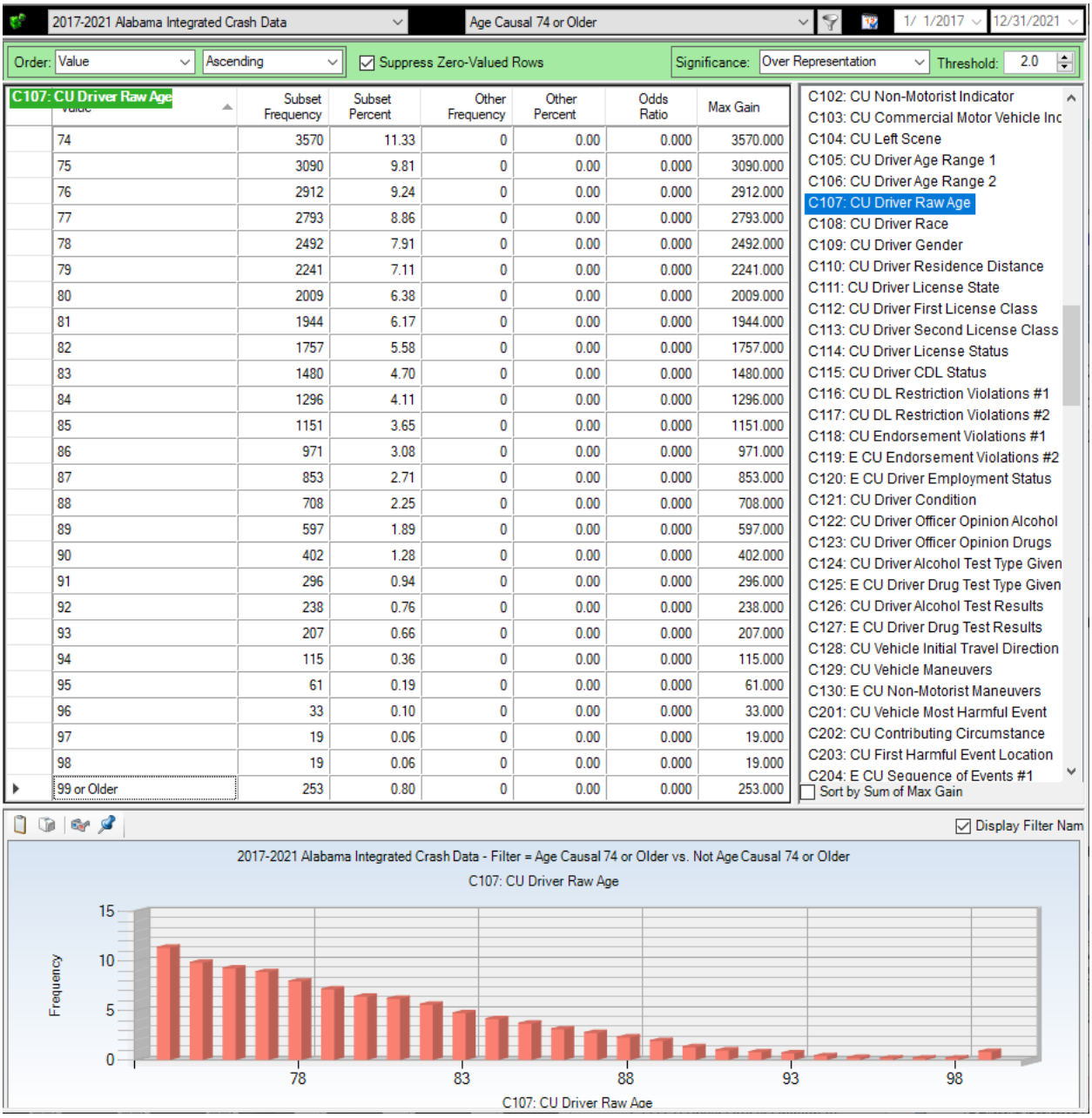
Suppress Zero Values: None | Select Cells: | Column: Day of the Week ; Row: Time of Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	TOTAL
12:00 Midnight to 12:59 AM	11	11	8	9	9	8	10	66
1:00 AM to 1:59 AM	11	4	4	5	4	2	14	44
2:00 AM to 2:59 AM	9	6	4	7	7	8	7	48
3:00 AM to 3:59 AM	8	2	6	6	7	4	9	42
4:00 AM to 4:59 AM	10	16	12	13	9	13	5	78
5:00 AM to 5:59 AM	9	25	20	34	45	24	16	173
6:00 AM to 6:59 AM	19	54	59	52	62	64	26	336
7:00 AM to 7:59 AM	41	150	172	207	145	147	50	912
8:00 AM to 8:59 AM	79	211	250	238	206	224	118	1326
9:00 AM to 9:59 AM	158	307	295	300	347	323	212	1942
10:00 AM to 10:59 AM	181	385	435	379	416	427	277	2500
11:00 AM to 11:59 AM	203	453	467	506	484	504	347	2964
12:00 Noon to 12:59 PM	289	492	510	533	553	631	314	3322
1:00 PM to 1:59 PM	262	514	478	519	536	585	327	3221
2:00 PM to 2:59 PM	205	464	486	461	513	572	276	2977
3:00 PM to 3:59 PM	183	512	528	529	531	622	282	3187
4:00 PM to 4:59 PM	181	414	409	420	463	519	266	2672
5:00 PM to 5:59 PM	180	378	379	428	403	413	198	2379
6:00 PM to 6:59 PM	164	192	213	222	235	227	196	1449
7:00 PM to 7:59 PM	99	91	113	110	107	130	115	765
8:00 PM to 8:59 PM	53	74	73	87	83	92	84	546
9:00 PM to 9:59 PM	35	32	40	39	50	59	57	312
10:00 PM to 10:59 PM	23	16	22	22	16	25	34	158
11:00 PM to 11:59 PM	13	5	8	10	10	17	13	76
Unknown	2	0	2	1	3	3	1	12
TOTAL	2428	4808	4993	5137	5244	5643	3254	31507

This display shows what times these day of travel are taking place. The red is not stating a higher frequency, as can easily be noticed. It is showing that a higher proportion of travel occurs during the older driver weekend travel then occurs on weekdays.

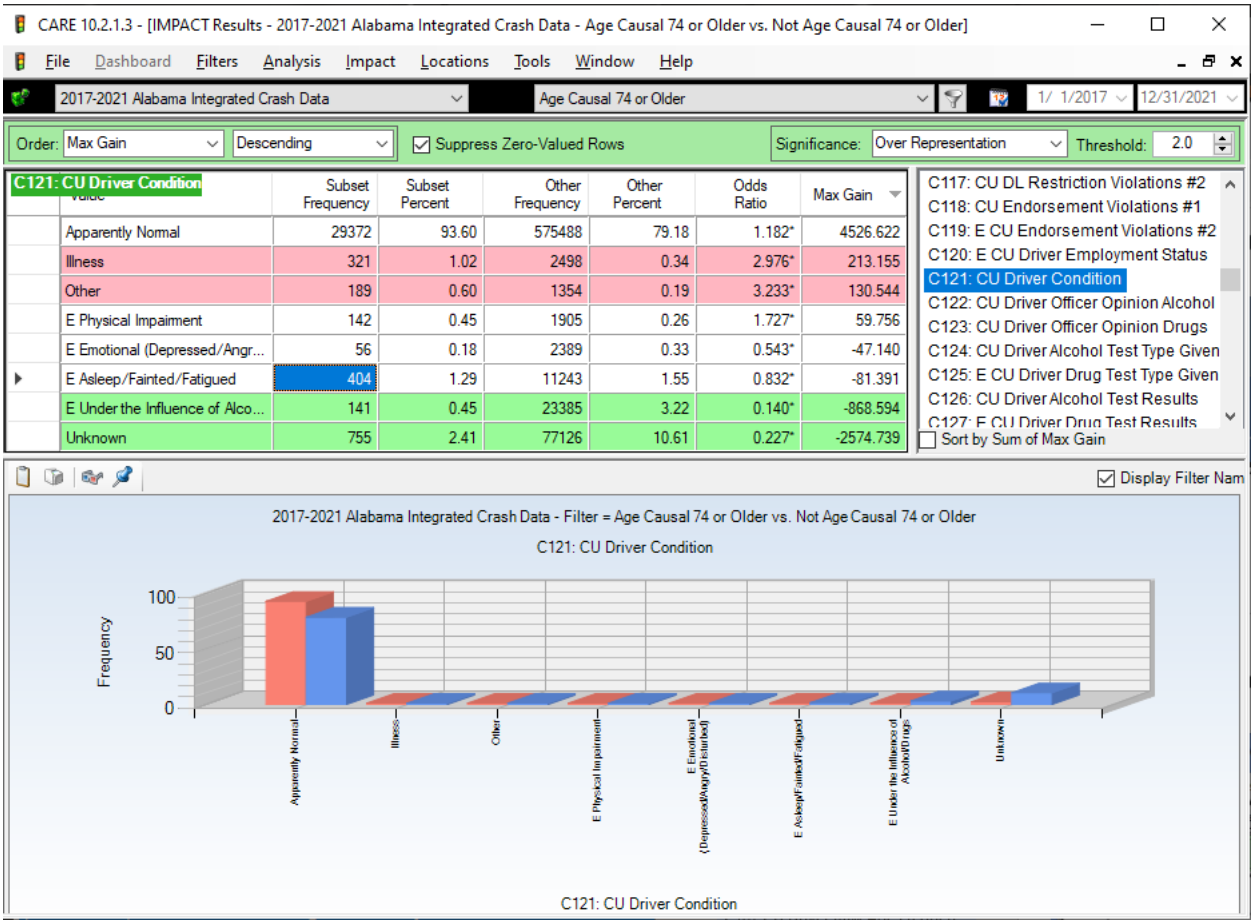
Driver Characteristics

C107 CU Driver Raw Age Frequency Distribution



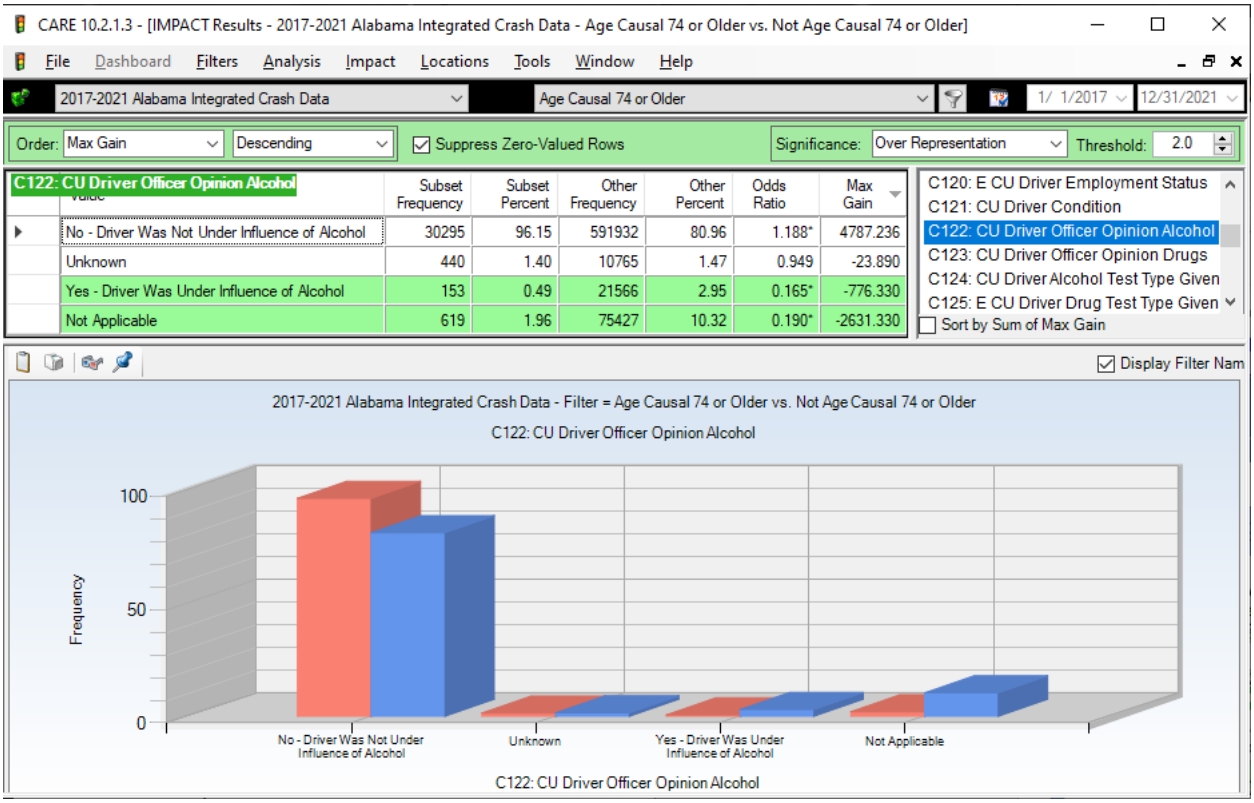
All causal drivers are in the 74 or greater range. Notice how they diminish exponentially from age 74, 3570 (11.33%) down to age 98, 19 (0.06%), with 99 showing all 99 or higher 253 (0.8%).

C023 CU Driver Condition



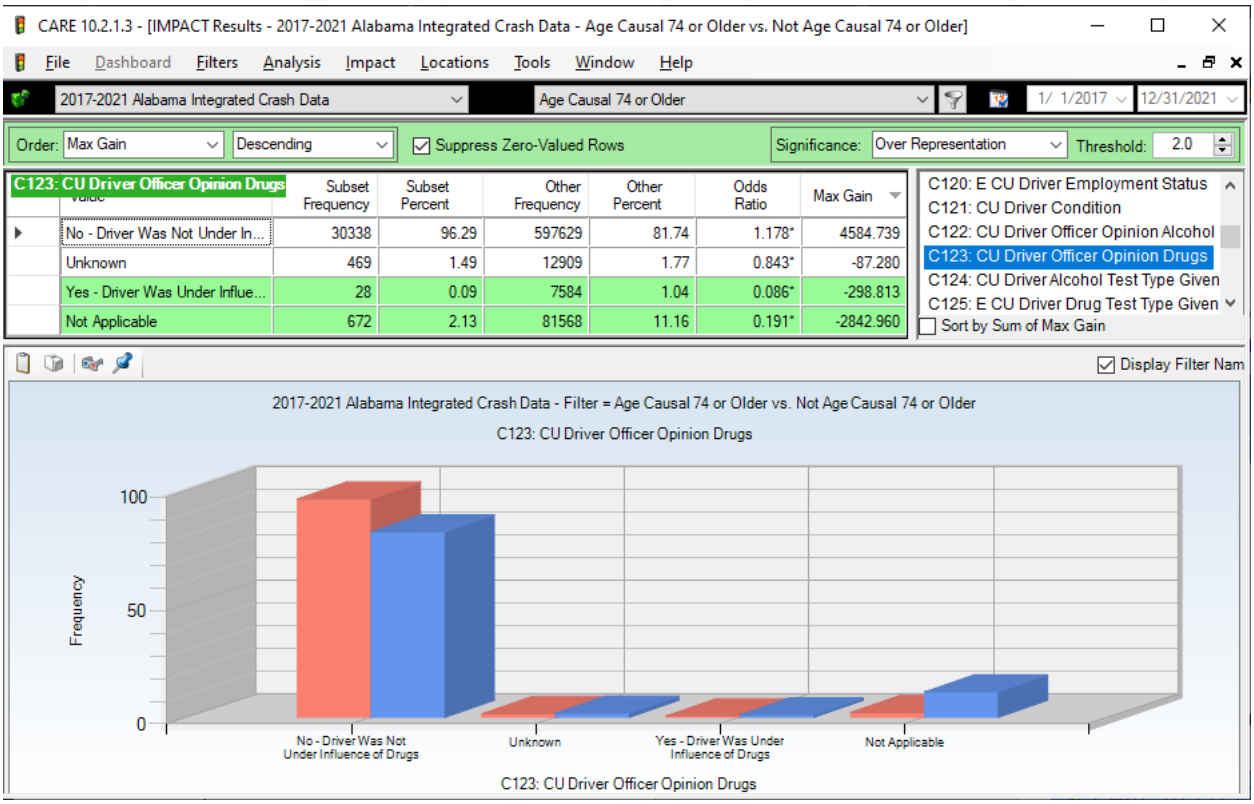
The item with the highest frequency, Asleep/Fainted/Fatigued, has a relatively low proportion and is thus under-represented (i.e., not necessarily a major problem for the older drivers). On the other hand, Illness has almost three times its expected number (321; 1.02%) in comparison with the younger ages (0.34%). Alcohol and/or other drugs do not seem to be a major problem for older drivers.

C122 CU Driver Officer Opinion Alcohol



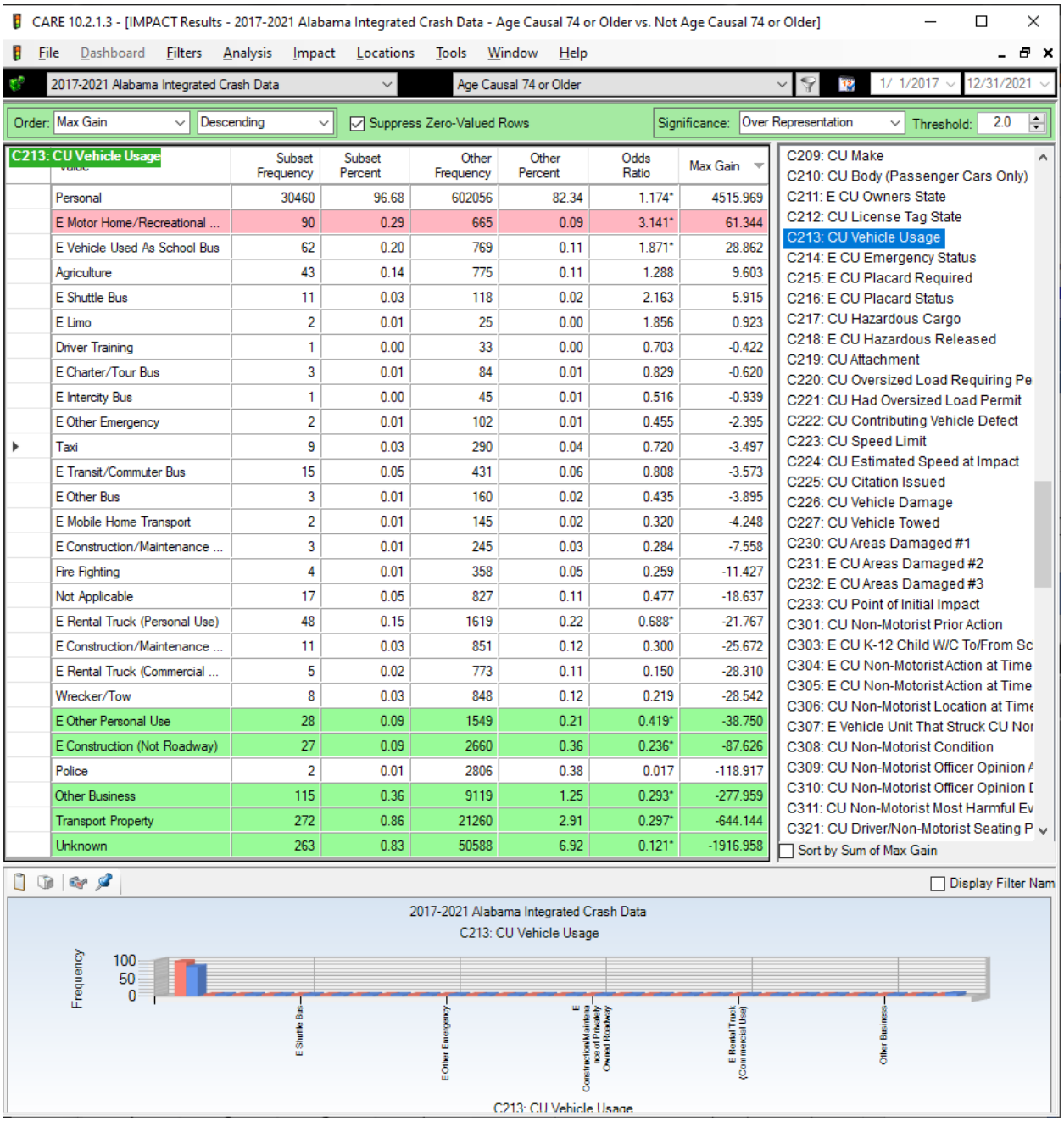
See next summary.

C123 CU Driver Officer Opinion Drugs



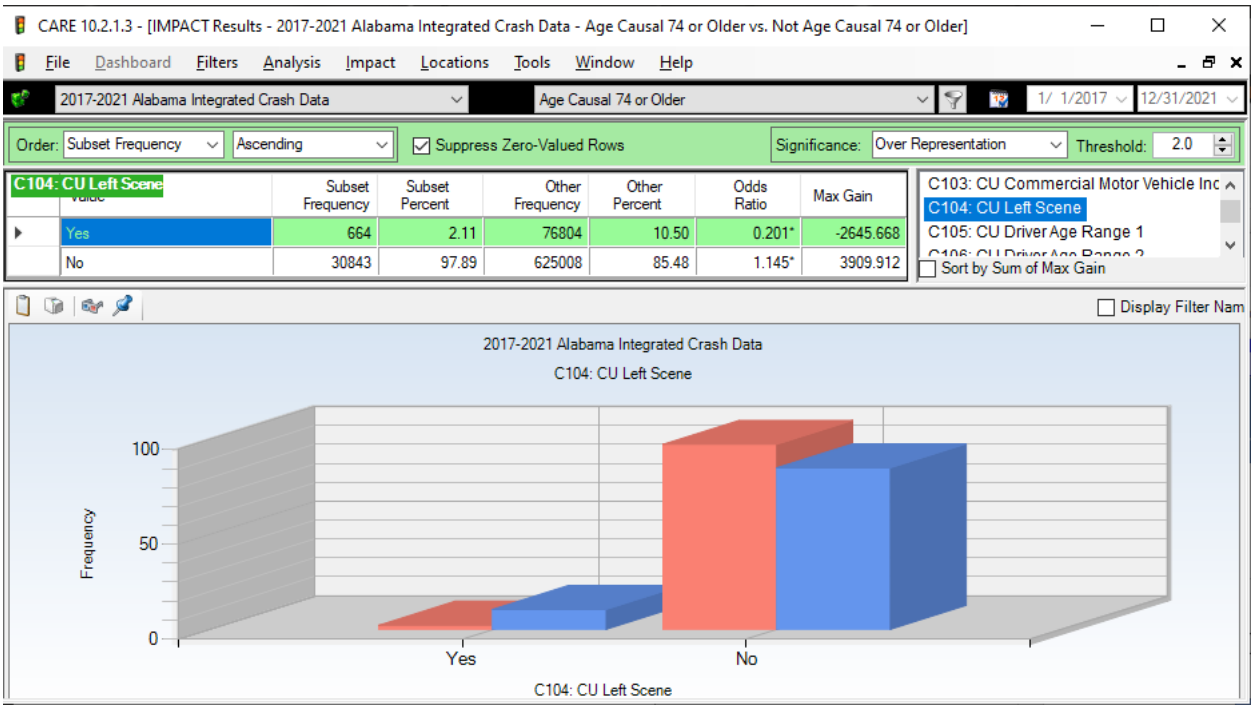
Both non-alcohol drugs and alcohol were dramatically under-represented showing that older drivers have very little problem with either of these intoxicants. For alcohol the younger drivers had a proportion that was over six (6.02) times the proportion as the older drivers. For non-alcohol drugs, the multiplier was 11.56 time the older driver proportion. In five years only 28 drivers were found to be under the influence of drugs, and only 153 were found to be under the influence of alcohol.

C213 CU Vehicle Usage



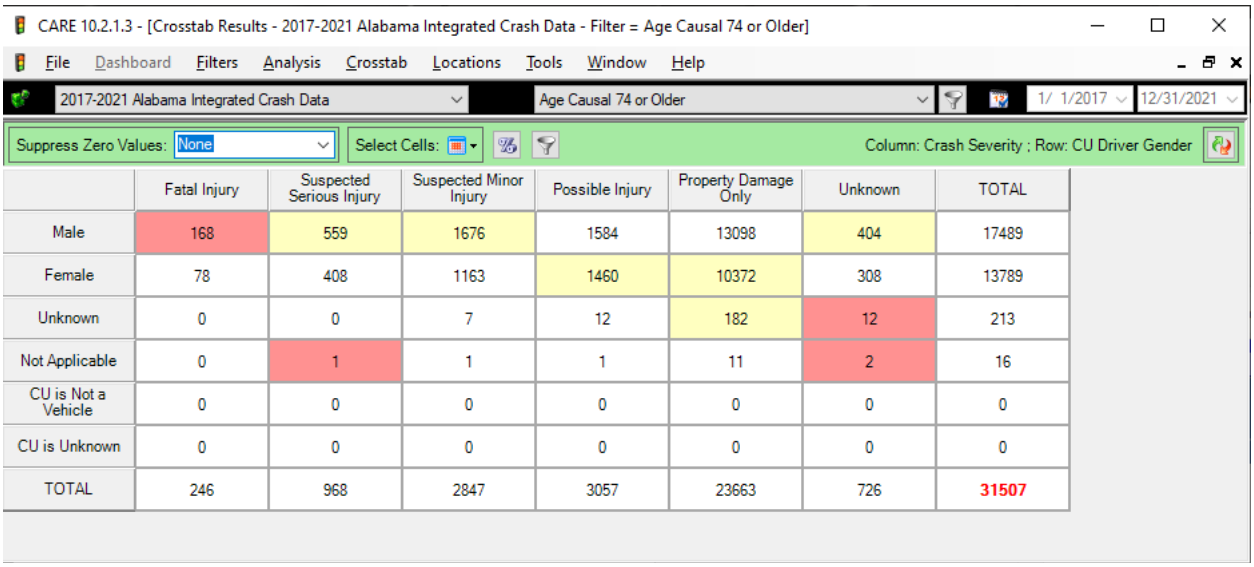
Older drivers use their vehicles for personal travel almost 10% (1.097 Odds Ratio) more than younger drivers. The presence of busses in this list would account for the very large number of persons involve in a few of their crashes. No statistical analyses are run for any item with less that 20 occurrences.

C104 CU Left the Scene



Leaving the scene of a crash occurs five (4.97) times more with the younger drivers than with the older driver subset.

C109 Driver Gender by Severity

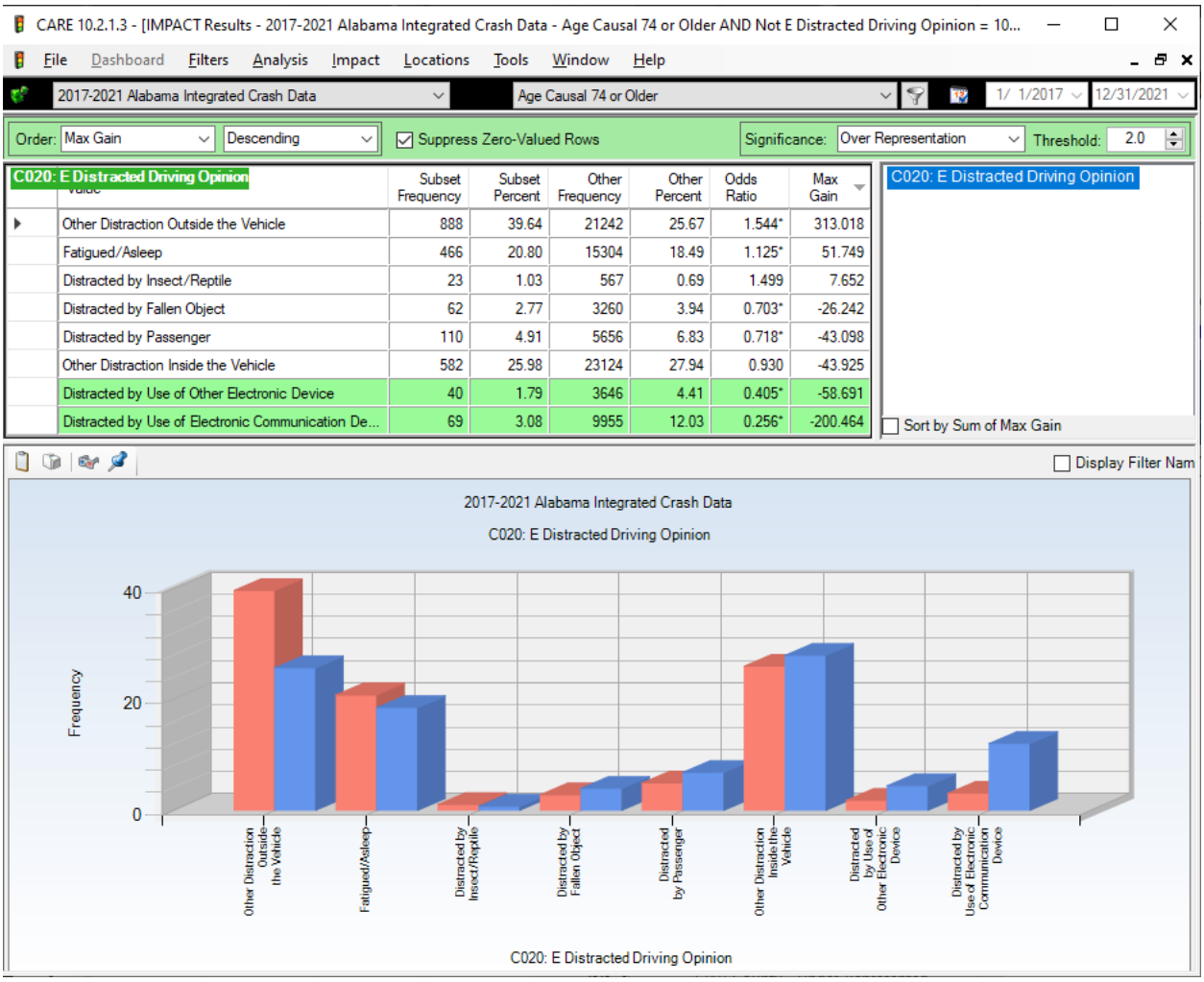


	Fatal Injury	Suspected Serious Injury	Suspected Minor Injury	Possible Injury	Property Damage Only	Unknown	TOTAL
Male	168	559	1676	1584	13098	404	17489
Female	78	408	1163	1460	10372	308	13789
Unknown	0	0	7	12	182	12	213
Not Applicable	0	1	1	1	11	2	16
CU is Not a Vehicle	0	0	0	0	0	0	0
CU is Unknown	0	0	0	0	0	0	0
TOTAL	246	968	2847	3057	23663	726	31507

The above display is only for the older dataset.

Males are the cause of over twice the number of fatal crashes involving the older age dataset. Generally their crashes are more severe than are those of females.

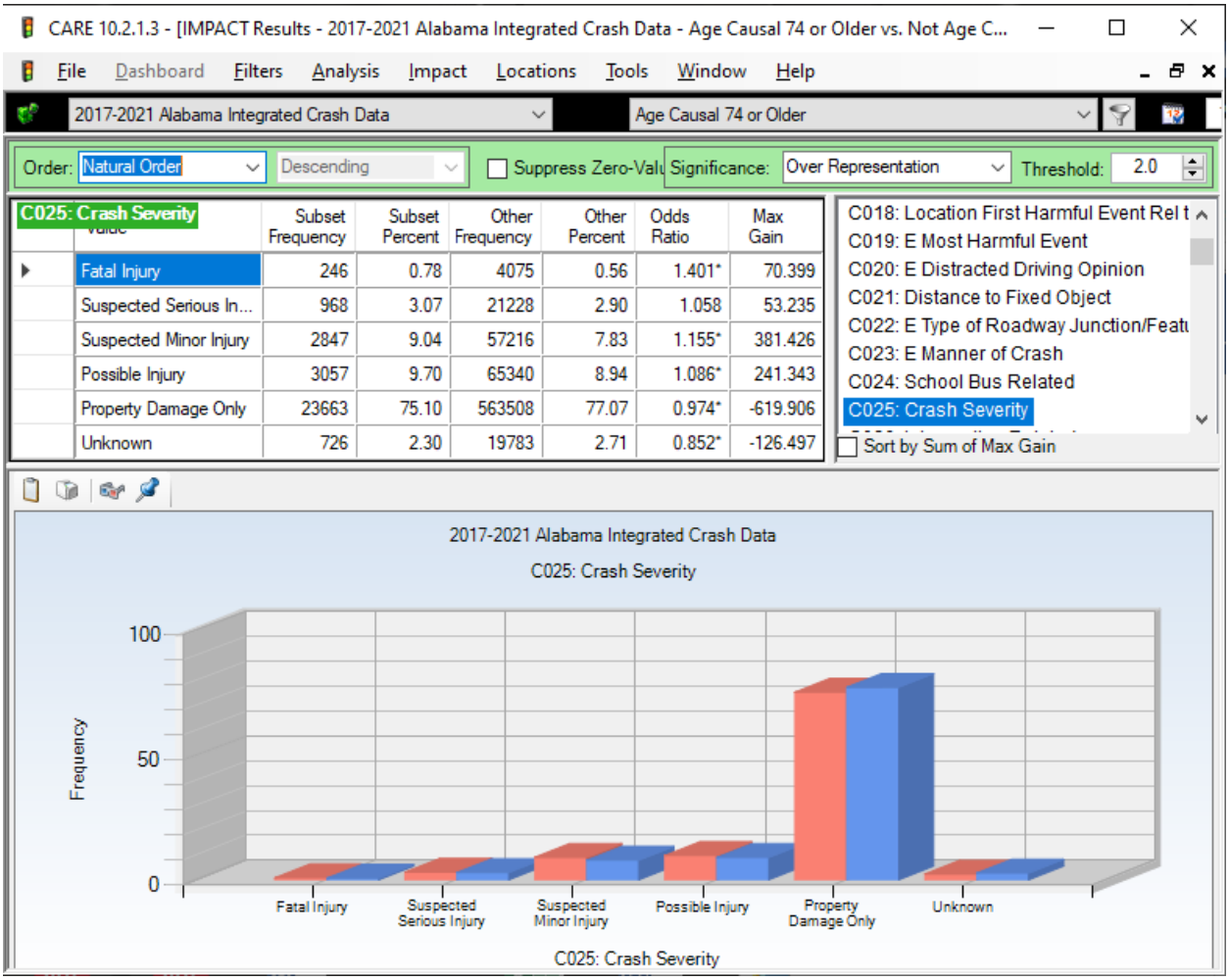
C020 E Distracted Driving Opinion



No Distractions and other meaningless items were removed from the above display. This leaves the largest items to be Other Distractions Outside the Vehicle (888), Fatigued/Asleep (466) and Other Distraction Inside the Vehicle (582 but under-represented). Both Electronic Device items were highly significantly under-represented (less than half of expectations), showing from a comparative point of view, older drivers have a relatively small problem with electronic and communication devices.

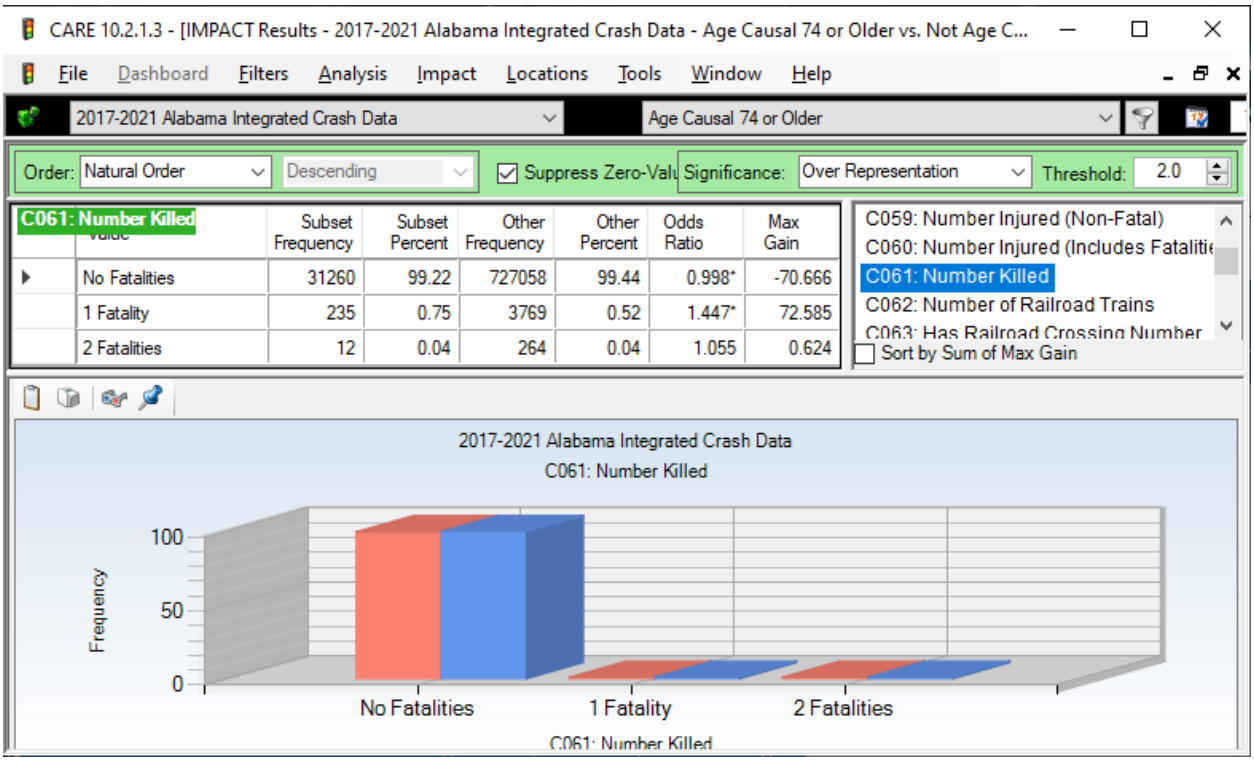
Severity Characteristics

C025 Crash Severity



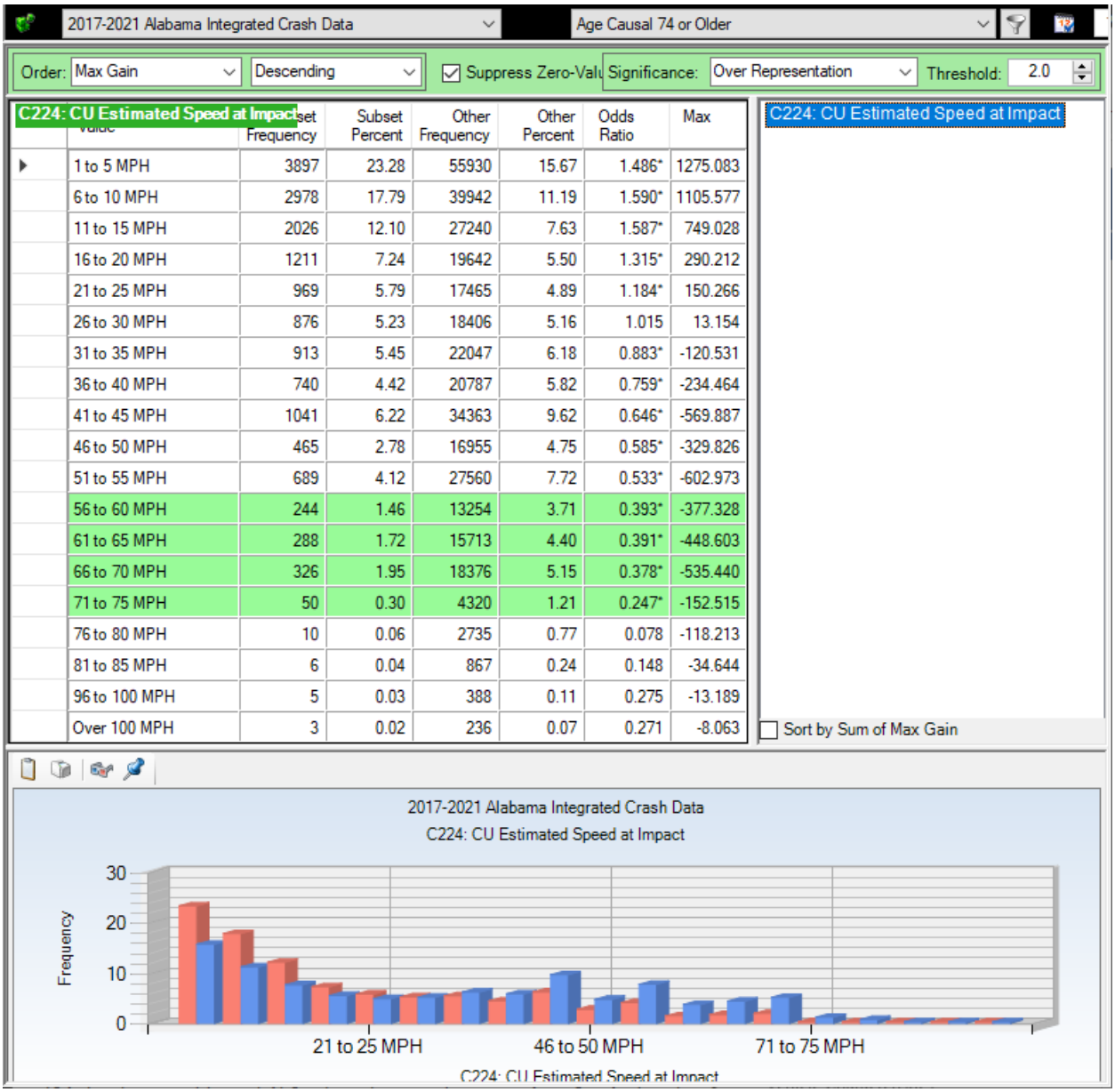
Fatal Injury is over-represented, not because the senior driver is taking risks speeding, but because the recovery chances for older ages is not as good. Fatal Injury are over-represented in the Senior driver group by over 40% (Odds Ratio 1.401). The other two higher severity categories are over-represented as well. Suspected Serious Injury is not statistically significant, perhaps adding credence to the poor survival theory. The only under-represented category is PDO.

C061 Number Killed



It is normal that most fatal crashes would only involve one fatality.

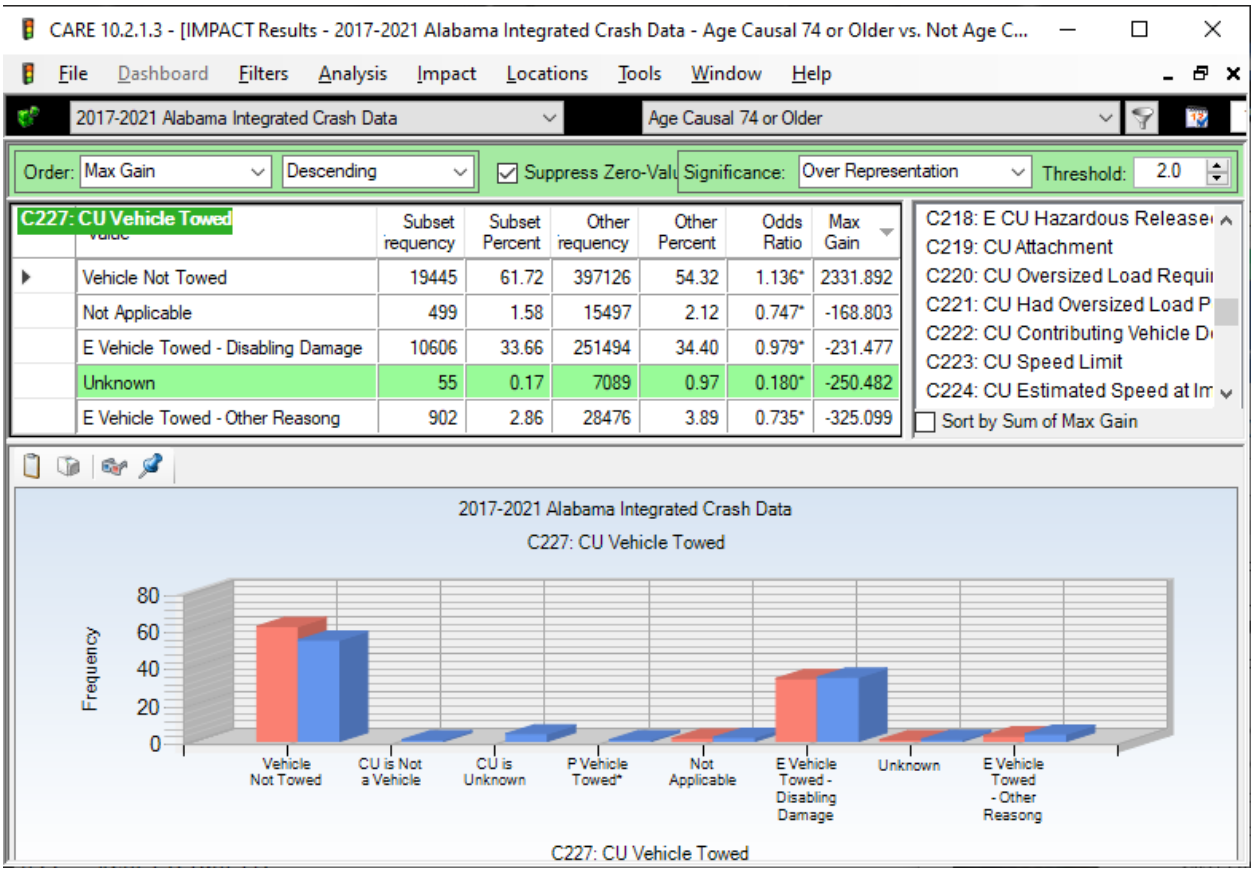
C224 CU Estimated Speed at Impact



Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max
1 to 5 MPH	3897	23.28	55930	15.67	1.486*	1275.083
6 to 10 MPH	2978	17.79	39942	11.19	1.590*	1105.577
11 to 15 MPH	2026	12.10	27240	7.63	1.587*	749.028
16 to 20 MPH	1211	7.24	19642	5.50	1.315*	290.212
21 to 25 MPH	969	5.79	17465	4.89	1.184*	150.266
26 to 30 MPH	876	5.23	18406	5.16	1.015	13.154
31 to 35 MPH	913	5.45	22047	6.18	0.883*	-120.531
36 to 40 MPH	740	4.42	20787	5.82	0.759*	-234.464
41 to 45 MPH	1041	6.22	34363	9.62	0.646*	-569.887
46 to 50 MPH	465	2.78	16955	4.75	0.585*	-329.826
51 to 55 MPH	689	4.12	27560	7.72	0.533*	-602.973
56 to 60 MPH	244	1.46	13254	3.71	0.393*	-377.328
61 to 65 MPH	288	1.72	15713	4.40	0.391*	-448.603
66 to 70 MPH	326	1.95	18376	5.15	0.378*	-535.440
71 to 75 MPH	50	0.30	4320	1.21	0.247*	-152.515
76 to 80 MPH	10	0.06	2735	0.77	0.078	-118.213
81 to 85 MPH	6	0.04	867	0.24	0.148	-34.644
96 to 100 MPH	5	0.03	388	0.11	0.275	-13.189
Over 100 MPH	3	0.02	236	0.07	0.271	-8.063

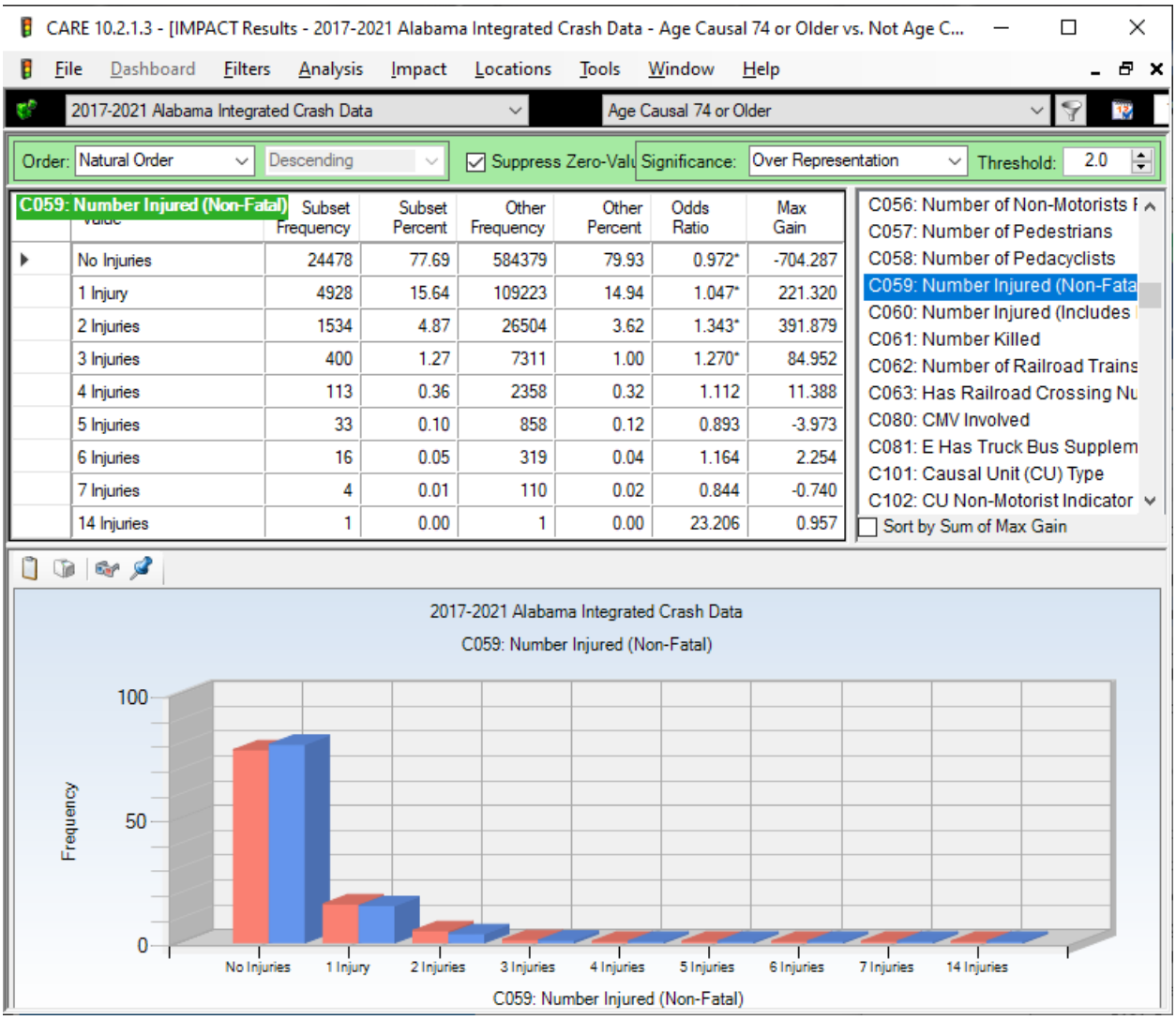
The display above shows that older drivers crash at significantly lower speeds than it typical of younger drivers. All impact speeds above 30 MPH are under-represented to a statistically significant degree. Those above 55 MPH up to 75 MPH had proportions less than half of that of the younger drivers. With this information, a good question that we need to answer is why the older drivers are having significantly more fatalities? Part of that question was addressed in Section C025 above.

C227 CU Vehicle Towed



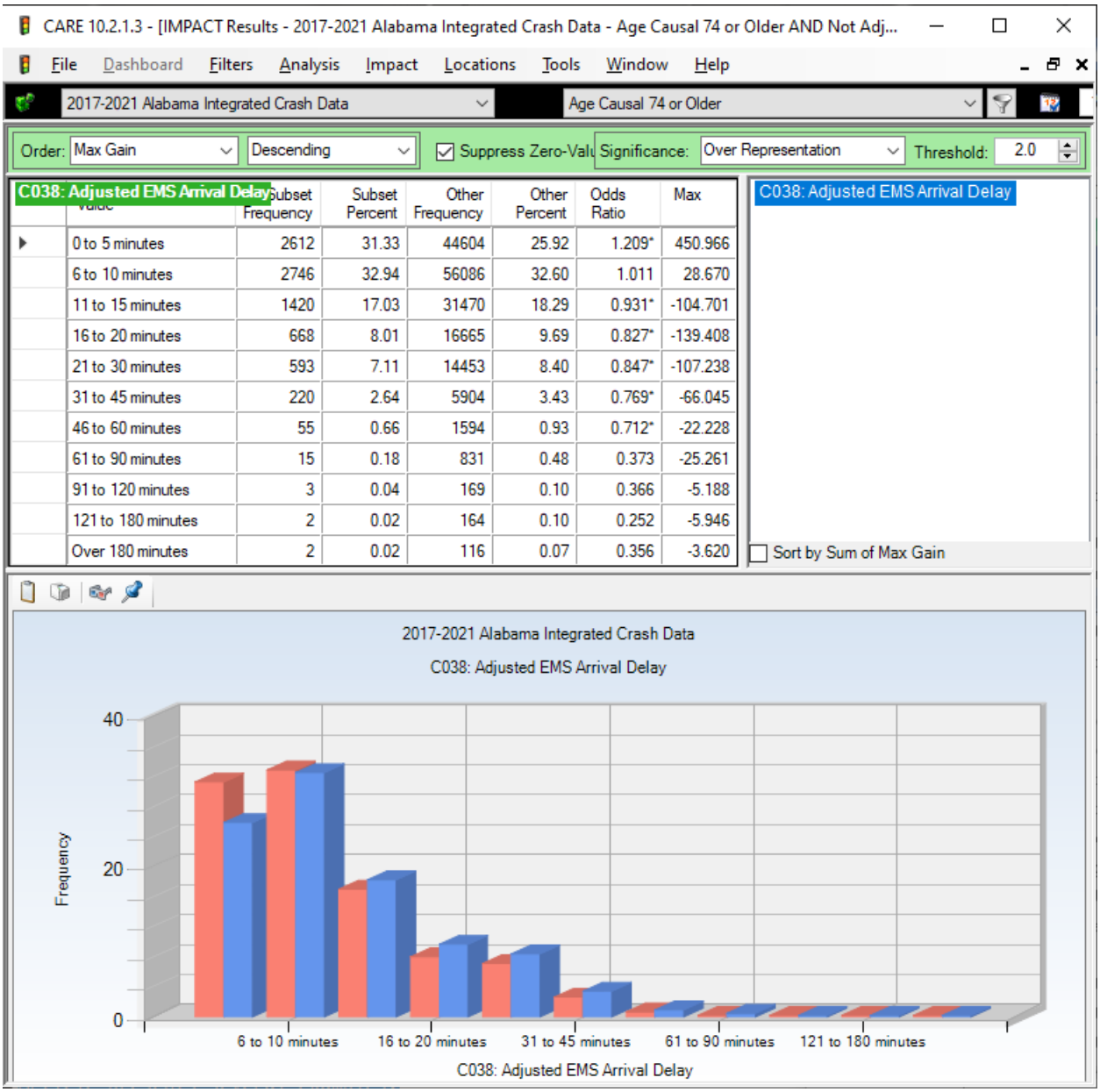
Consistent with their lower impact speeds, older drivers are over-represented in the proportion of their crashed vehicles that are not toed. Towed with Disabling Damage is significantly under-represented, but the proportion values are not too different (33.66 for older drivers; 34.40 for younger drivers).

C059 Number Injured (Non-Fatal)



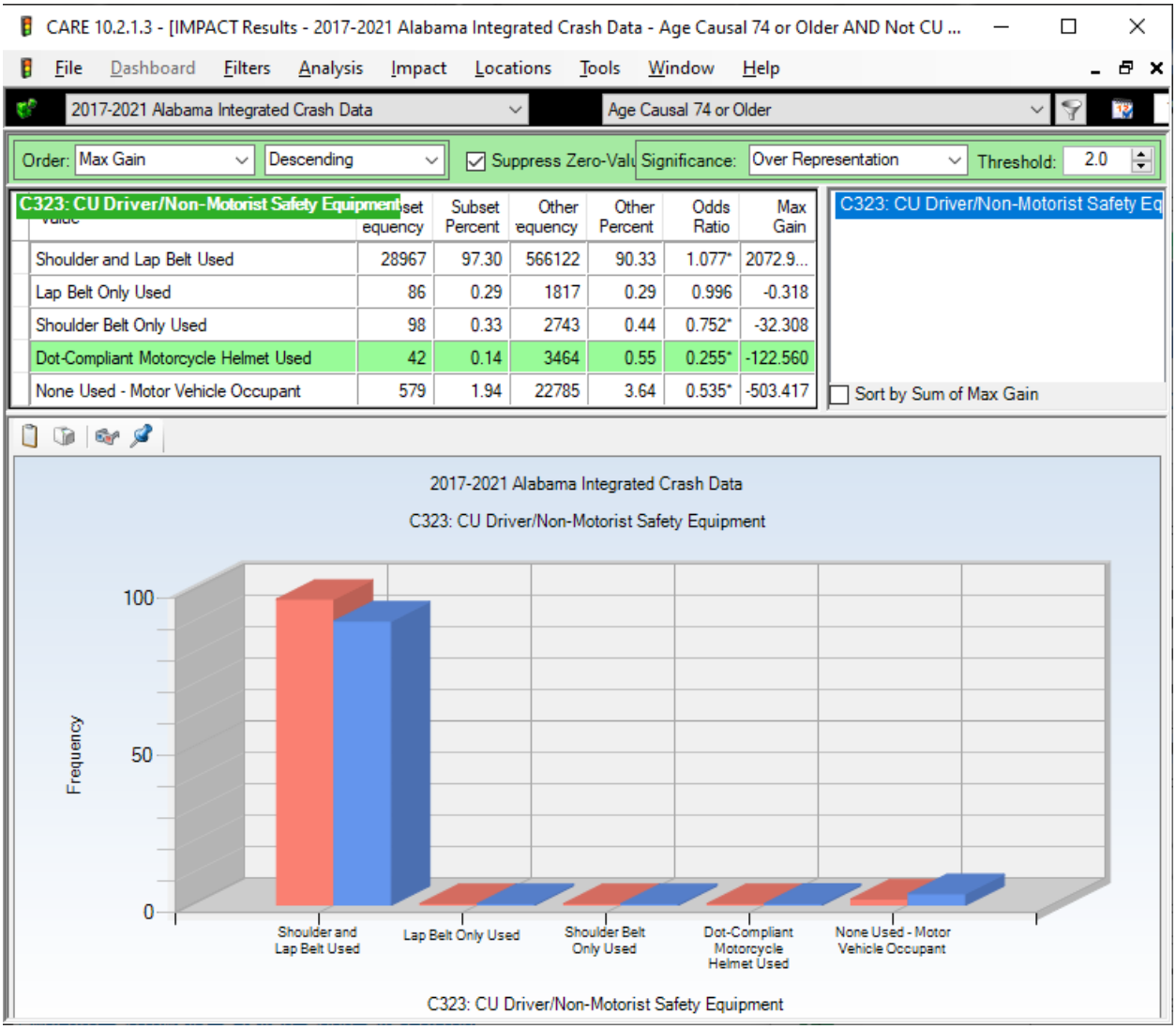
This gives an idea how severe the senior driver crashes were (compared to the younger drivers). Senior drivers are significantly under-represented in crashes with no injuries. They are over-represented in crashes with 1, 2 or 3 injuries.

C038 Adjusted EMS Arrival Delay



The reason for the greater severity in senior driver crashes cannot be blamed on ambulance delay. Senior drivers are over-represented in both of the lowest delay times (0-5 minutes and 6 to 10 minutes), with the lowest of these being quite significant.

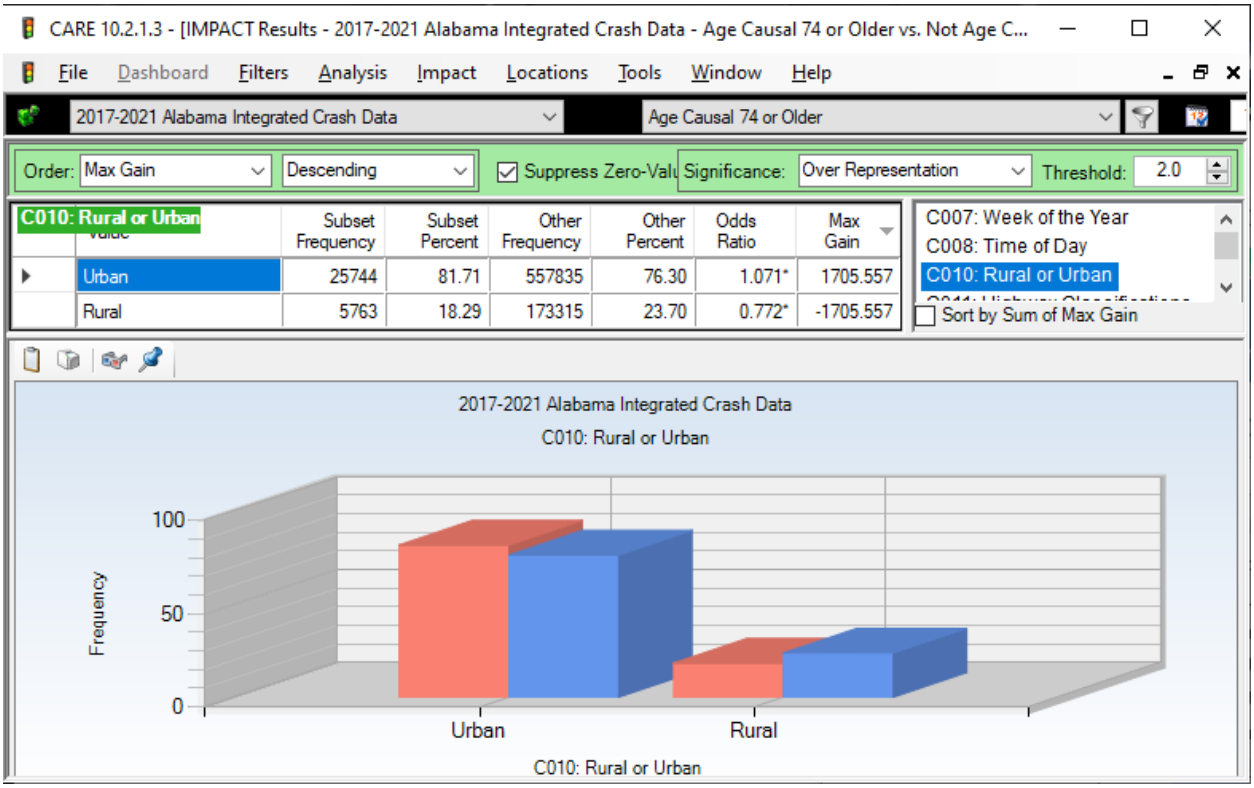
C323 CU Driver Safety Equipment



Senior drivers perform favorably when it comes to seatbelt use.

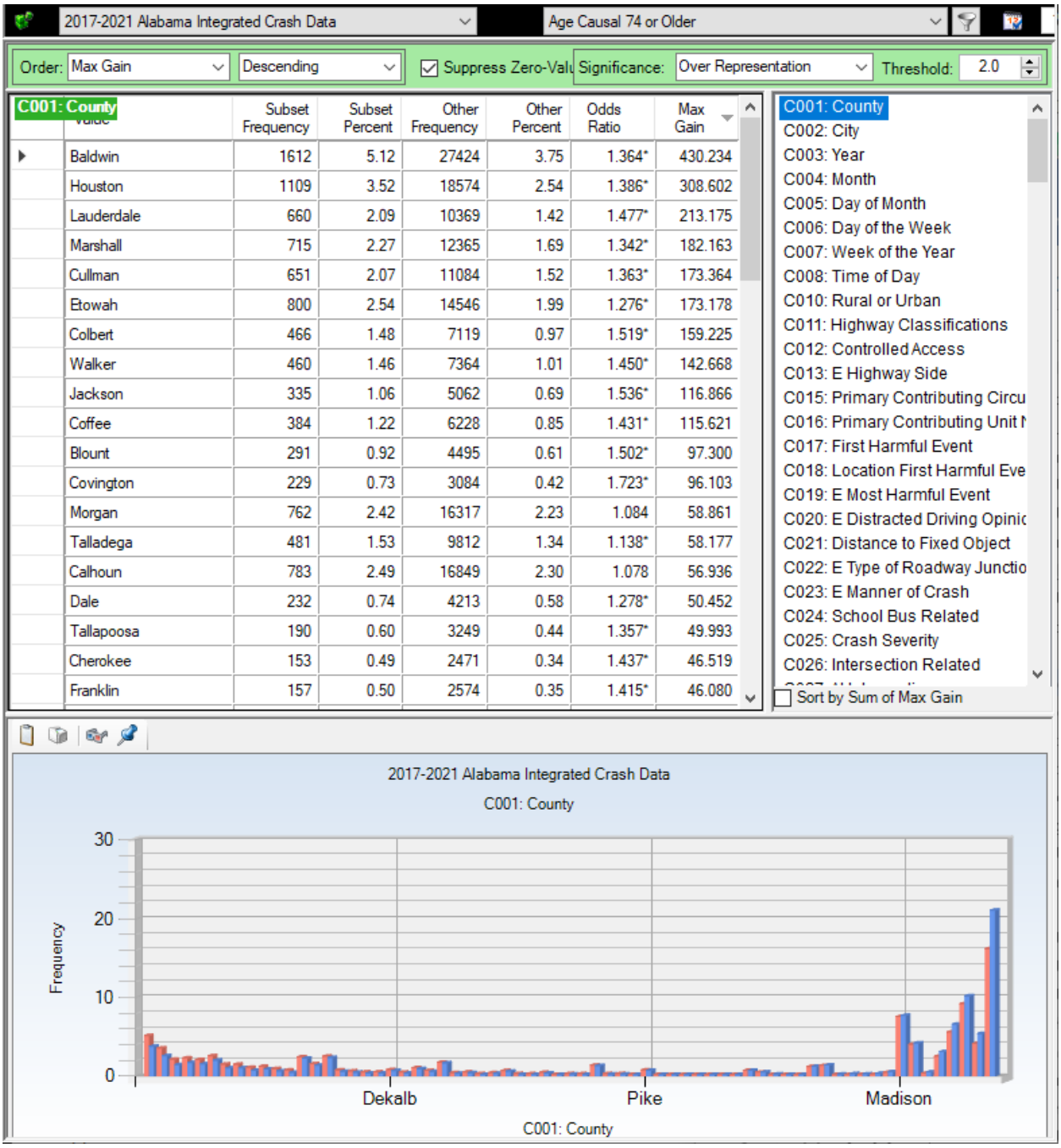
Geographical Characteristics

C010 Rural or Urban



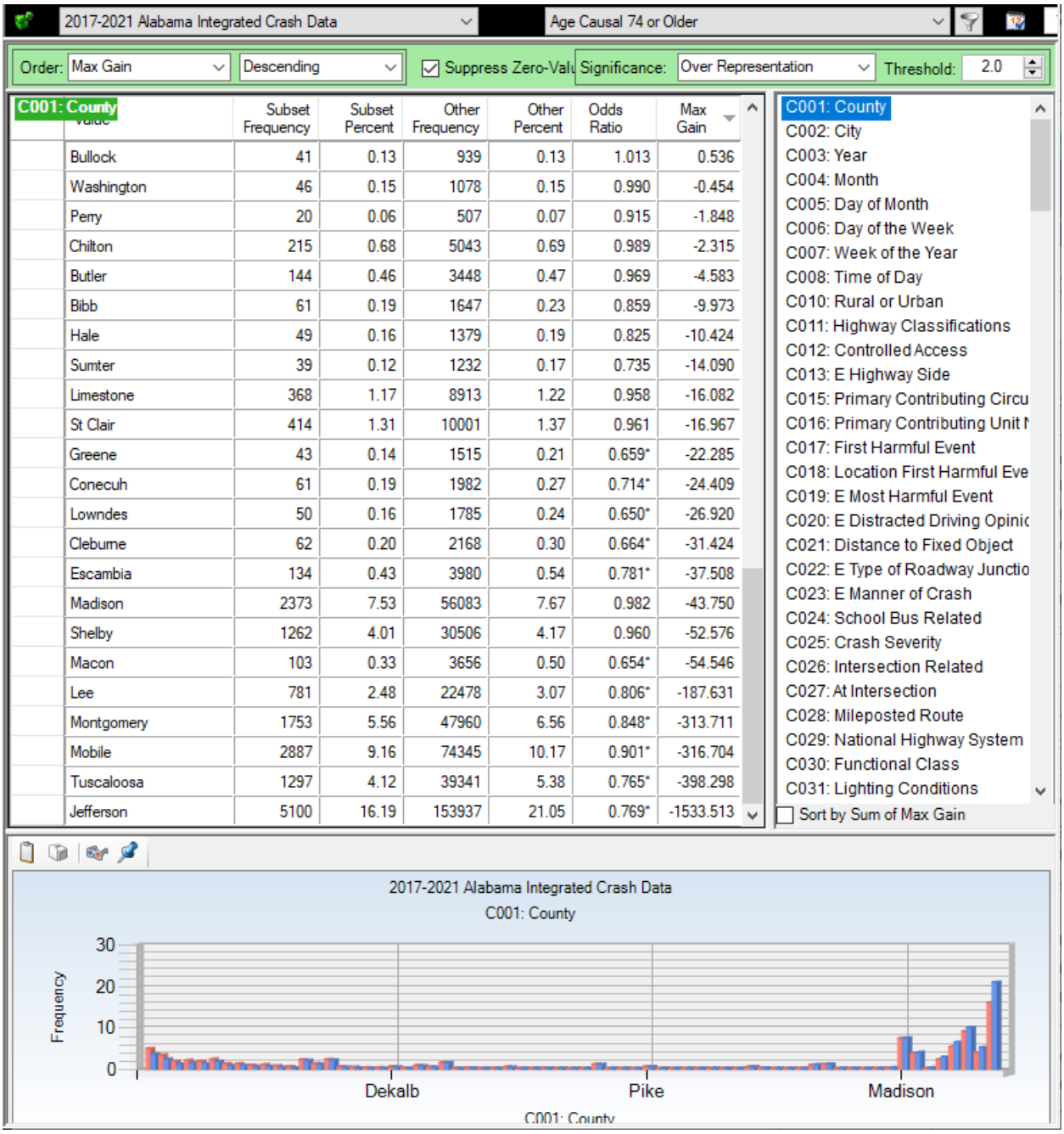
The choice of Rural or Urban driving is not solely on the driver since this depends heavily upon where the homes of the drivers are located. It appear that the older drivers have gravitated toward the more urbanized areas. This would have a heavy influence on their impact speeds.

C001 County – Over-Represented



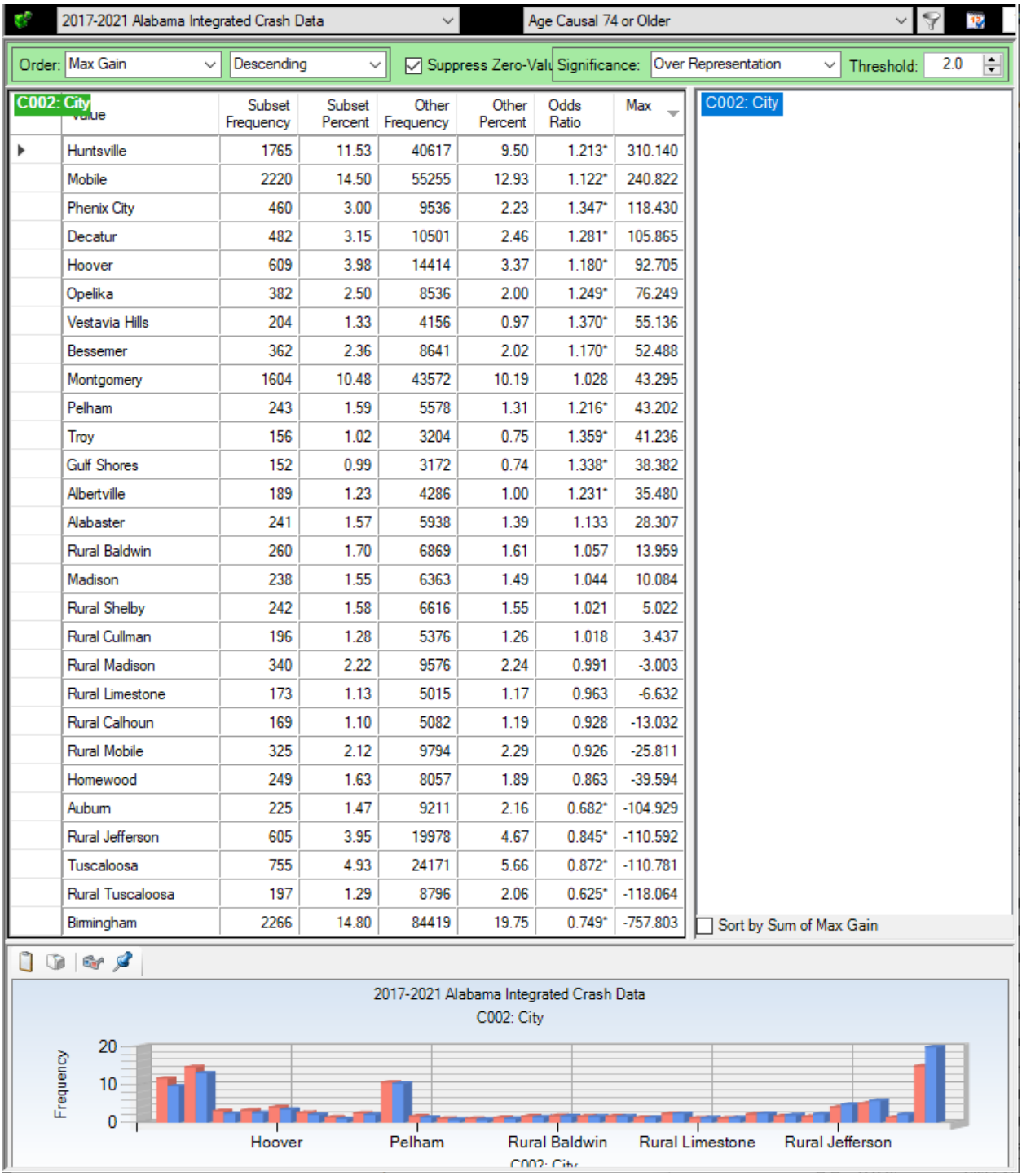
The display above presents all of the counties that had a Max Gain of 40 or more crashes over the five year period. This metric indicates that it the older drivers had the same proportion of crashes as the younger drivers, this number of crashes would have been be reduced.

C001 County – Under-Represented



The above display is all of the under-represented counties in order of the most under-represented at the bottom.

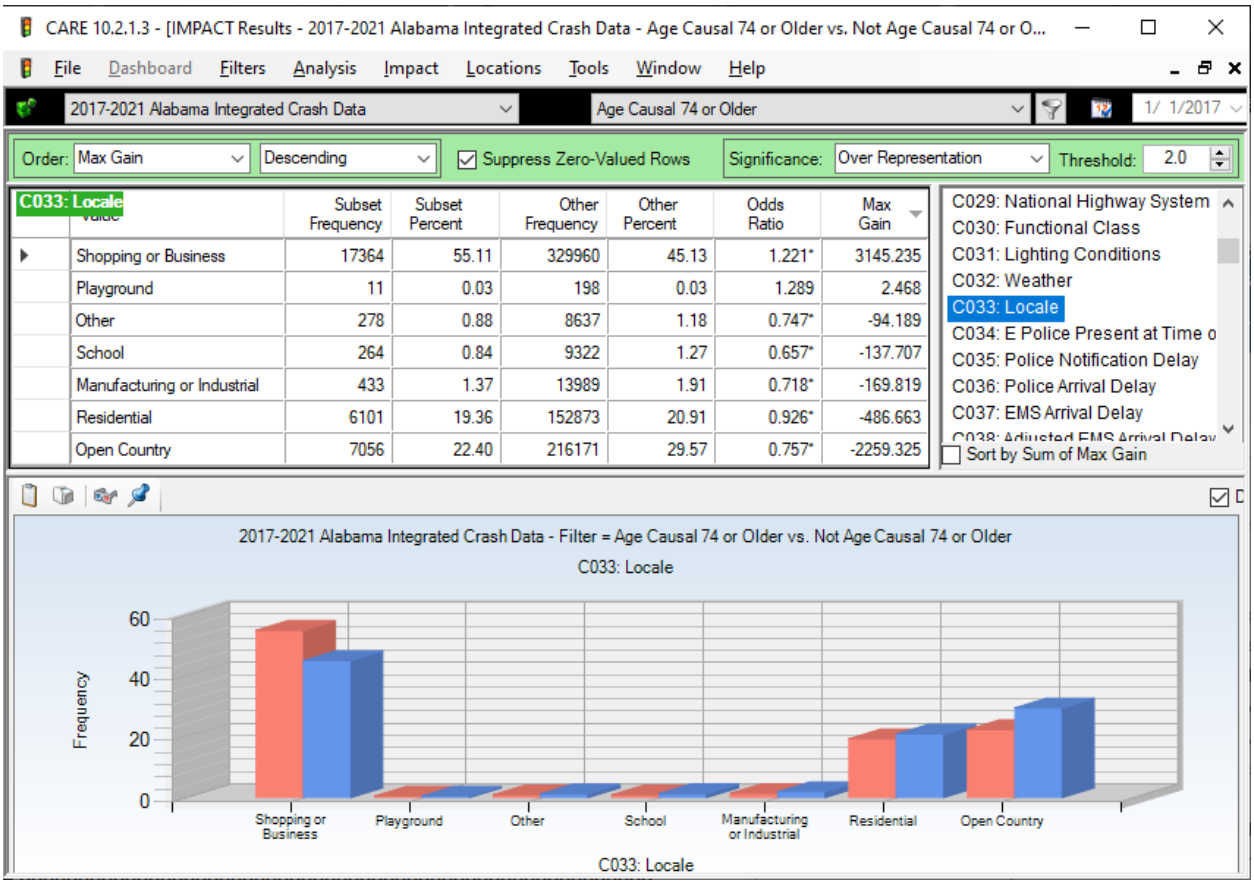
C002 Cities with Largest Numbers of Senior-Driver Crashes



C002: City Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max
Huntsville	1765	11.53	40617	9.50	1.213*	310.140
Mobile	2220	14.50	55255	12.93	1.122*	240.822
Phenix City	460	3.00	9536	2.23	1.347*	118.430
Decatur	482	3.15	10501	2.46	1.281*	105.865
Hoover	609	3.98	14414	3.37	1.180*	92.705
Opelika	382	2.50	8536	2.00	1.249*	76.249
Vestavia Hills	204	1.33	4156	0.97	1.370*	55.136
Bessemer	362	2.36	8641	2.02	1.170*	52.488
Montgomery	1604	10.48	43572	10.19	1.028	43.295
Pelham	243	1.59	5578	1.31	1.216*	43.202
Troy	156	1.02	3204	0.75	1.359*	41.236
Gulf Shores	152	0.99	3172	0.74	1.338*	38.382
Albertville	189	1.23	4286	1.00	1.231*	35.480
Alabaster	241	1.57	5938	1.39	1.133	28.307
Rural Baldwin	260	1.70	6869	1.61	1.057	13.959
Madison	238	1.55	6363	1.49	1.044	10.084
Rural Shelby	242	1.58	6616	1.55	1.021	5.022
Rural Cullman	196	1.28	5376	1.26	1.018	3.437
Rural Madison	340	2.22	9576	2.24	0.991	-3.003
Rural Limestone	173	1.13	5015	1.17	0.963	-6.632
Rural Calhoun	169	1.10	5082	1.19	0.928	-13.032
Rural Mobile	325	2.12	9794	2.29	0.926	-25.811
Homewood	249	1.63	8057	1.89	0.863	-39.594
Auburn	225	1.47	9211	2.16	0.682*	-104.929
Rural Jefferson	605	3.95	19978	4.67	0.845*	-110.592
Tuscaloosa	755	4.93	24171	5.66	0.872*	-110.781
Rural Tuscaloosa	197	1.29	8796	2.06	0.625*	-118.064
Birmingham	2266	14.80	84419	19.75	0.749*	-757.803

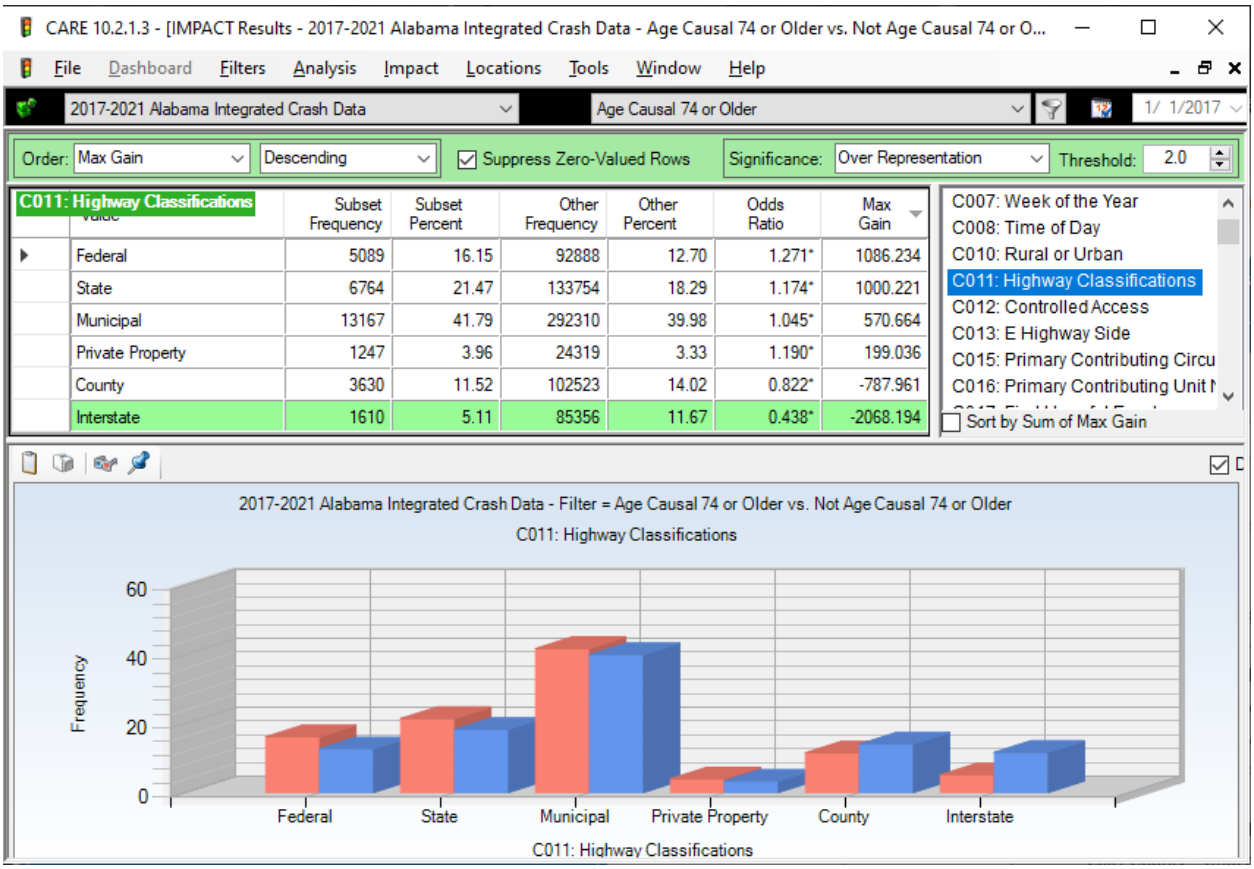
These are cities with greater than 150 senior-driver crashes.

C033 Locale



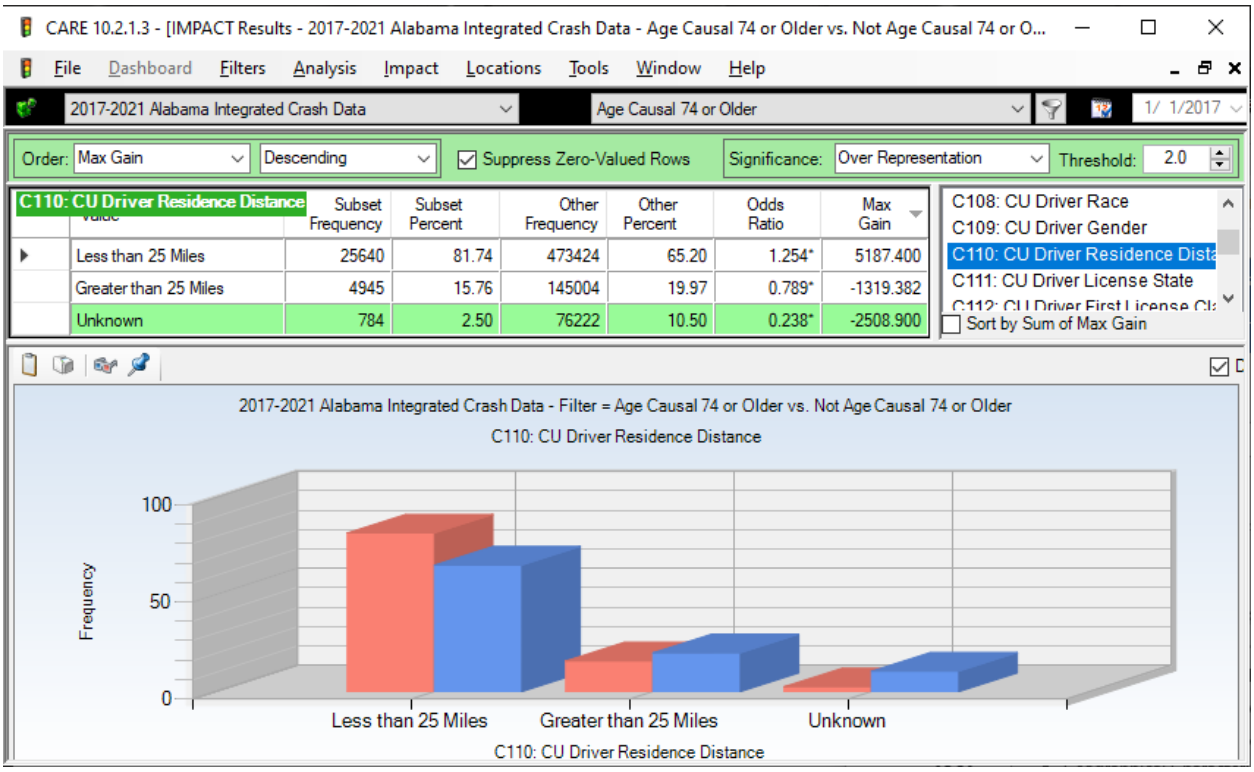
Shopping or Business is the overwhelming locale, with 22.1% more than expected given the proportion for the younger aged subset. Open Country is a distant second with Residential coming in a close third.

C011 Highway Classifications



Older drivers are significantly over-represented in their use of Federal, State, Municipal roadways. County and Interstate classifications are under-represented reflecting their affinity for urban areas.

C110 CU Driver Residence Distance



Over 80% of older driver confine their travel to less than 25 miles from home, as opposed to 65.20% for the younger drivers.

Vehicle Characteristics

C101 Causal Unit (CU) Type

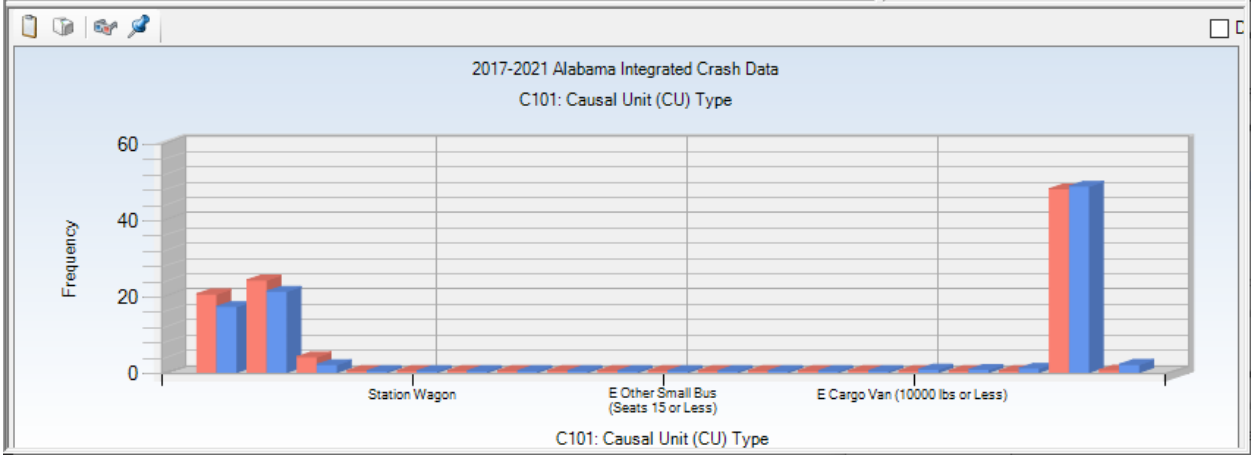
2017-2021 Alabama Integrated Crash Data | Age Causal 74 or Older | 1/ 1/2017

Order: Max Gain | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C101: Causal Unit (CU) Type	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Pick-Up (Four-Tire Light ...	6442	20.49	123973	17.20	1.191*	1034.797
E Sport Utility Vehicle (S...	7588	24.14	152661	21.18	1.140*	929.541
E Mini-van	1268	4.03	14572	2.02	1.995*	632.428
Motor Home/Recreation...	77	0.24	350	0.05	5.044*	61.734
Station Wagon	125	0.40	1720	0.24	1.666*	49.981
E Passenger Van	127	0.40	2175	0.30	1.339*	32.135
E Other Bus (Seats More...	72	0.23	1044	0.14	1.581*	26.465
E Low Speed Vehicle	14	0.04	143	0.02	2.245	7.763
E Van or Mini-Van	36	0.11	741	0.10	1.114	3.681
E Other Small Bus (Seats...	16	0.05	302	0.04	1.215	2.828
E Other Heavy Truck (C...	15	0.05	703	0.10	0.489	-15.662
E Other Passenger Vehicle	16	0.05	955	0.13	0.384	-25.653
E Truck (6 or 7) with Trailer	45	0.14	2140	0.30	0.482*	-48.338
E Single-Unit Truck (3 Ax...	56	0.18	3102	0.43	0.414*	-79.297
E Cargo Van (10000 lbs ...	97	0.31	5833	0.81	0.381*	-157.412
Motorcycle	53	0.17	5277	0.73	0.230*	-177.162
E Single-Unit Truck (2-Ax...	130	0.41	7466	1.04	0.399*	-195.637
Passenger Car	15082	47.98	350894	48.68	0.985*	-222.584
E Tractor/Semi-Trailer	178	0.57	14874	2.06	0.274*	-470.744

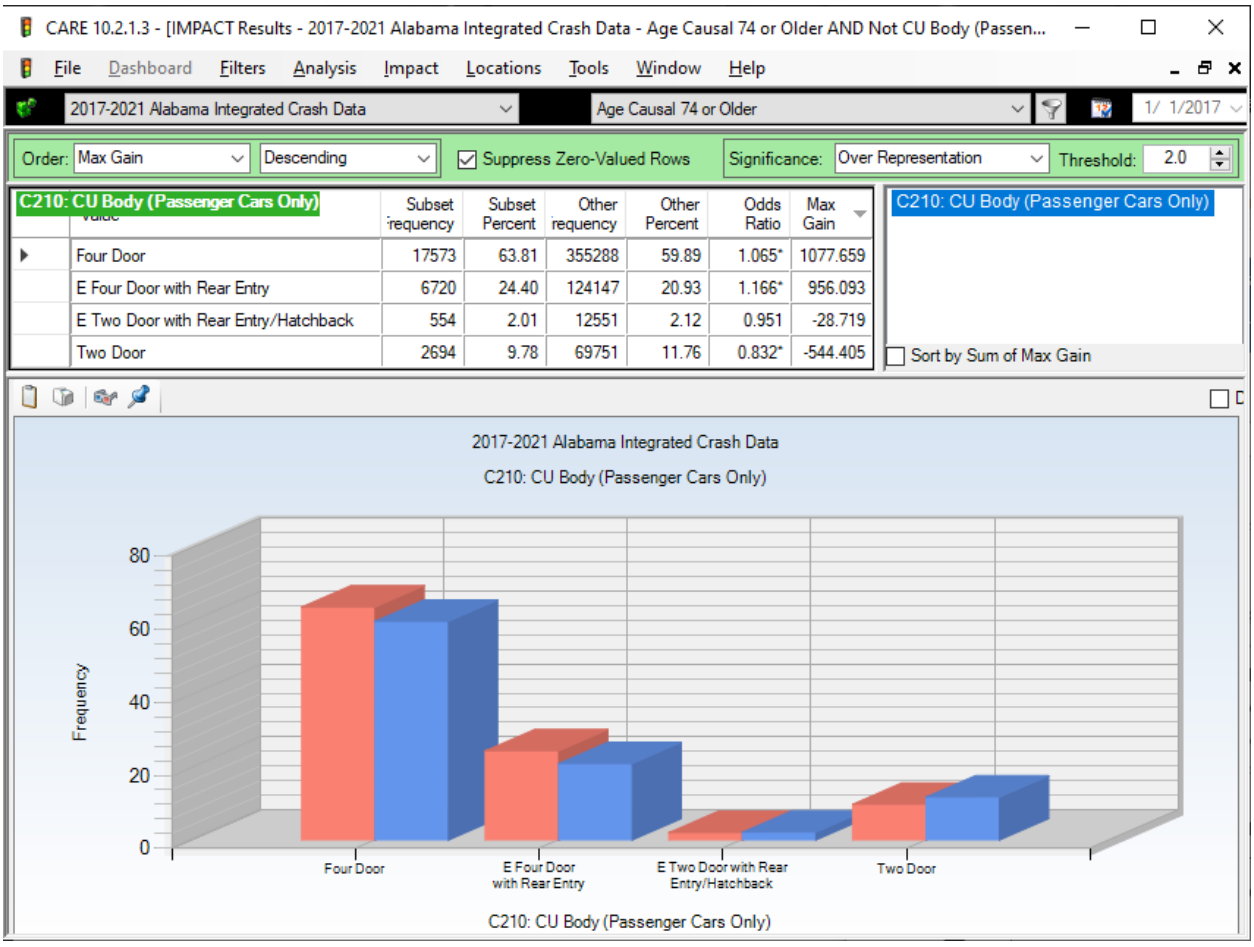
C101: Causal Unit (CU) Type

Sort by Sum of Max Gain



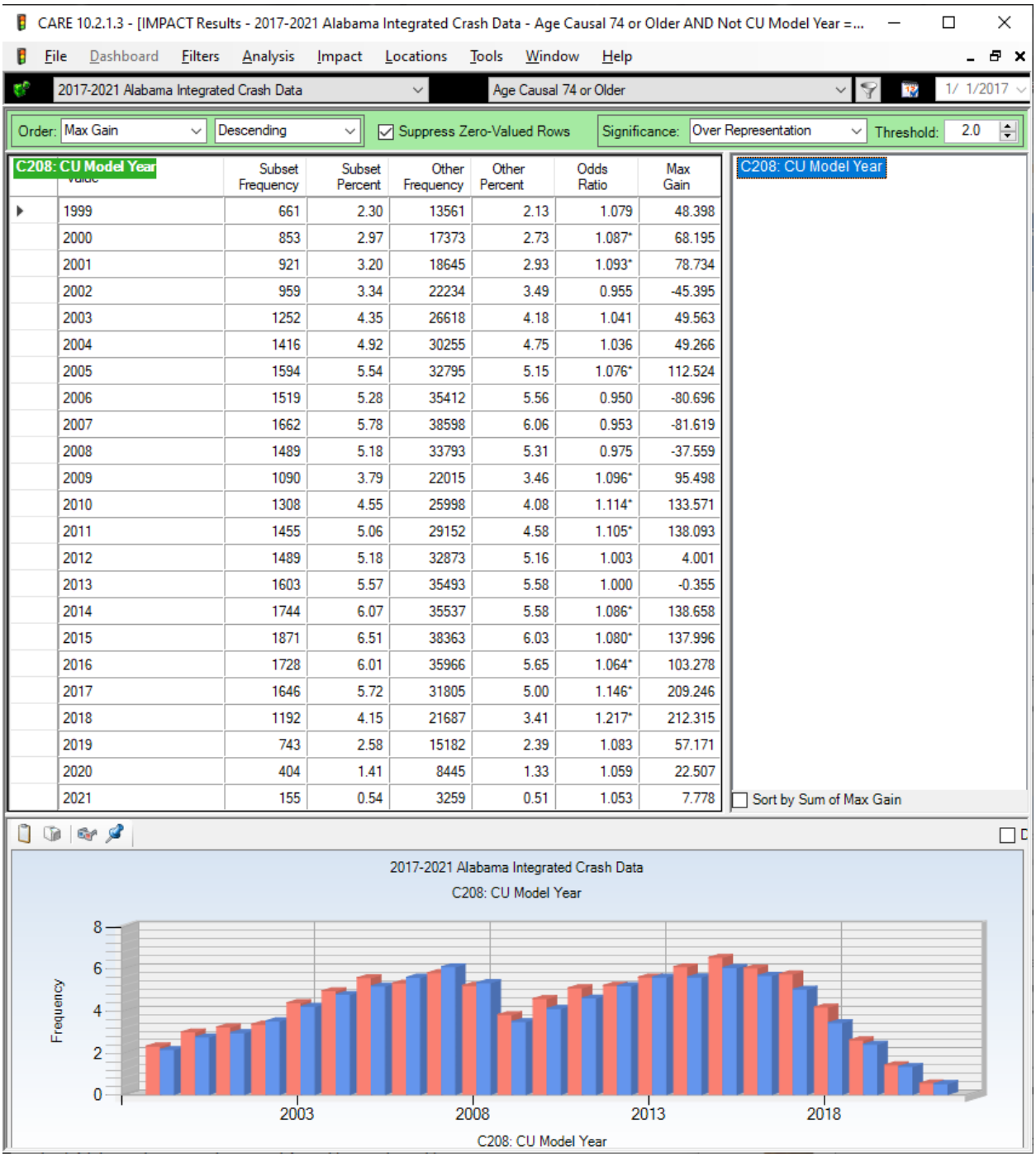
Vehicles with less than 10 occurrences were removed. Passenger Car has the highest frequency, but it is under-represented because of being the favorite of the younger age group. The most over-represented are Pick-Up (Four-Tire Light Truck), Sport Utility Vehicle (SUV), Mini-van, and Motor Home/Recreational Vehicle.

C210 CU Body (Passenger Cars Only)



Older drivers clearly prefer four-door passenger vehicles, while the younger subset tended more toward two-doors.

C208 CU Model Year

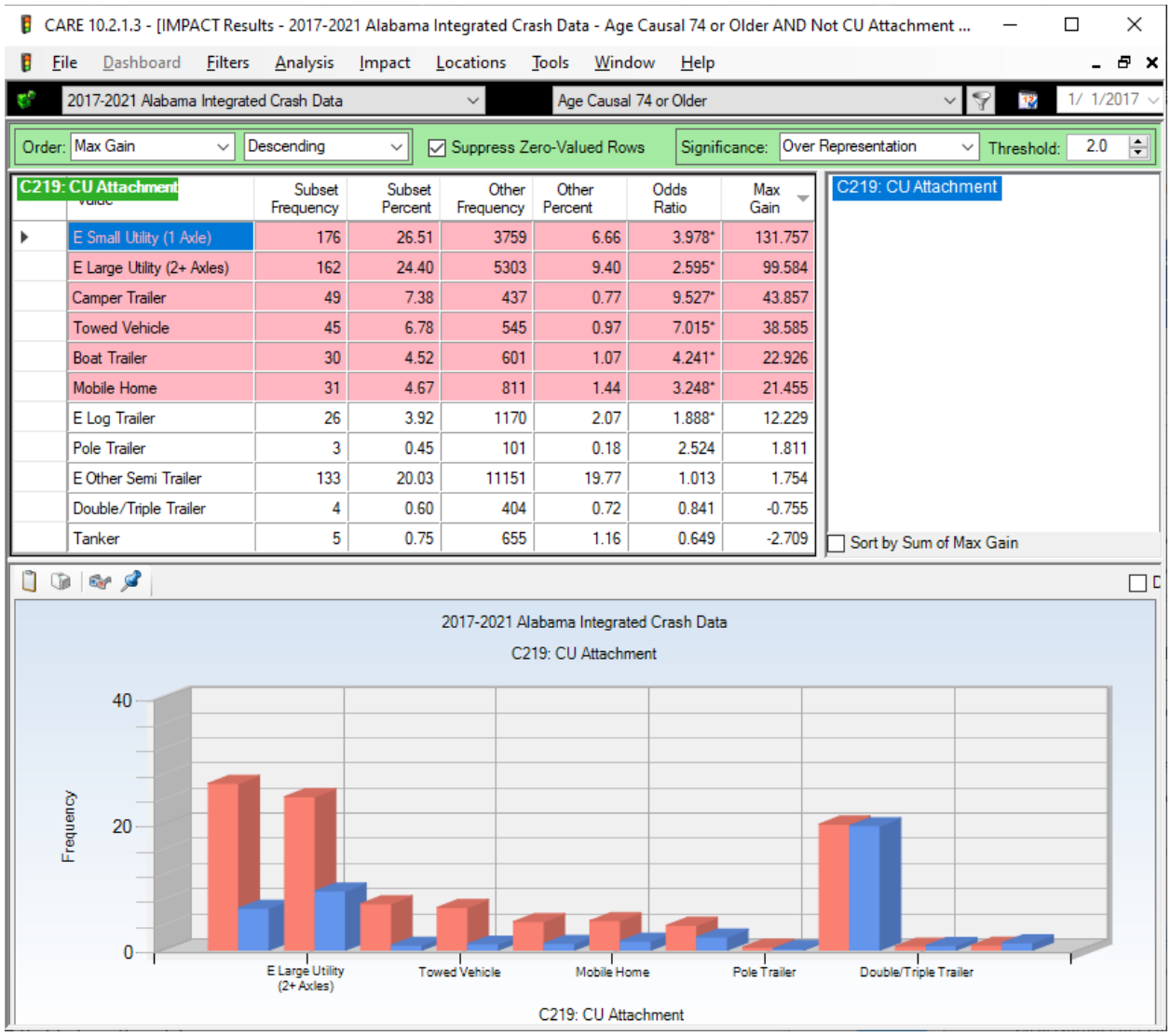


C208: CU Model Year	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
1999	661	2.30	13561	2.13	1.079	48.398
2000	853	2.97	17373	2.73	1.087*	68.195
2001	921	3.20	18645	2.93	1.093*	78.734
2002	959	3.34	22234	3.49	0.955	-45.395
2003	1252	4.35	26618	4.18	1.041	49.563
2004	1416	4.92	30255	4.75	1.036	49.266
2005	1594	5.54	32795	5.15	1.076*	112.524
2006	1519	5.28	35412	5.56	0.950	-80.696
2007	1662	5.78	38598	6.06	0.953	-81.619
2008	1489	5.18	33793	5.31	0.975	-37.559
2009	1090	3.79	22015	3.46	1.096*	95.498
2010	1308	4.55	25998	4.08	1.114*	133.571
2011	1455	5.06	29152	4.58	1.105*	138.093
2012	1489	5.18	32873	5.16	1.003	4.001
2013	1603	5.57	35493	5.58	1.000	-0.355
2014	1744	6.07	35537	5.58	1.086*	138.658
2015	1871	6.51	38363	6.03	1.080*	137.996
2016	1728	6.01	35966	5.65	1.064*	103.278
2017	1646	5.72	31805	5.00	1.146*	209.246
2018	1192	4.15	21687	3.41	1.217*	212.315
2019	743	2.58	15182	2.39	1.083	57.171
2020	404	1.41	8445	1.33	1.059	22.507
2021	155	0.54	3259	0.51	1.053	7.778

Excluding model year with less than 500 vehicles. Older drivers favor the model years of 1999-2001, 2003-2005, and later than 2009.

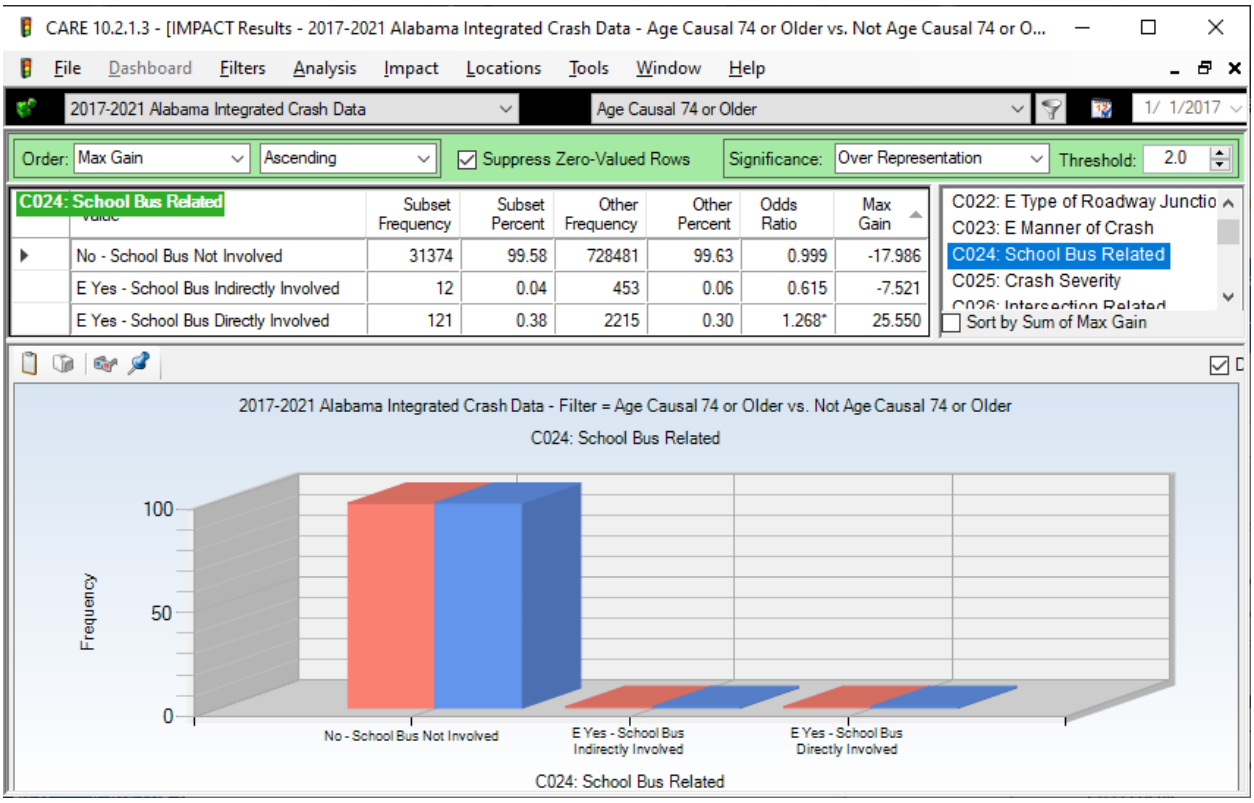
C219 CU Attachments

For crashes involving attachments (the “No Attachments” item was removed).



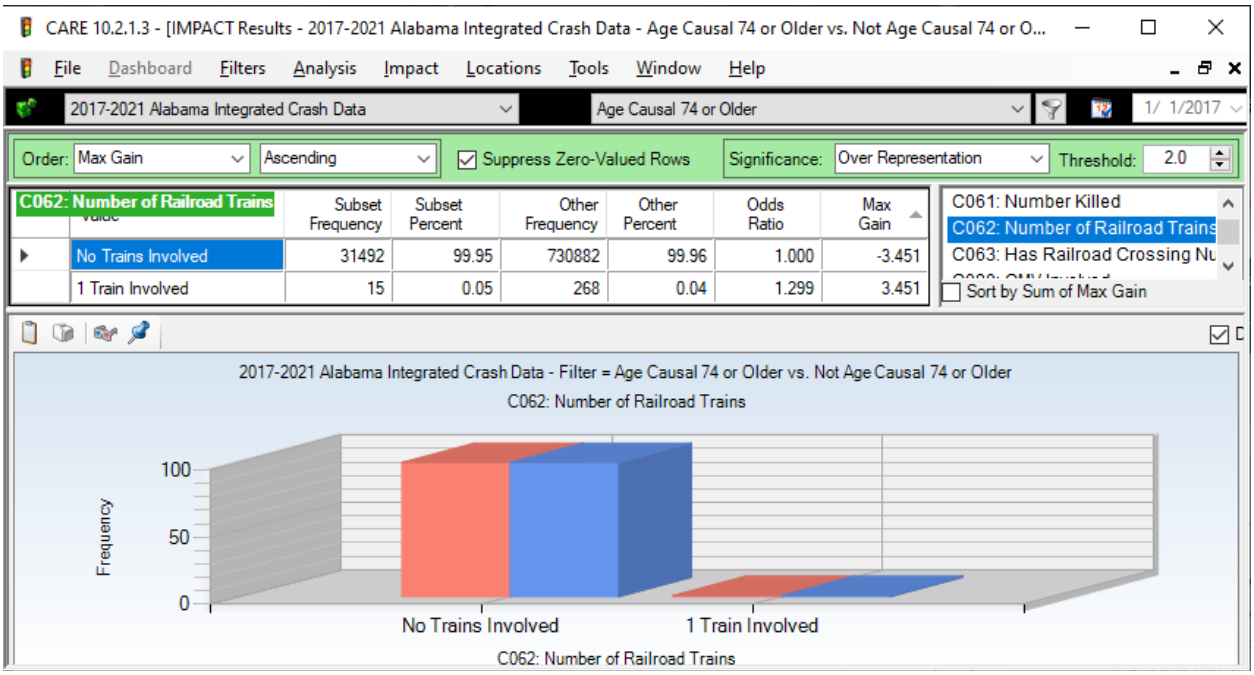
While not predominant, older drivers are still involved in a wide range of vehicles and attachments.

C024 School Bus Related



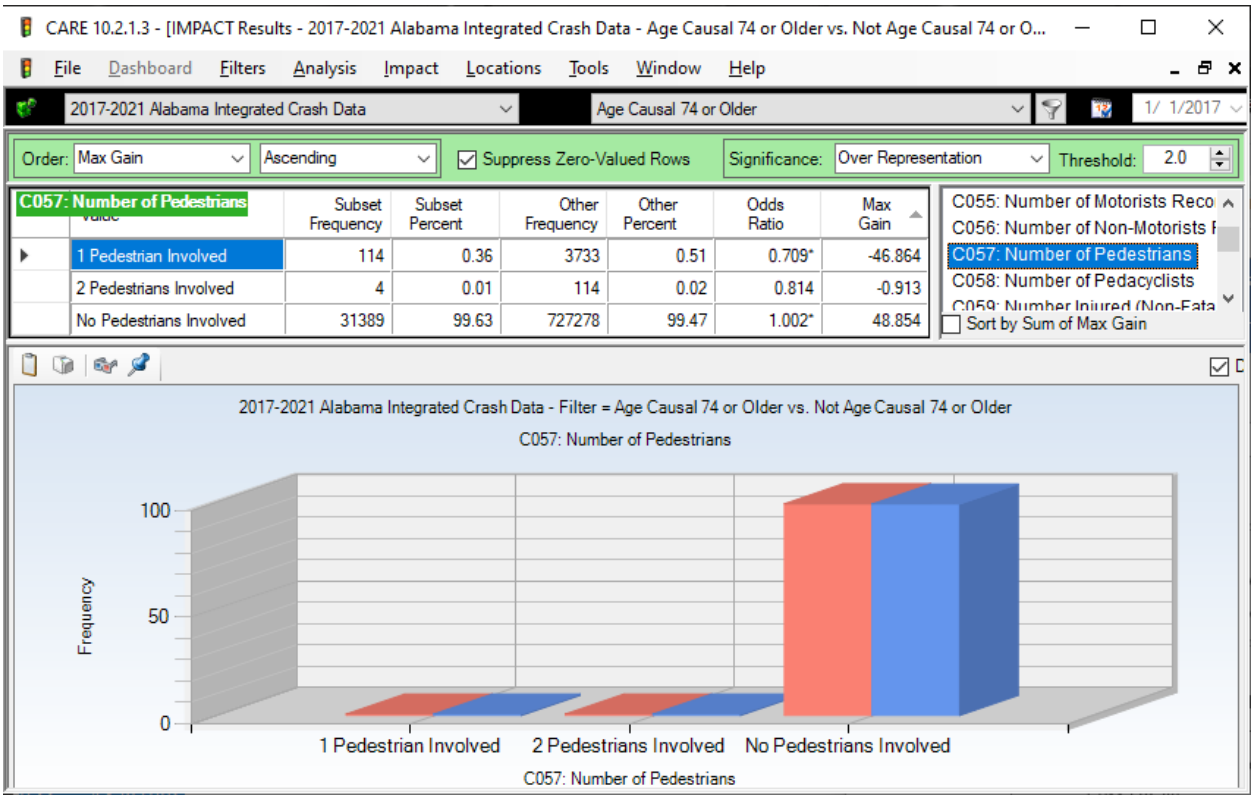
Older drivers tended to have a proportion of “School Bus Directly Involved” crashes that was significantly higher than that of the younger subset.

C062 Train Involved



Train involvement for older drivers is about the same proportion as it is for the younger drivers.

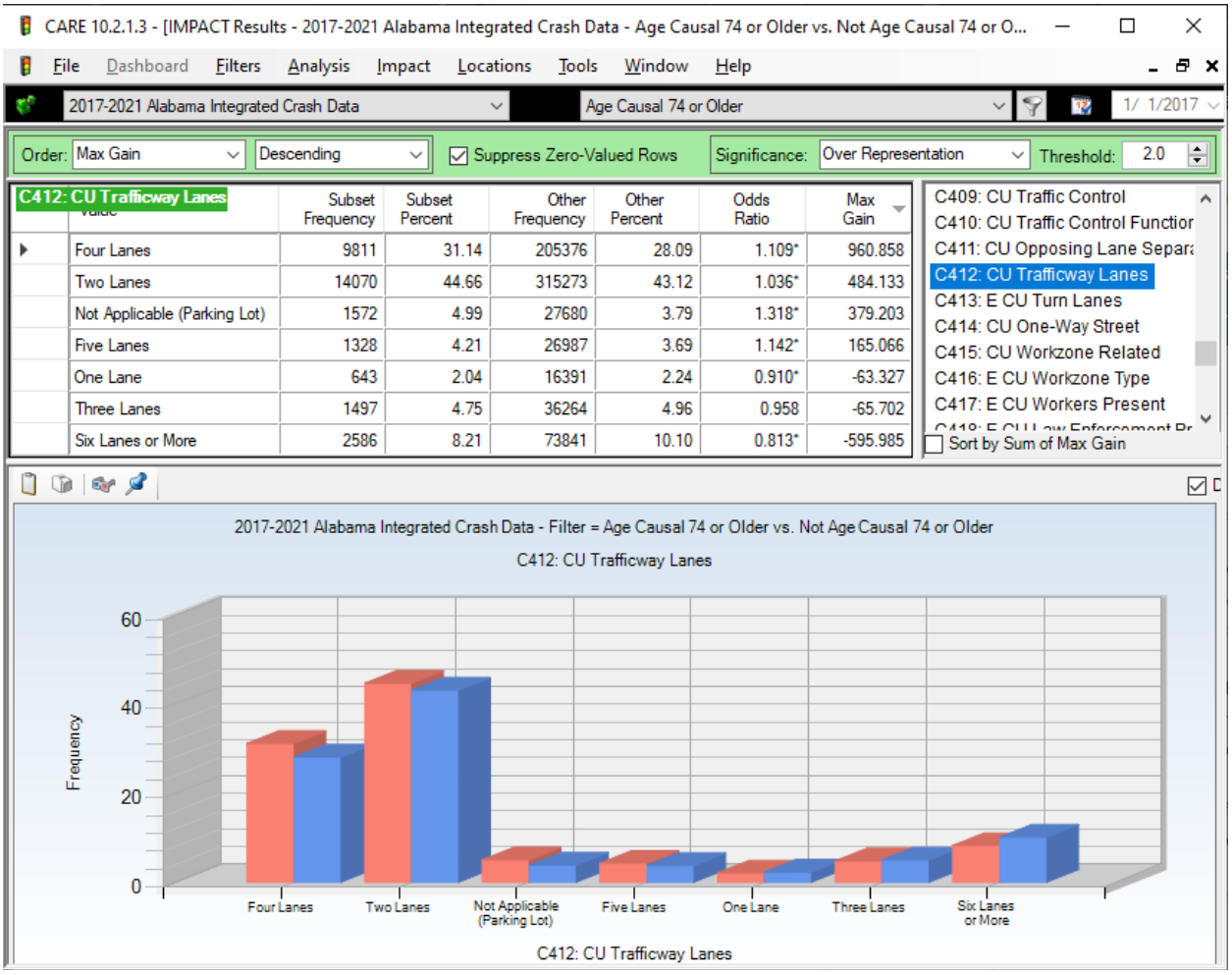
C056 Number of Pedestrians



Older drivers are significantly under-represented in single and two-pedestrian crashes, and they are over-represented in No Pedestrians Involved. This is noteworthy for a group that spends the majority of their driving time in urban areas.

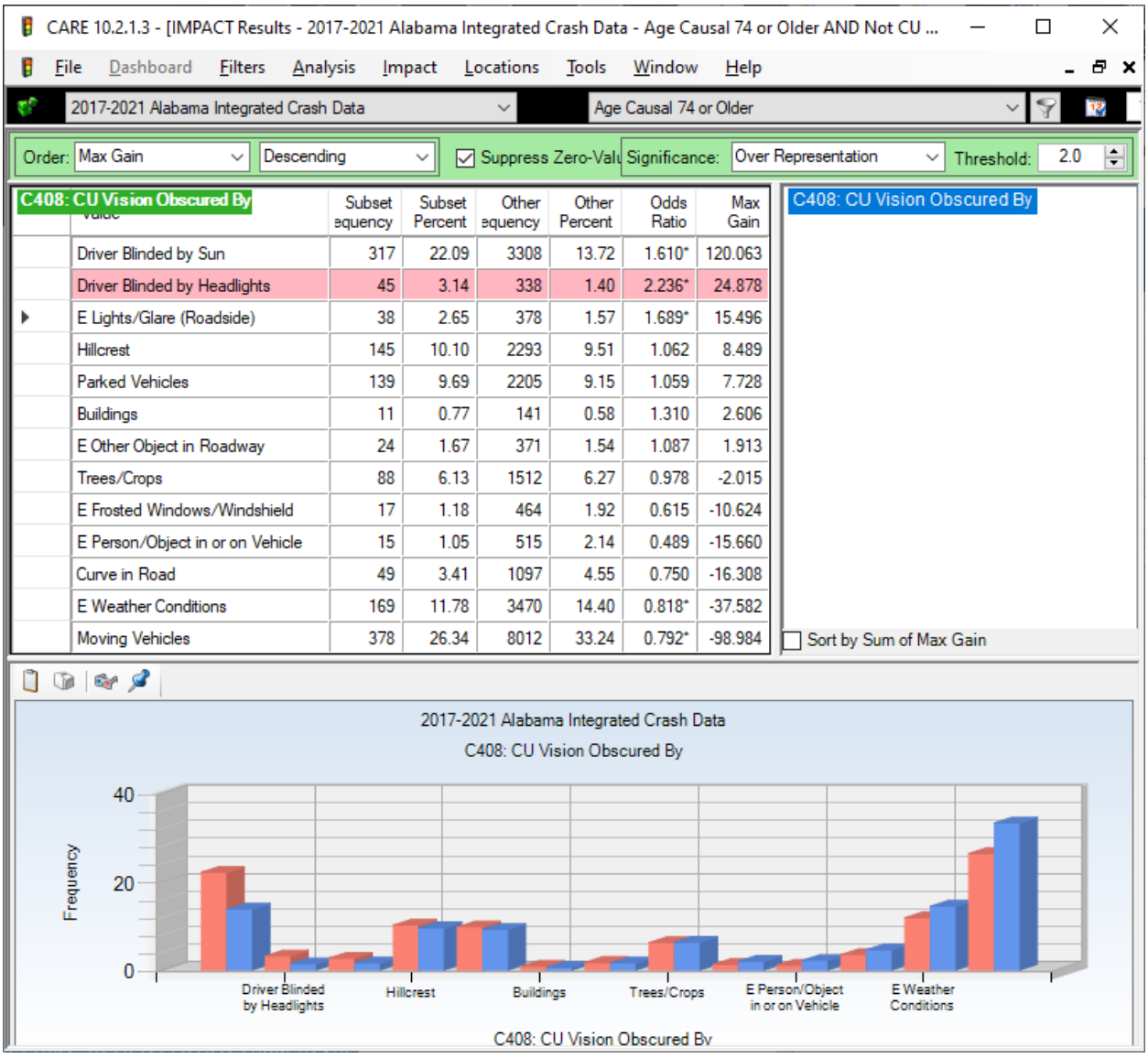
Roadway Environment and Pavement Characteristics

C412 CU Traffic Lanes



Older drivers are over-represented on two-lane and four-lane roads, and also on five-lanes. They are under-represented on Three Lanes and Six Lanes or More. This is more indicative of the roadway characteristics that they most often frequent as opposed to any problems on their parts that come from the lane configurations.

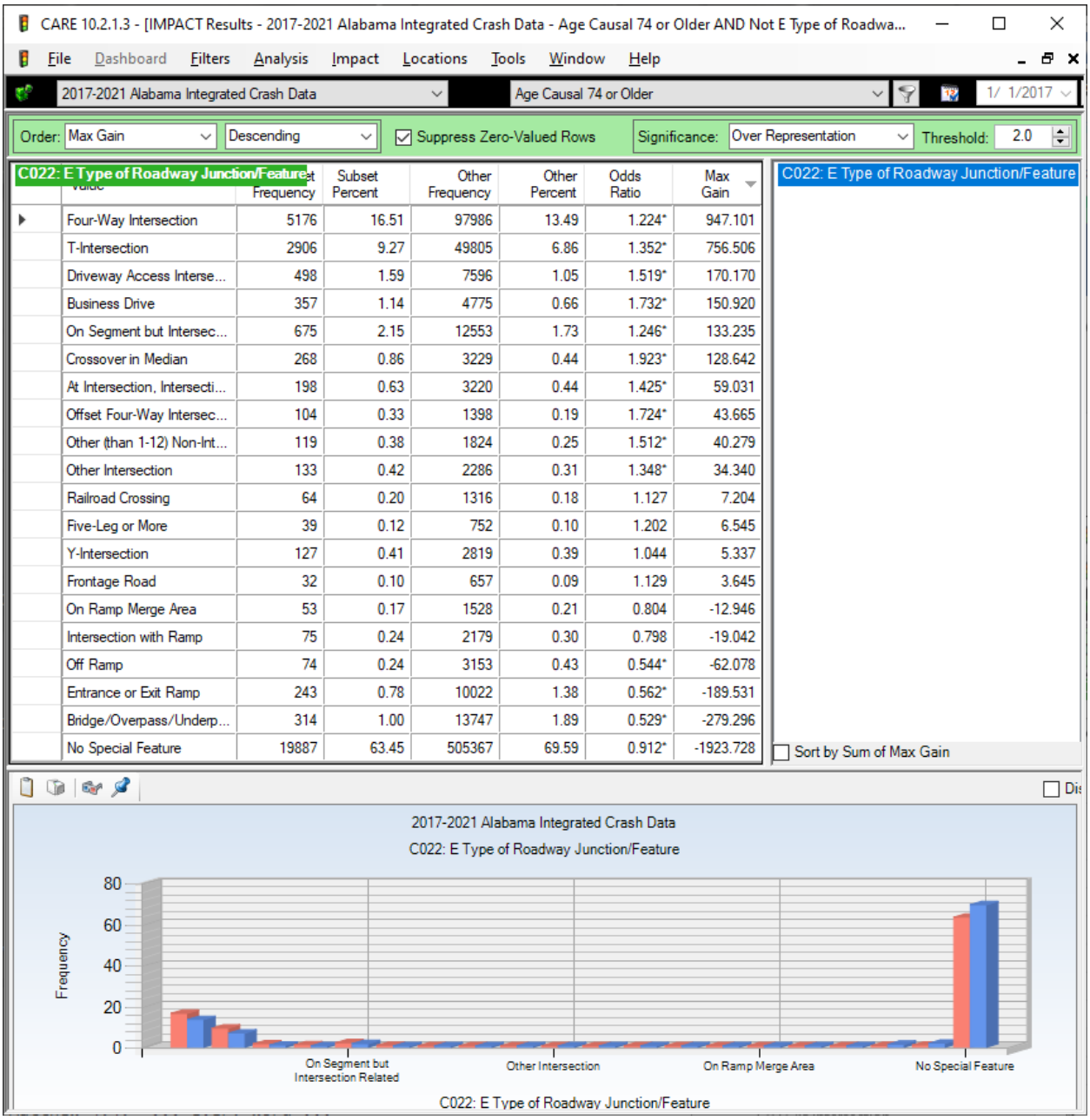
C408 CU Vision Obscured By



C408: CU Vision Obscured By	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Driver Blinded by Sun	317	22.09	3308	13.72	1.610*	120.063
Driver Blinded by Headlights	45	3.14	338	1.40	2.236*	24.878
E Lights/Glare (Roadside)	38	2.65	378	1.57	1.689*	15.496
Hillcrest	145	10.10	2293	9.51	1.062	8.489
Parked Vehicles	139	9.69	2205	9.15	1.059	7.728
Buildings	11	0.77	141	0.58	1.310	2.606
E Other Object in Roadway	24	1.67	371	1.54	1.087	1.913
Trees/Crops	88	6.13	1512	6.27	0.978	-2.015
E Frosted Windows/Windshield	17	1.18	464	1.92	0.615	-10.624
E Person/Object in or on Vehicle	15	1.05	515	2.14	0.489	-15.660
Curve in Road	49	3.41	1097	4.55	0.750	-16.308
E Weather Conditions	169	11.78	3470	14.40	0.818*	-37.582
Moving Vehicles	378	26.34	8012	33.24	0.792*	-98.984

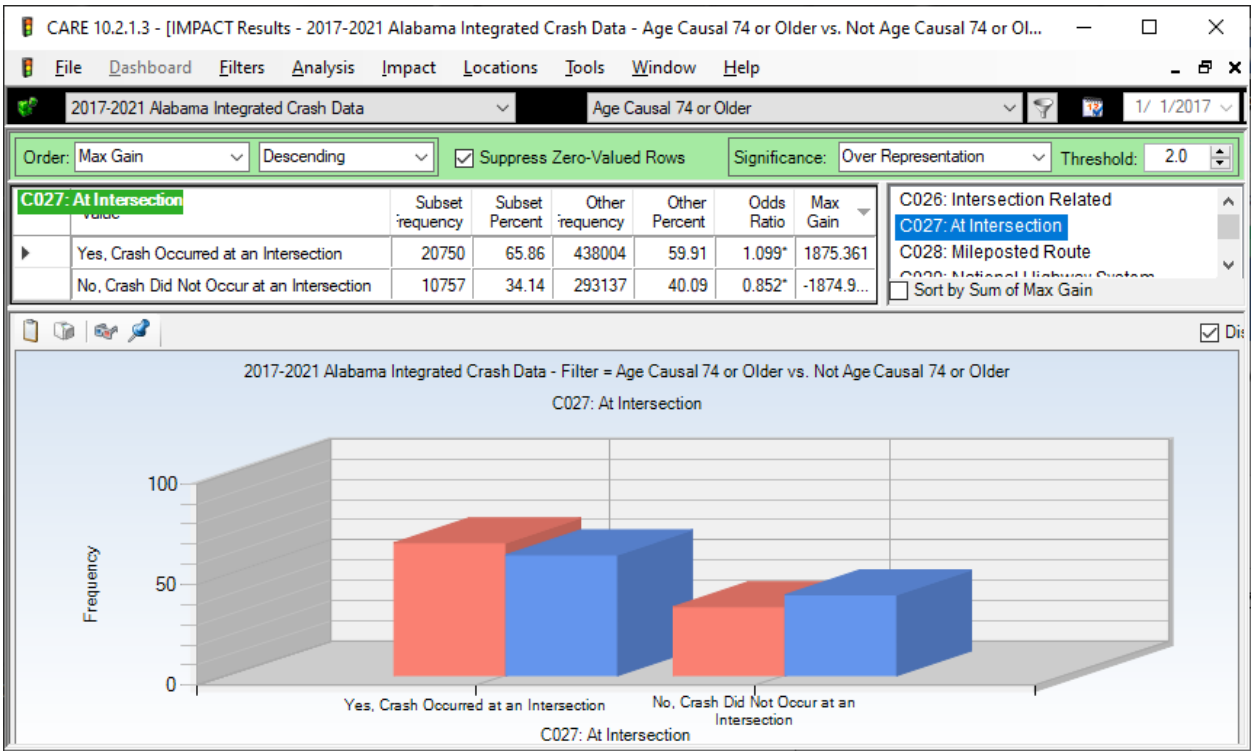
The Not Obscured category, which included 90.48% of the Senior Driver crashes was removed in order to enable the obscured categories to be observed. Also, all items with less than 10 occurrences were removed. Senior drivers were significantly over-represented in the following items: Driver Blinded by Sun, Driver Blinded by Headlights, and Lights/Glare (Roadside). The largest number of obscurities were Hillcrest (145) and Parked Vehicles (139).

C022 E Type of Roadway Junction Feature



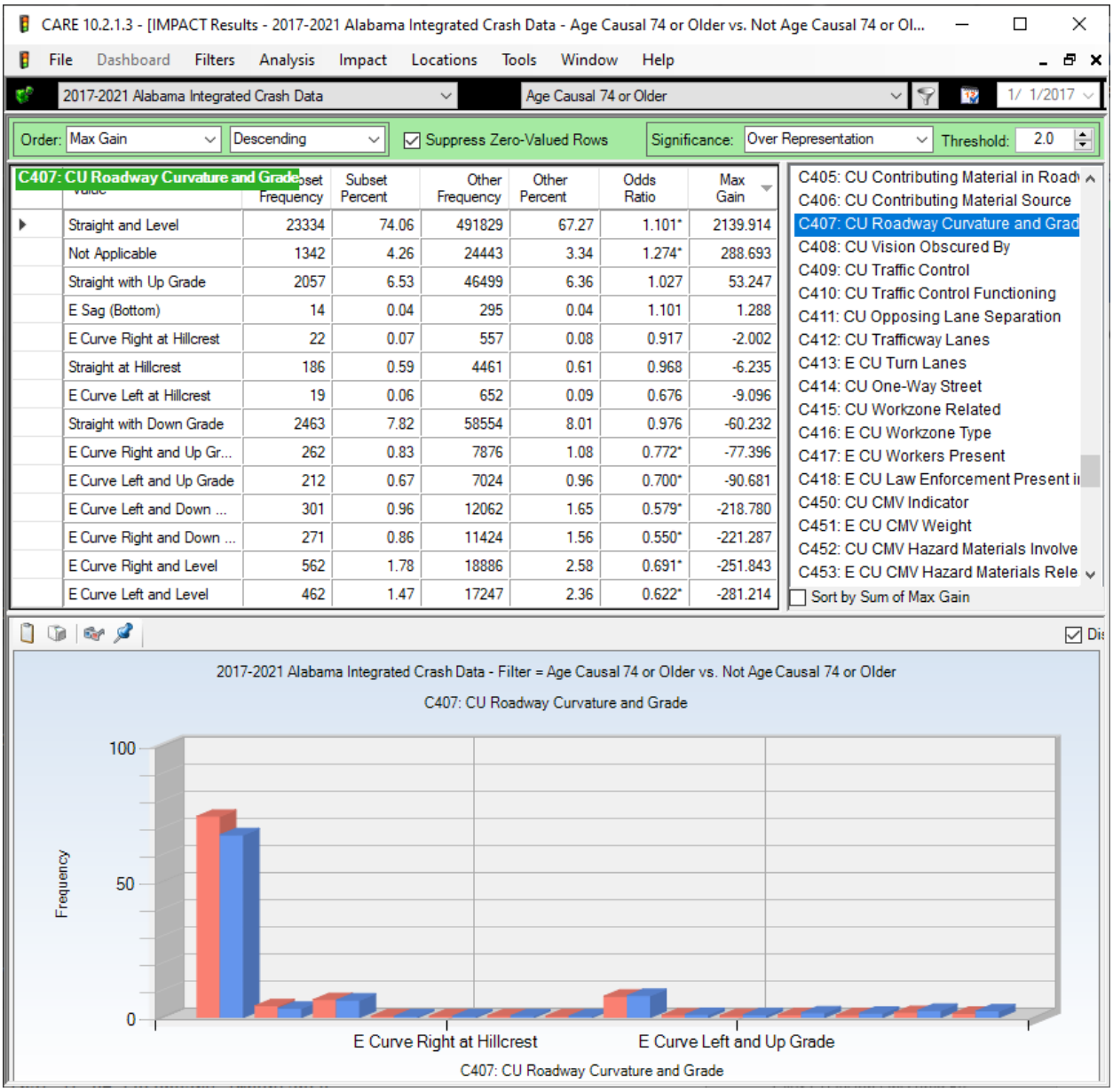
Items with less than 30 occurrences have been removed. There are ten items that show a significant over-representation for senior drivers. Four-way Intersections and T-Intersections are the most frequent problems.

C027 At Intersection



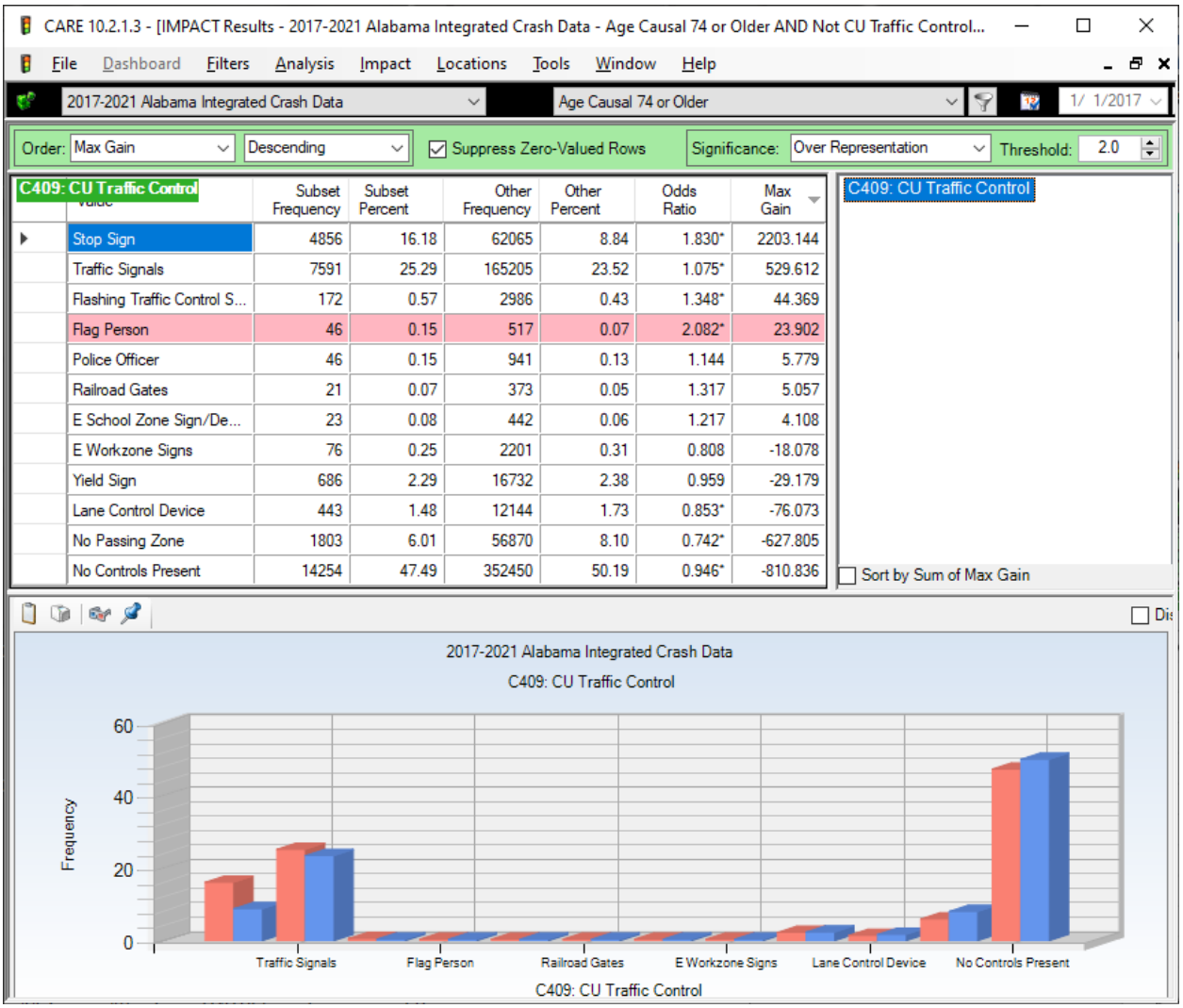
Intersections in general obviously give problems to senior drivers.

C407 CU Roadway Curvature and Grade



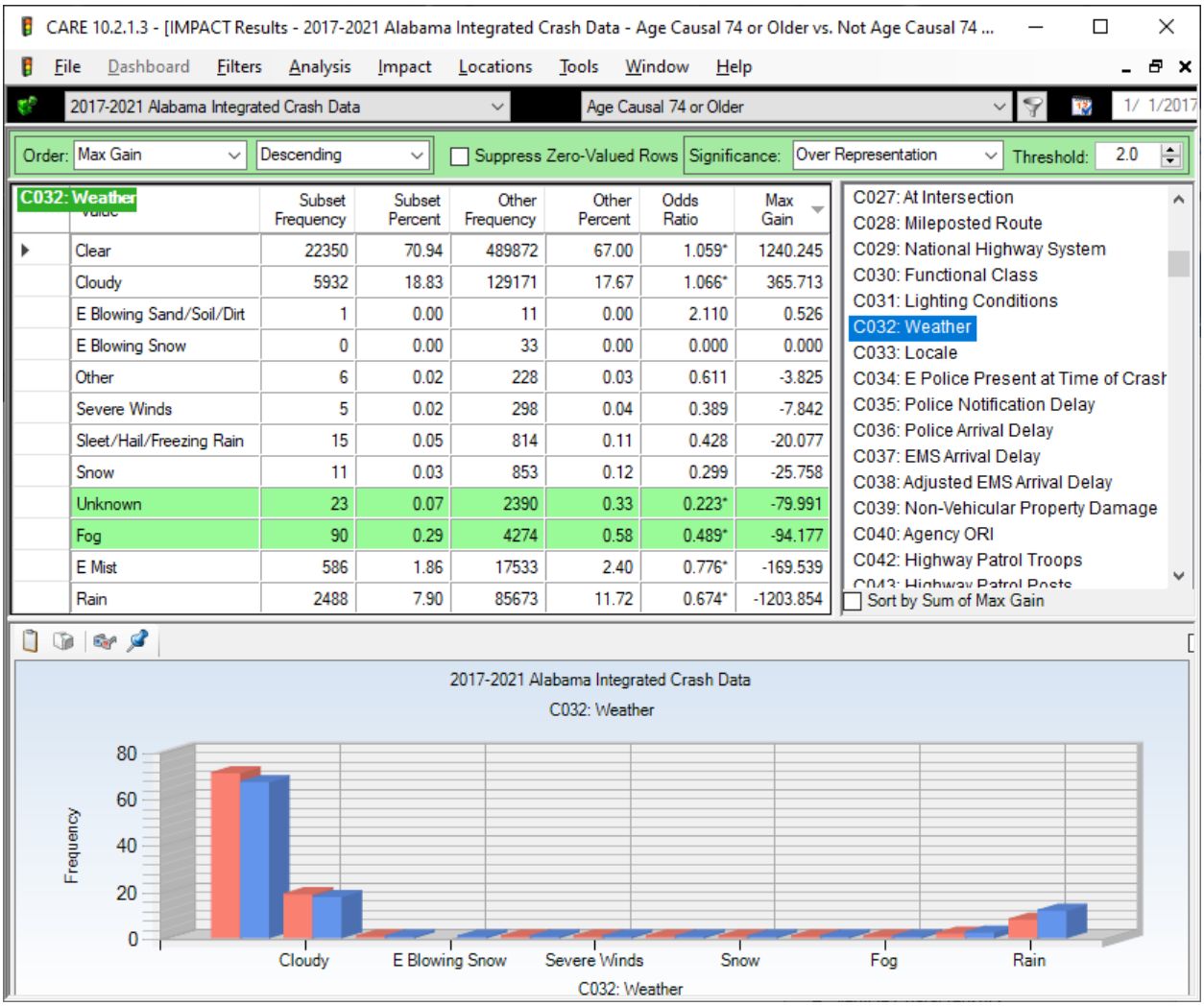
Evidence here would indicate that senior drivers slow down and make allowances for various curves that tend to give younger drivers issues.

C409 CU Traffic Control



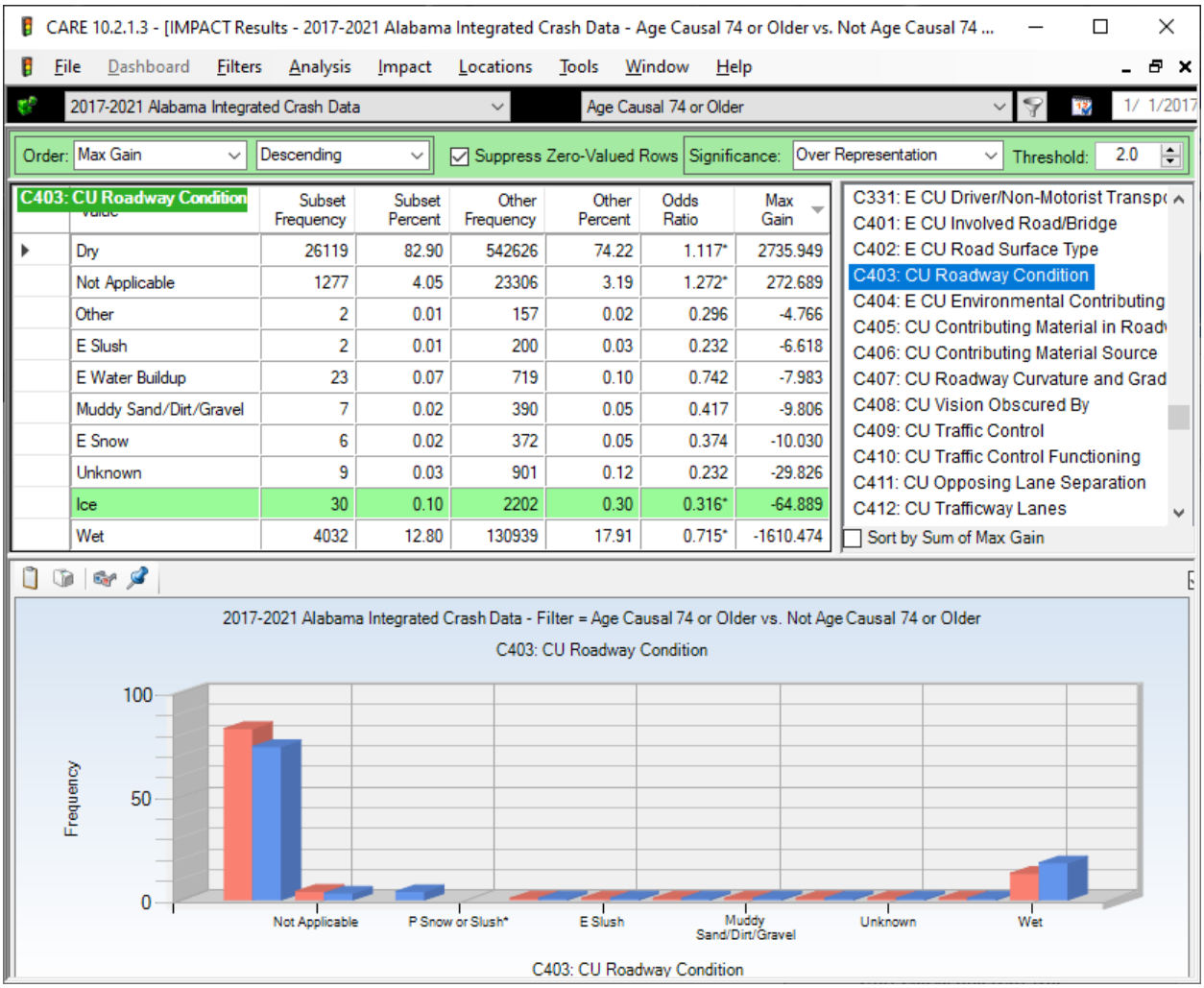
Stop Signs and Traffic Signals seem to be the only traffic controls that are of major concern. The other over-represented items have considerable diminished frequency.

C032 Weather



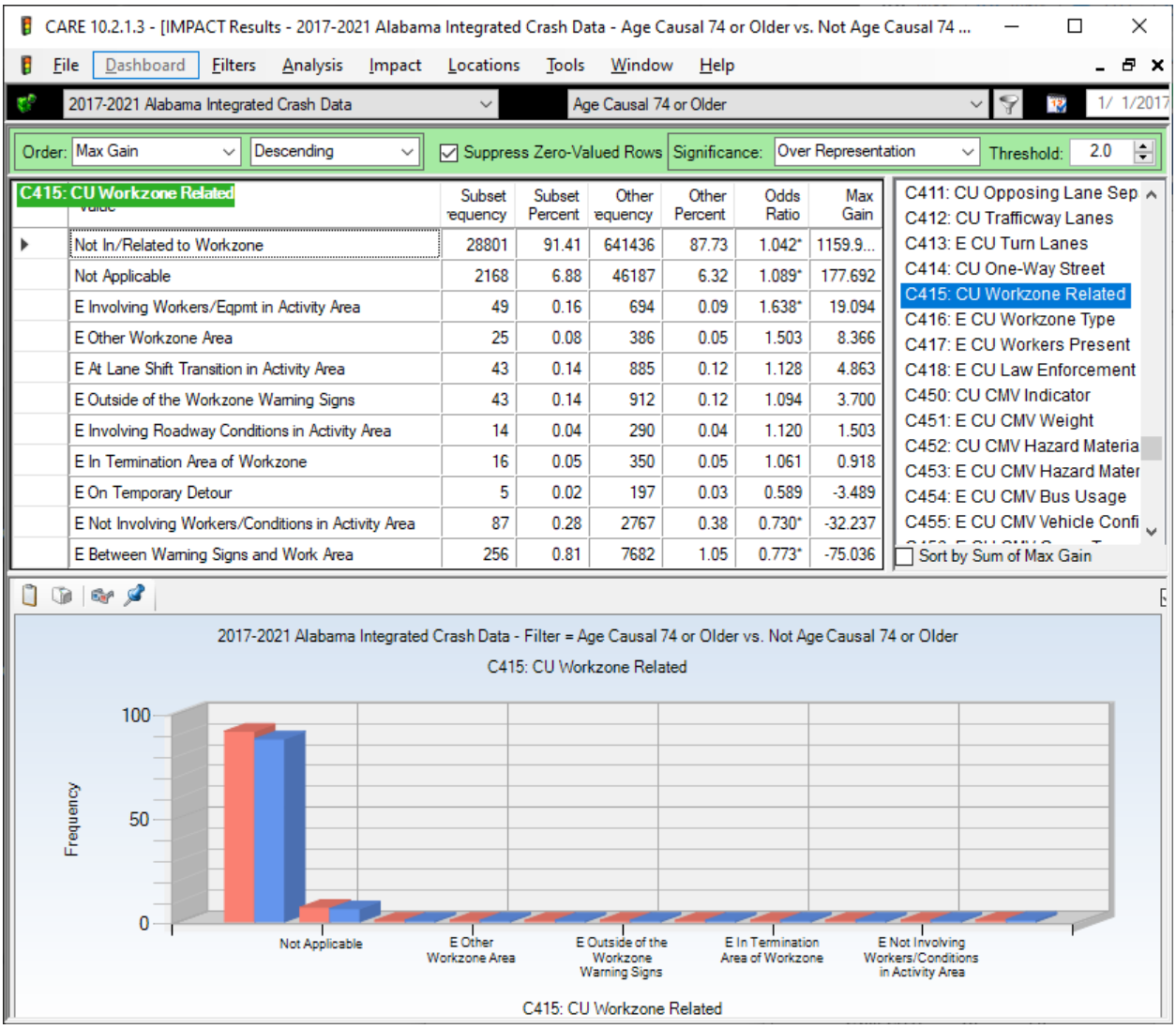
Senior drivers seem to be avoiding bad weather, being over-represented in Clear and Cloudy and under-represented in all other categories.

C403 CU Roadway Condition



Roadway conditions reflect weather findings quite closely.

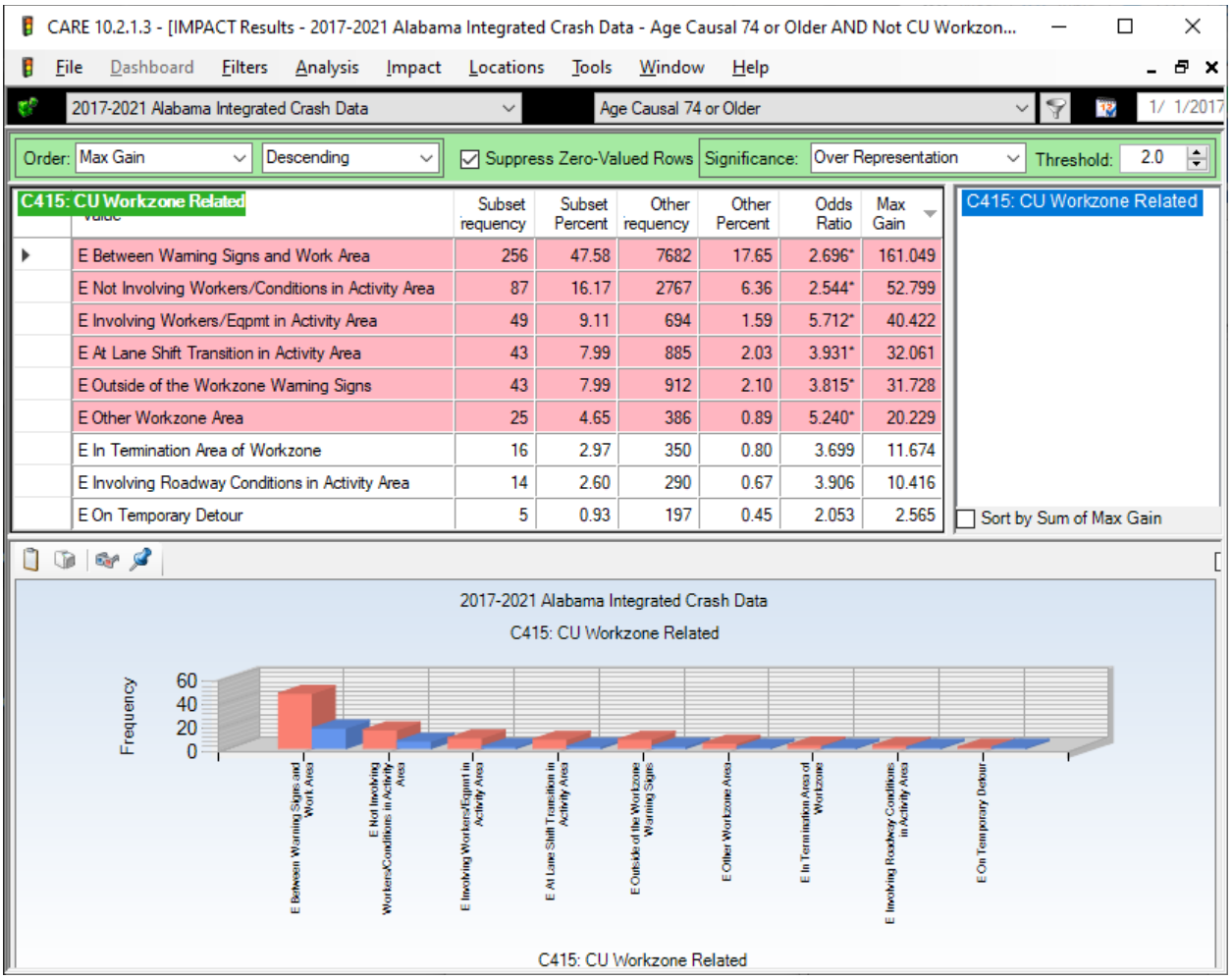
C415 CU Workzone Related – All Items



It appears that senior drivers use their same cautious approach to workzones that they do to other potential hazards – that of risk avoidance. They are significantly over-represented in Not In/Related to Workzone. See the next display for a clearer picture of those crashes that they had involved workzones.

C415 CU Workzone Related – Workzone Items

Eliminating the Not in Workzone category.



The high Odds Ratios in this display should not be interpreted as unconditional. They are conditional given the following: "For all senior drivers who were involved in Workzone-related crashes, these are the CU Workzone Related items that apply." While the frequencies are good indicators of their vulnerabilities, the higher Odds Ratios indicate which items senior drivers have problems with more than younger drivers.

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

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