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CENTER for ADVANCED PUBLIC SAFETY

ADECA Special Study Report

ANALYSIS OF FATAL CRASHES IN CY2016 AS COMPARED TO CY2014

August 2017

Updated September 2018

THE UNIVERSITY OF ALABAMA

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Summary of Recommendations

Summary of Recommendations

Detailed Recommendations follow this slide

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- **Speed Reduction***
  - ✓ Increase in patrol officers both at the ALEA and local levels
  - ✓ Comprehensive demonstration speed reduction projects
  - ✓ Legislative action to recognize problem and increase funding to ALEA specifically for field officers
  - ✓ Continue hot-spot selective enforcement targeting and assure compliance to it
  - ✓ Roadway improvements: trees, rollovers, utility poles, culverts, ditches, embankments
- **Seatbelt (Restraint) Use Target Groups***
  - ✓ PI&E targeting the worst offenders = DUI, high risk takers, young males
  - ✓ Target their friends and relatives – people of influence over them
  - ✓ Need to draw from intensive psychological studies
- **Multi-Fatality Crash Target Groups**
  - ✓ Age 16-21
  - ✓ State/Federal Roads as Opposed to County
  - ✓ Severest of Violations
    - Cross centerline, wrong way, aggressive driving
    - DUI (same as for single fatality crashes & seatbelts)
  - ✓ Collisions with other Vehicles as opposed to roadside objects
  - ✓ Countermeasures must target worst offenders
- **Pedestrian Fatalities: Develop Countermeasures***
  - ✓ Impaired walking and walking while intoxicated
  - ✓ Target: “Not Visible” and Other pedestrian violations
  - ✓ Combine impaired and distracted walking with driving
- **Impaired* and Distracted Driving* – Intensify Current Efforts**

*** Special studies exist for these subjects (see SHA home page)**

Detailed Recommended Countermeasures

Countermeasure Development - 1

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Speed Reduction

Analysis: *Fatal Crash AND Speed vs Fatal and NOT Speeding*

- Rural roadways about 77% of speed fatalities
- County roads almost 50% of speed fatalities
- Younger Drivers 16-35 (60% speed vs 37% non-speed)
- Potential Immediate Actions:
  - ✓ Increase in patrol officers ALEA and local
    - Demonstration speed reduction project (comprehensive)
    - Legislative action to recognize problem
  - ✓ Assure compliance with selective enforcement targeting
  - ✓ Roadway improvements: trees, rollovers, utility poles, culverts, ditches, embankments (Most Harmful Event)

Countermeasure Development - 2

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Seatbelt Use Target Groups

Analysis: *Fatal NOT Restrained vs N-F Properly Restrained*

- DUI (5 times the expected)
- Other Severe Violations
  - ✓ Speed (8.3); Aggressive (5.4)
- Age 16-20 (risk); 21-37 (correlation with DUI)
- Single Vehicle Crashes (3.3 times expected)
- Potential Immediate Actions
  - ✓ Get "Budweiser" to promote seatbelt use ("save our customers")
  - ✓ PI&E targeting the worst offenders
    - Their friends and relatives – people of influence over them
    - Need to draw from intensive psychological studies

Countermeasure Development - 3

Multi-Fatality Crash Target Groups

Analysis: *Multiple Fatality Crashes vs Single Fatality Crashes*

- Age 16-21
- State/Federal Roads as Opposed to County
- Severest of Violations
  - ✓ Cross centerline, wrong way, aggressive driving
  - ✓ DUI same as for single fatality crashes & seatbelts
- Collisions with other Vehicles
  - ✓ As opposed to roadside objects (e.g., trees)
- Countermeasures Must Target Worst Offenders

Countermeasure Development - 4

Pedestrian Fatality Target Groups

Analysis: *Pedestrian Fatalities vs. Pedestrian Non-Fatal*

- All Roadway Types O-R other than Municipal
- Impaired Walking (ID = DUI > IW = WUI)
  - ✓ 4 times the drug use indicators (including prescription)
  - ✓ 2 times the alcohol use indicators
- Time of Day Validates Drug/Alcohol Use
- "Not Visible" and Other Pedestrian Violations
  - ✓ Validates lack of concern
  - ✓ No good data on distractions – but ample anecdotal evidence
- CMs: Target IW/DW Same as for ID/DD
  - ✓ Combined Impaired DUI/WUI = ID/IW PI&E efforts
  - ✓ Combined Distracted DD/DW PI&E efforts

Introduction: PPT Organization

- **Motivation**
  - ✓ Unprecedented fatality increase in CY2016
  - ✓ Objective: to determine causes
- **Rationale for Comparing 2016 to 2014**
  - ✓ Overall trends crashes and fatalities
- **PCC Differences Fatal and Injury Crashes**
- **IMPACT and Frequency Comparison Results**
  - ✓ 2016 vs 2014 for fatal and overall crashes
  - ✓ Straight Numerical Comparison 2016/2014
- **Presentation Approach**
  - ✓ Conclusion summaries given first for each section
  - ✓ Analytical support for conclusions presented next

Introductory Analyses

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- **Fatal and Non-Fatal Crashes 2012-2016**
  - ✓ Why compare 2016 with 2014?
  - ✓ Some general increase in crashes seen in 2015
  - ✓ Accelerated increase in fatal crashes in 2016
- **PCC Codes Showing the Greatest Increases**
  - ✓ In fatal crashes
  - ✓ In fatal plus severe injury crashes
  - ✓ Note: Reason for looking at percentage INCREASES: *Searching for what caused the fatality increases*

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data...

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2012-2016 Alabama Integrated Crash Data | Fatal Crashes

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

C003: Year Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
2012	817	19.91	127695	18.49	1.077*	58.184
2013	757	18.45	126727	18.35	1.005	3.936
2014	739	18.01	132594	19.20	0.938	-48.928
2015	799	19.47	148754	21.54	0.904*	-84.957
2016	992	24.17	154859	22.42	1.078*	71.764

C001: County
C002: City
C003: Year
C004: Month
C005: Day of Month
C006: Day of the Week
C007: Week of the Year

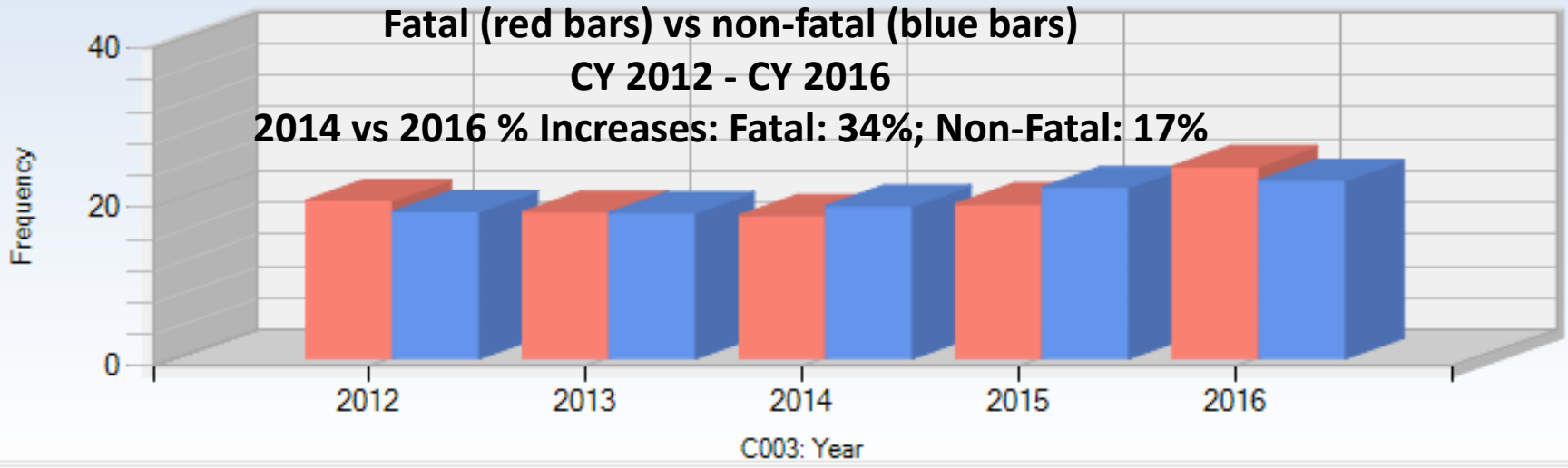
Sort by Sum of Max Gain

Red = Fatal Crashes

2012-2016 Alabama Integrated Crash Data

C003: Year

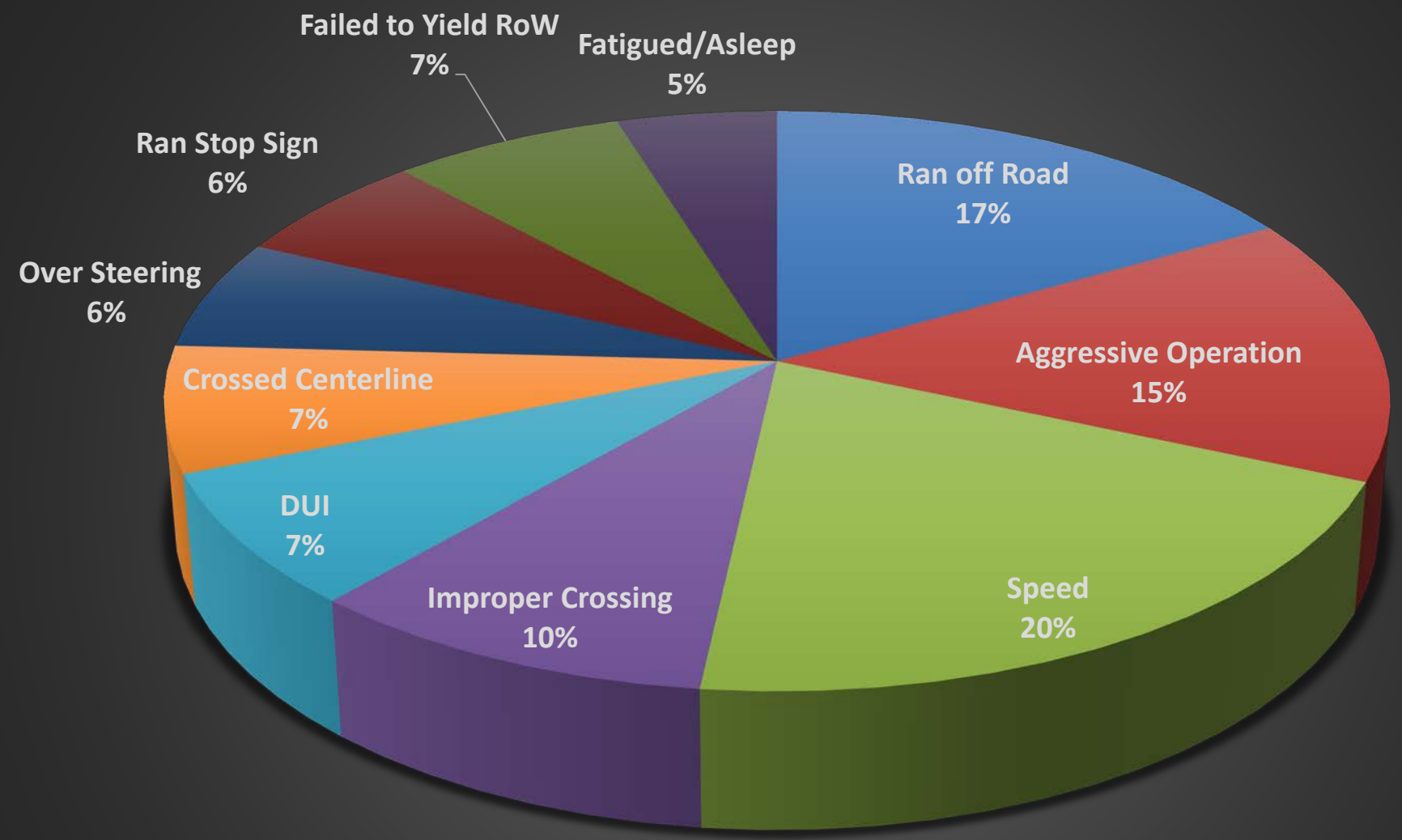
Blue = Non-Fatal Crashes



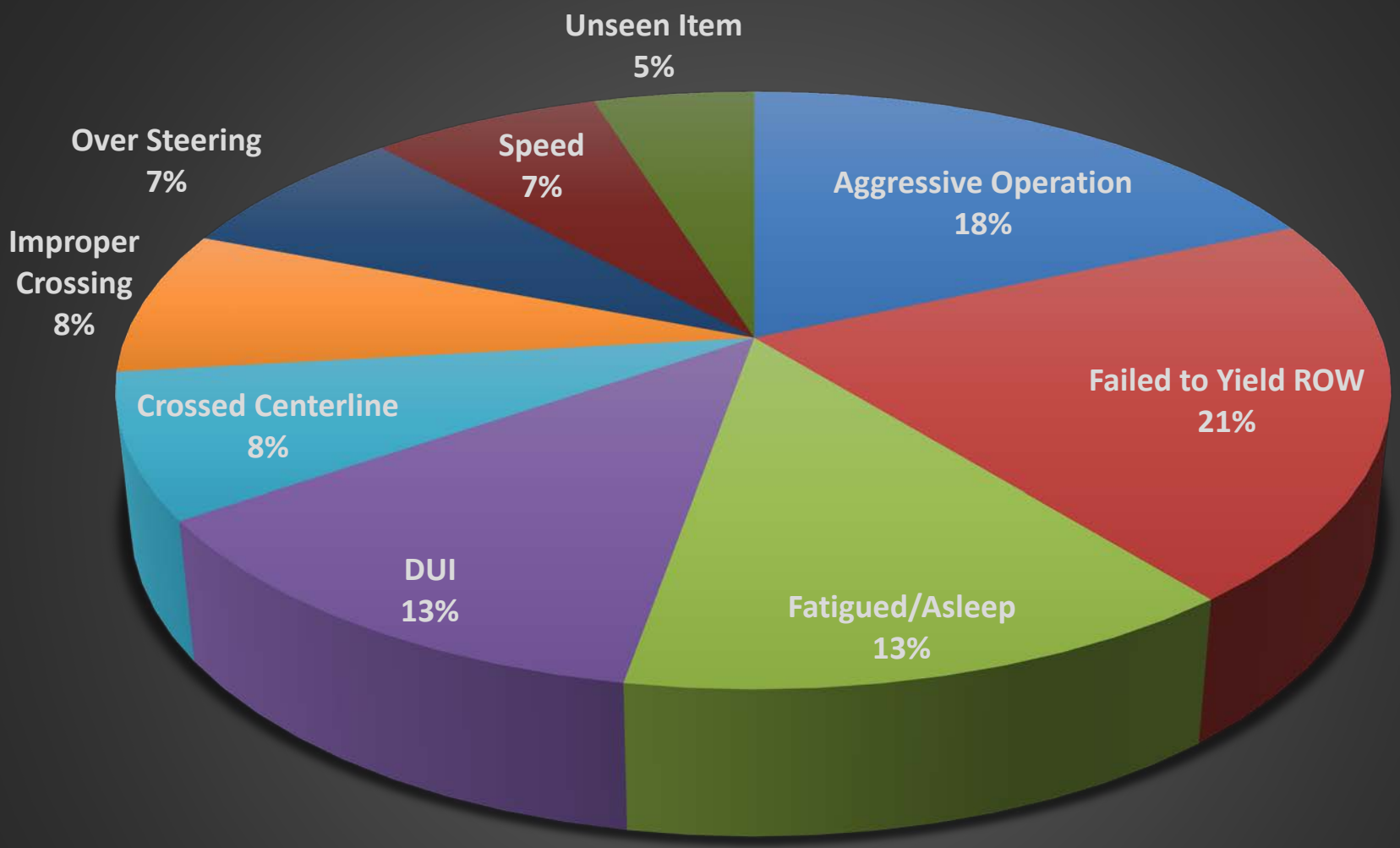
2014-2016 Crash Per Cent *Increase* by PCC

	Per Cent Crash Increase	
Pri Cntrb Circumstances	**Fatal**	**Sev Injury**
Speed	20%	7%
Ran off Road	17%	0%
Aggressive Operation	15%	18%
Improper Crossing	10%	8%
DUI	7%	13%
Crossed Centerline	7%	8%
Failed to Yield RoW	7%	21%
Over Steering	6%	7%
Ran Stop Sign	6%	0%
Fatigued/Asleep	5%	14%
Unseen Item	0%	5%

2014 vs 2016 % Increase in Fatal Crashes



2014 vs 2016 % Increase in Fatal or Serious Injury Crashes



IMPACT Analysis Organization

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- Crash Severity Causes
  - ✓ Restraints and Helmets, Weather, EMS Delays
- Driver Behavior
  - ✓ PCC, DUI, Speed
- Driver Demographics – Age and Gender
- Time Considerations – Time of Day, Day of Week, Month
- Geographical Characteristics
  - ✓ County, City, Rural/Urban, Locale
- Roadway Characteristics
- Crash Characteristics
- Pedestrian Characteristics
- Vehicle Characteristics
- Recommended Countermeasures

Aspects of Crash Severity

- **Overall**
  - ✓ Over 22,000 more crashes in 2016
  - ✓ Equals 60+ more crashes per day
  - ✓ Increases are not just in fatalities
- **Fatal Crashes**
  - ✓ Increased by 253 crashes
  - ✓ Greater than 34% increase (more than one-third)

2014 vs. 2016 Crashes by Severity

CARE Crosstab Results - 2014-2016 Crash Data		
2014 vs 2016 -- Year vs. Crash Severity		
All changes statistically significant		
	Complete Year	
	2014	2016
Fatal Injury	739	992
	0.55%	0.64%
Incapacitating Injury	6,009	6,096
	4.51%	3.91%
Non-Incapacitating Injury	10,015	11,567
	7.51%	7.42%
Possible Injury	12,026	14,898
	9.02%	9.56%
Property Damage Only	100,426	118,268
	75.32%	75.89%
Unknown	4,118	4,030
	3.09%	2.59%
TOTAL	133,333	155,851
	46.11%	53.89%

Yellow indicates the cells with the greater proportions (%); 2016 had relatively fewer severe injury crashes.

Restraints and Helmets

Effects on Crash Severity

- **Probability of Death Multipliers in 2016**
  - ✓ **Increases about 30 times when not restrained**
  - ✓ **Increases about 35 times for no MC helmet**
  - ✓ **Increases over 56 times for improper MC helmet**
  - ✓ **Increases over 42 times if thrown from vehicle**

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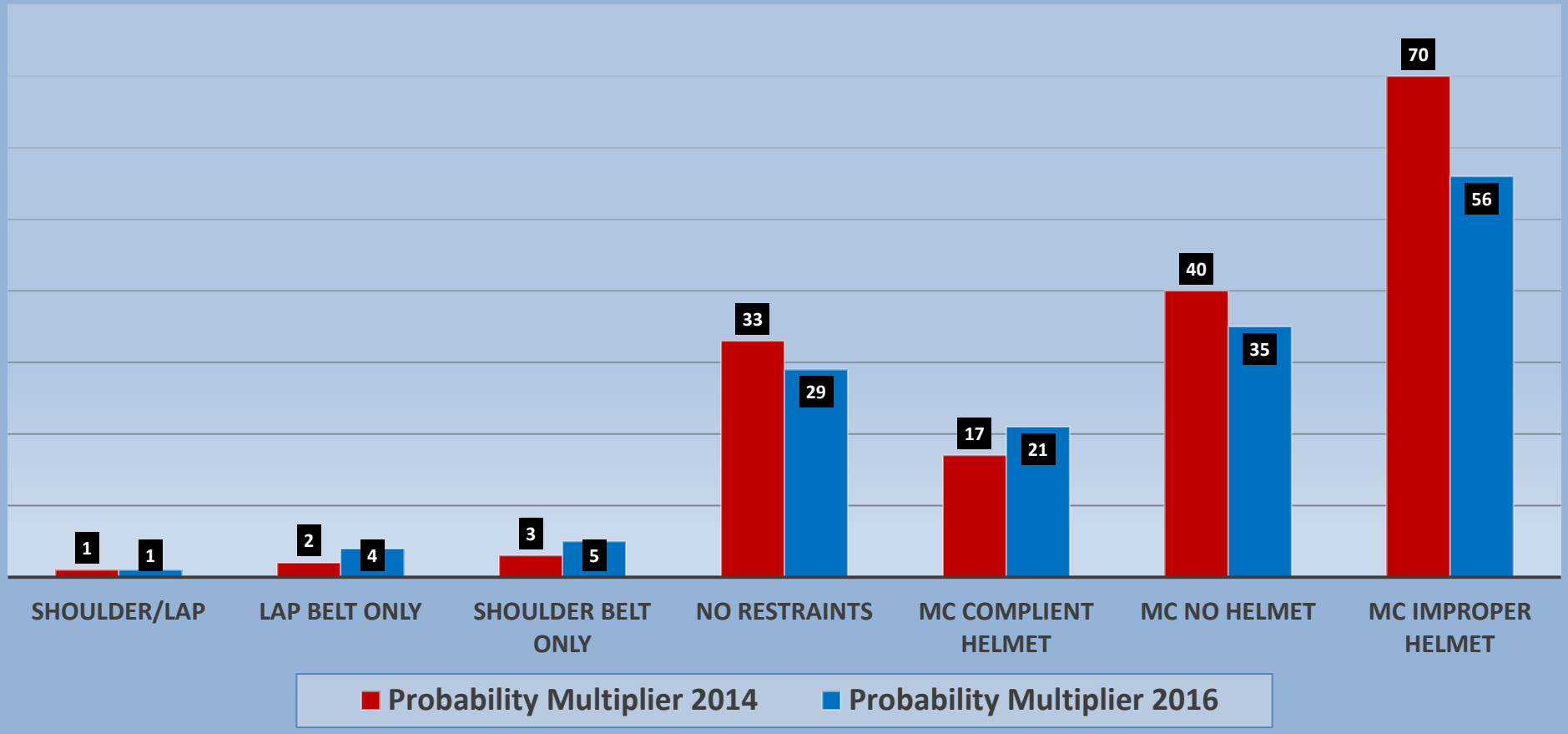
Safety Equipment Comparisons
Fatality Probability Multipliers



Best case motorcycle is 17-21 times worse than the best case passenger car, i.e., with restraints used.

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - Fatal Crashes AND...

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2012-2016 Alabama Integrated Crash Data | Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

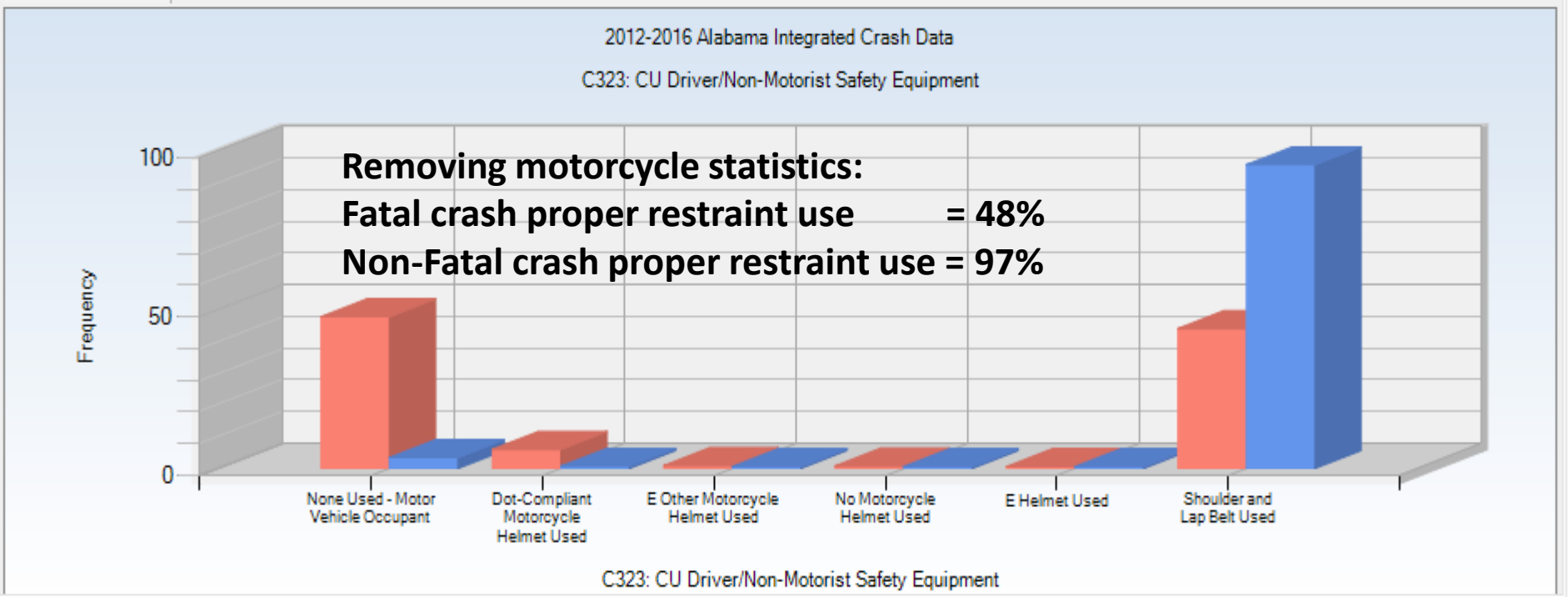
C323: CU Driver/Non-Motorist Safety Equipment	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
None Used - Motor Vehicle O...	1637	47.81	19967	3.40	14.060*	1520.569
Dot-Compliant Motorcycle Hel...	205	5.99	3924	0.67	8.959*	182.118
E Other Motorcycle Helmet U...	30	0.88	218	0.04	23.600*	28.729
No Motorcycle Helmet Used	26	0.76	304	0.05	14.667*	24.227
E Helmet Used	17	0.50	459	0.08	6.352	14.323
Shoulder and Lap Belt Used	1509	44.07	562280	95.76	0.460*	-1769.751

C323: CU Driver/Non-Motorist Safety Equip

Fatal (red bars) vs non-fatal (blue bars) 2012-2016

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

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2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

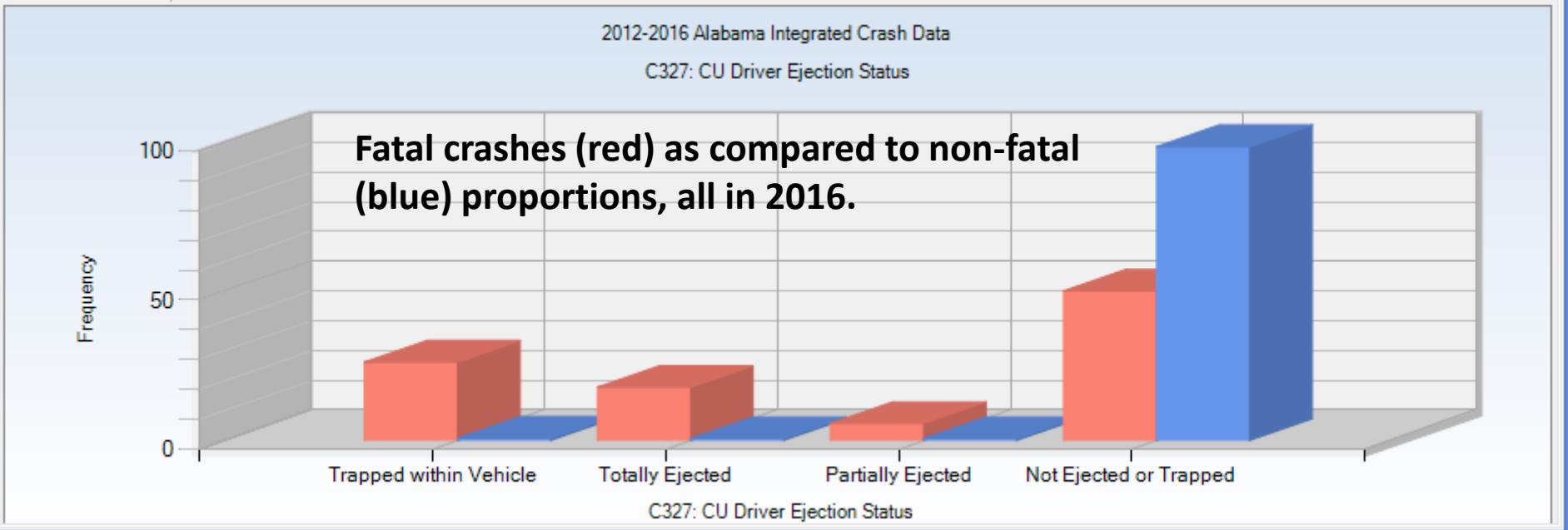
Order: Max Gain | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C327: CU Driver Ejection Status	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Trapped within Vehicle	224	26.29	968	0.68	38.405*	218.167
Totally Ejected	152	17.84	552	0.39	45.700*	148.674
Partially Ejected	48	5.63	186	0.13	42.829*	46.879
Not Ejected or Trapped	428	50.23	139694	98.79	0.508*	-413.721

C327: CU Driver Ejection Status

Sort by Sum of Max Gain

Display Filter Name



Weather

Effects on Crash Severity

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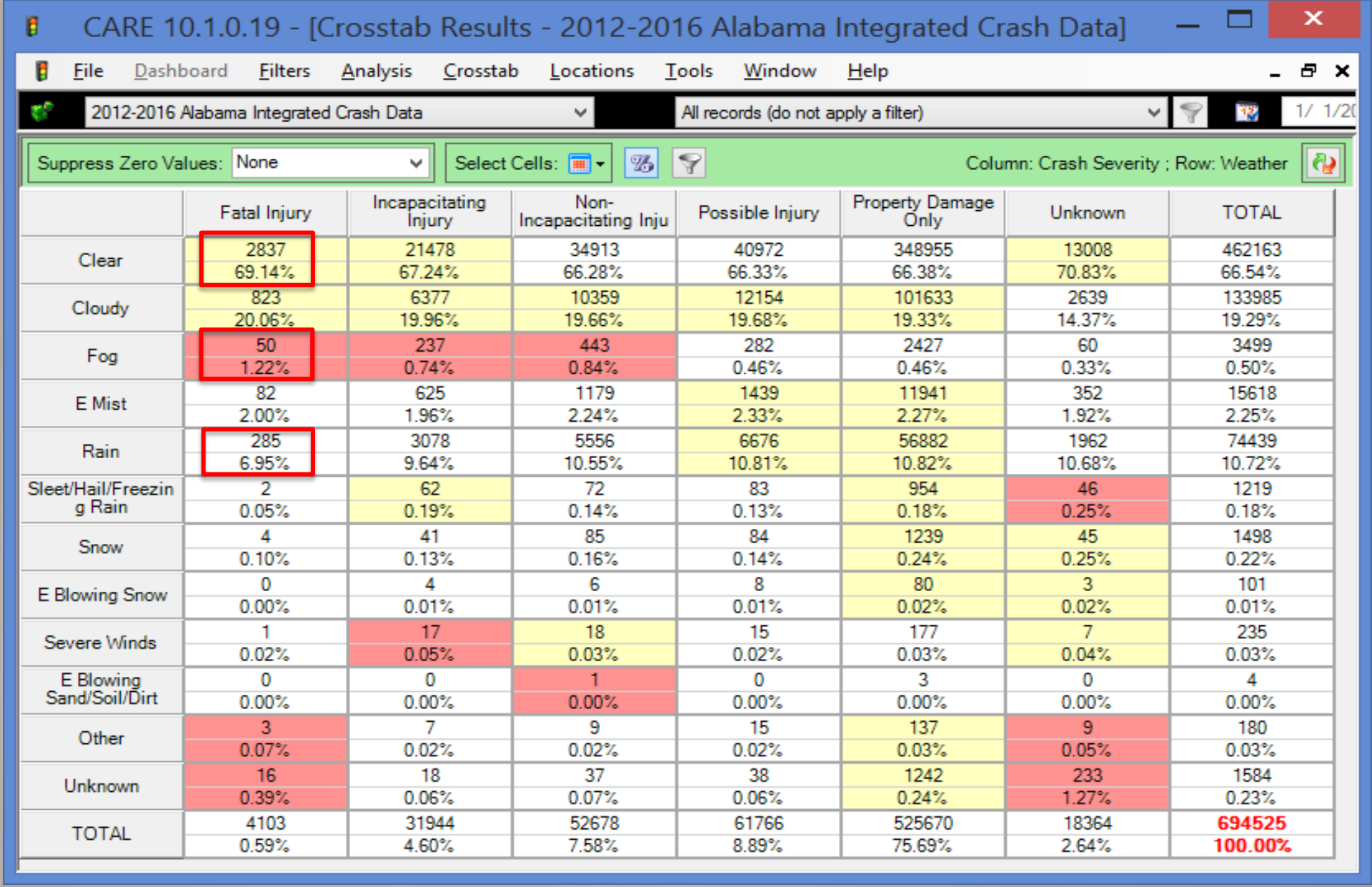
- **Reduced Speeds = Reduce Fatalities (all data)**
  - ✓ Fatalities in rain = 64% of those in other conditions
  - ✓ 2016 Increase of over 200 fatal crashes in clear weather
  - ✓ Clear weather caused 14 of the increase in fatal crashes
  - ✓ Increases = 244% in the fog (over twice the expected)

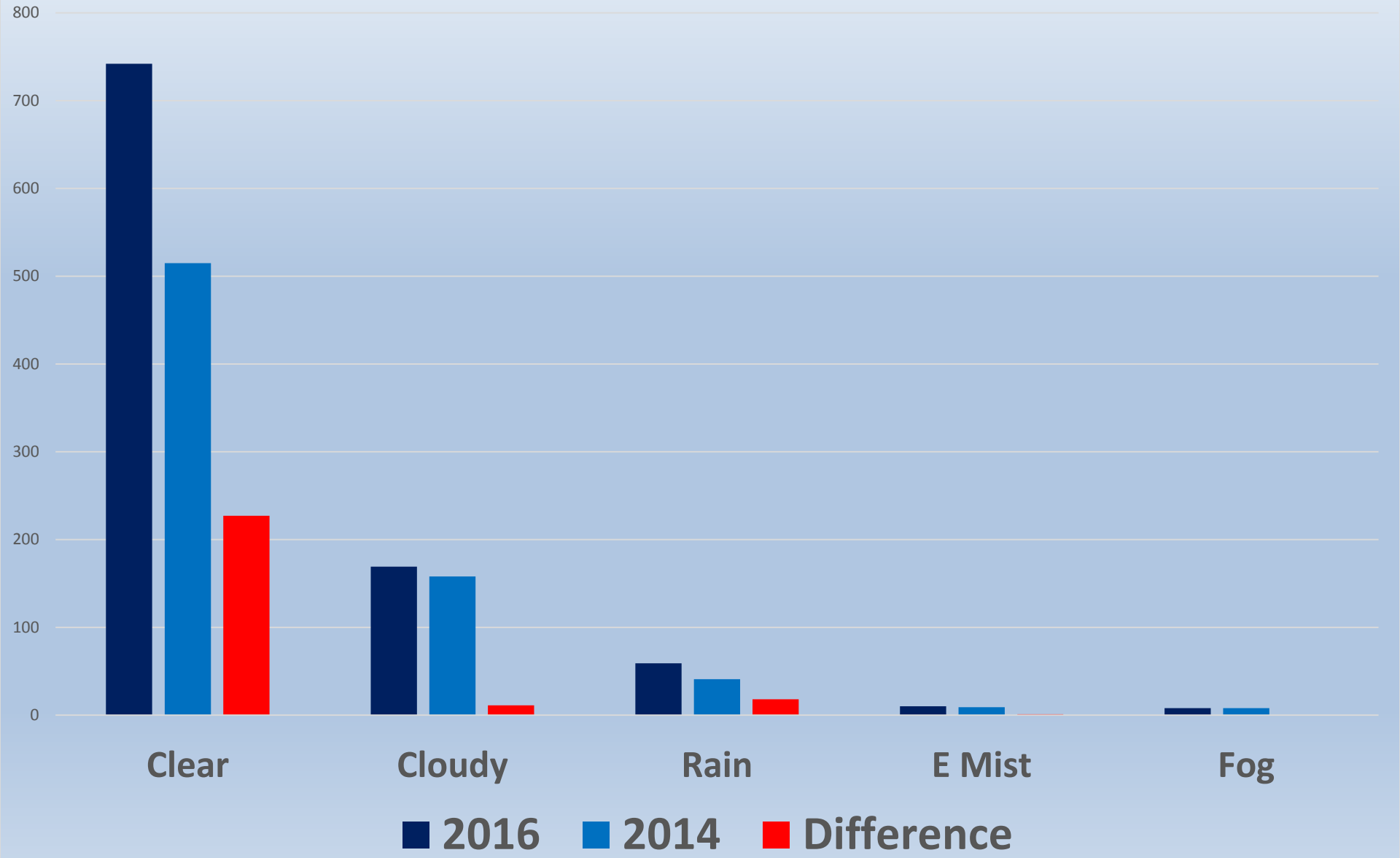


	Fatal Injury	Incapacitating Injury	Non-Incapacitating Inju	Possible Injury	Property Damage Only	Unknown	TOTAL
Clear	2837 69.14%	21478 67.24%	34913 66.28%	40972 66.33%	348955 66.38%	13008 70.83%	462163 66.54%
Cloudy	823 20.06%	6377 19.96%	10359 19.66%	12154 19.68%	101633 19.33%	2639 14.37%	133985 19.29%
Fog	50 1.22%	237 0.74%	443 0.84%	282 0.46%	2427 0.46%	60 0.33%	3499 0.50%
E Mist	82 2.00%	625 1.96%	1179 2.24%	1439 2.33%	11941 2.27%	352 1.92%	15618 2.25%
Rain	285 6.95%	3078 9.64%	5556 10.55%	6676 10.81%	56882 10.82%	1962 10.68%	74439 10.72%
Sleet/Hail/Freezing Rain	2 0.05%	62 0.19%	72 0.14%	83 0.13%	954 0.18%	46 0.25%	1219 0.18%
Snow	4 0.10%	41 0.13%	85 0.16%	84 0.14%	1239 0.24%	45 0.25%	1498 0.22%
E Blowing Snow	0 0.00%	4 0.01%	6 0.01%	8 0.01%	80 0.02%	3 0.02%	101 0.01%
Severe Winds	1 0.02%	17 0.05%	18 0.03%	15 0.02%	177 0.03%	7 0.04%	235 0.03%
E Blowing Sand/Soil/Dirt	0 0.00%	0 0.00%	1 0.00%	0 0.00%	3 0.00%	0 0.00%	4 0.00%
Other	3 0.07%	7 0.02%	9 0.02%	15 0.02%	137 0.03%	9 0.05%	180 0.03%
Unknown	16 0.39%	18 0.06%	37 0.07%	38 0.06%	1242 0.24%	233 1.27%	1584 0.23%
TOTAL	4103 0.59%	31944 4.60%	52678 7.58%	61766 8.89%	525670 75.69%	18364 2.64%	694525 100.00%

Weather baseline for 2012-2016: Weather by Crash Severity

Fatal Over-Representations: Clear and Fog; Rain was Under-Represented

2016 to 2014 Fatal Crashes by Weather (C030)



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

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2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

C030: Weather	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Clear	742	75.10	110943	71.92	1.044	31.449
Fog	8	0.81	581	0.38	2.150	4.279
Cloudy	169	17.11	26145	16.95	1.009	1.551
E Mist	10	1.01	2680	1.74	0.583	-7.164
Rain	59	5.97	13701	8.88	0.672*	-28.750

C030: Weather

Fatal (red bars) vs Non-Fatal (blue bars) CY 2016

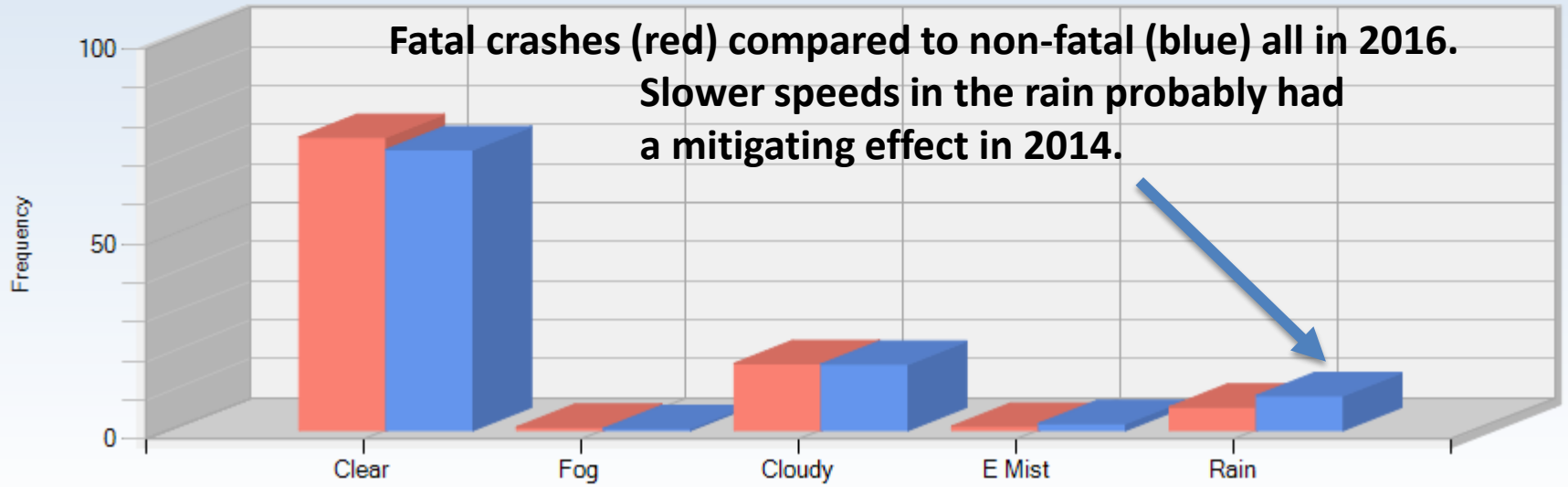
Sort by Sum of Max Gain

Display Filter Name

2012-2016 Alabama Integrated Crash Data

C030: Weather

Fatal crashes (red) compared to non-fatal (blue) all in 2016. Slower speeds in the rain probably had a mitigating effect in 2014.



EMS Arrival

Effects on Crash Severity

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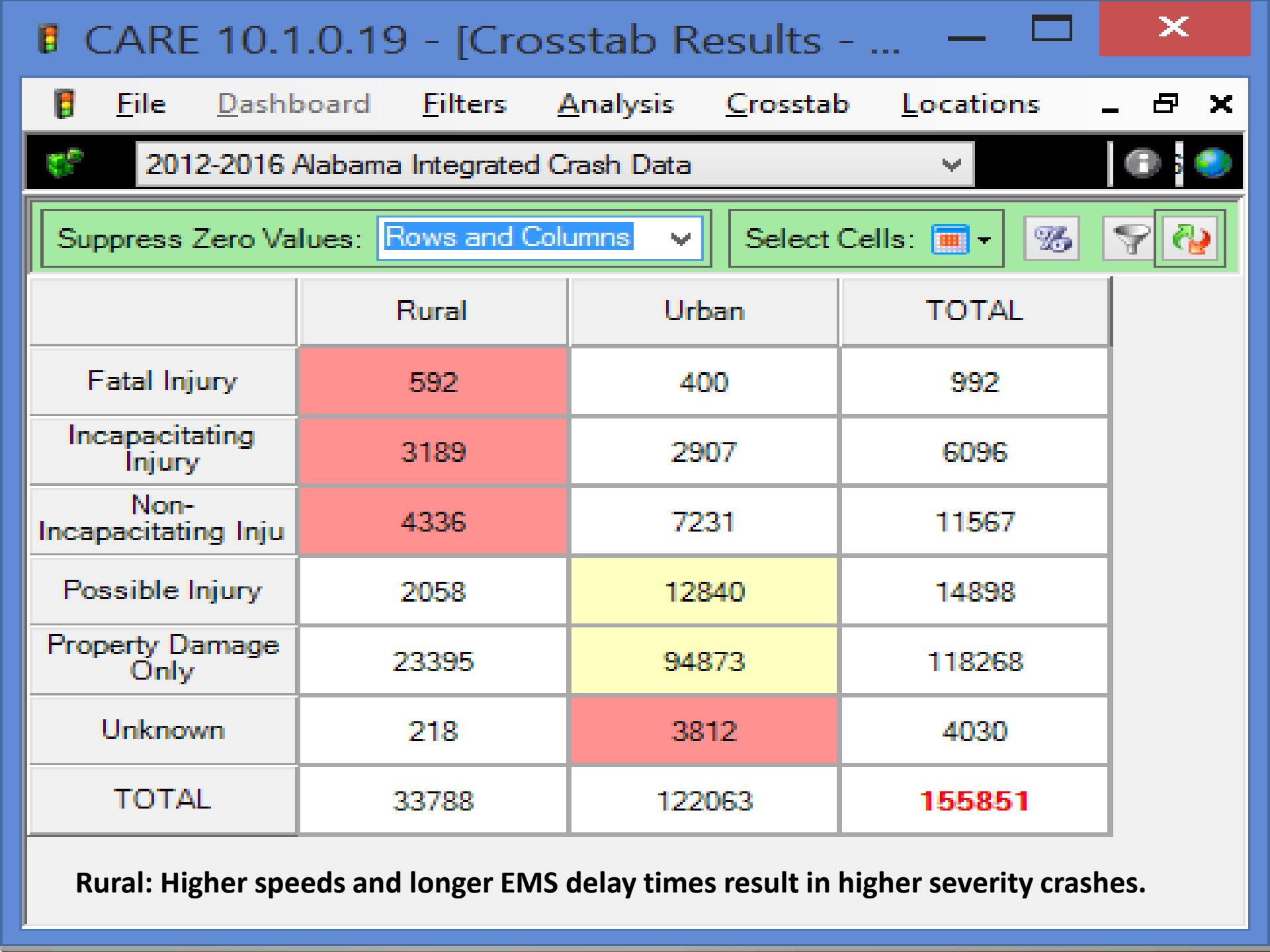
- **Rural High Speeds and Remote Locations**
  - ✓ **Fatal probability:**
    - **1.7% rural; 0.3% urban**
    - **Increase in rural area more than a factor of 5**
  - ✓ **See relationship with speed under Driver Behavior**
- **Delay times**
  - ✓ **All above 11 minutes overrepresented**
  - ✓ **Larger overrepresentations above 46 minutes**



	Rural	Urban	TOTAL
Fatal Injury	592	400	992
Incapacitating Injury	3189	2907	6096
Non-Incapacitating Inju	4336	7231	11567
Possible Injury	2058	12840	14898
Property Damage Only	23395	94873	118268
Unknown	218	3812	4030
TOTAL	33788	122063	**155851**

Rural: Higher speeds and longer EMS delay times result in higher severity crashes.

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Cr...

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2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/20

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

C036: Adjusted EMS Arrival Delay	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
0 to 5 minutes	148	17.19	9973	27.18	0.632*	-86.061
6 to 10 minutes	249	28.92	11815	32.21	0.898	-28.291
11 to 15 minutes	218	25.32	6621	18.05	1.403*	62.609
16 to 20 minutes	94	10.92	3439	9.37	1.165	13.289
21 to 30 minutes	98	11.38	3019	8.23	1.383*	27.146
31 to 45 minutes	26	3.02	1200	3.27	0.923	-2.163
46 to 60 minutes	12	1.39	338	0.92	1.513	4.067
61 to 90 minutes	7	0.81	190	0.52	1.570	2.541
91 to 120 minutes	2	0.23	34	0.09	2.506	1.202
121 to 180 minutes	1	0.12	32	0.09	1.332	0.249
Over 180 minutes	6	0.70	25	0.07	10.226	5.413

C036: Adjusted EMS Arrival Delay

Fatal (red bars) vs non-fatal (blue bars) CY 2016

Sort by Sum of Max Gain

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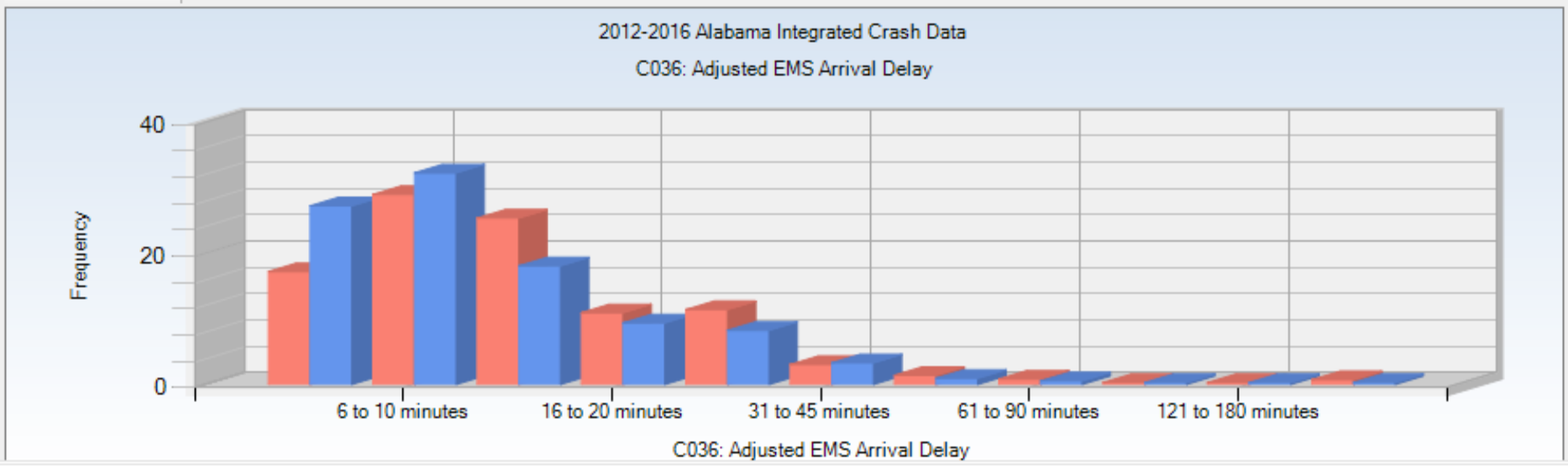

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Driver Behavior

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016...

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2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012

Order: Subset Frequency | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C015: Primary Contributing Circumstance	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Over Speed Limit	121	16.24	81	16.20	1.003	0.310
DUI	120	16.11	103	20.60	0.782	-33.470
E Ran off Road	84	11.28	46	9.20	1.226	15.460
E Aggressive Operation	80	10.74	46	9.20	1.167	11.460
E Improper Crossing	42	5.64	20	4.00	1.409	12.200
E Crossed Centerline	36	4.83	20	4.00	1.208	6.200
E Fatigued/Asleep	36	4.83	25	5.00	0.966	-1.250
E Failed to Yield Right-o...	34	4.56	31	6.20	0.736	-12.190
Driving too Fast for Con...	32	4.30	26	5.20	0.826	-6.740
Unseen Object/Person/...	30	4.03	29	5.80	0.694	-13.210
Traveling Wrong Way/...	26	3.49	25	5.00	0.698	-11.250
E Over Correcting/Over...	26	3.49	12	2.40	1.454	8.120
E Failed to Yield Right-o...	24	3.22	11	2.20	1.464	7.610
E Ran Stop Sign	21	2.82	7	1.40	2.013	10.570
E Ran Traffic Signal	18	2.42	12	2.40	1.007	0.120
E Other Distraction Insid...	15	2.01	6	1.20	1.678	6.060

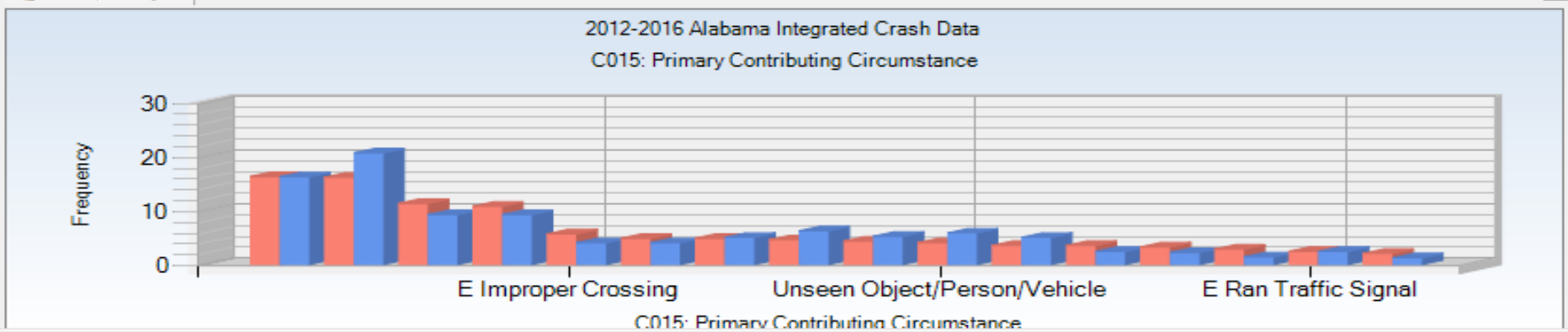
C015: Primary Contributing Circumstance

PCCs with 15 or More Fatal Crashes in 2016

All of the top causes down to Unseen Object could have a speed cofactor.

Improper Crossing is a pedestrian issue.

Sort by Sum of Max Gain

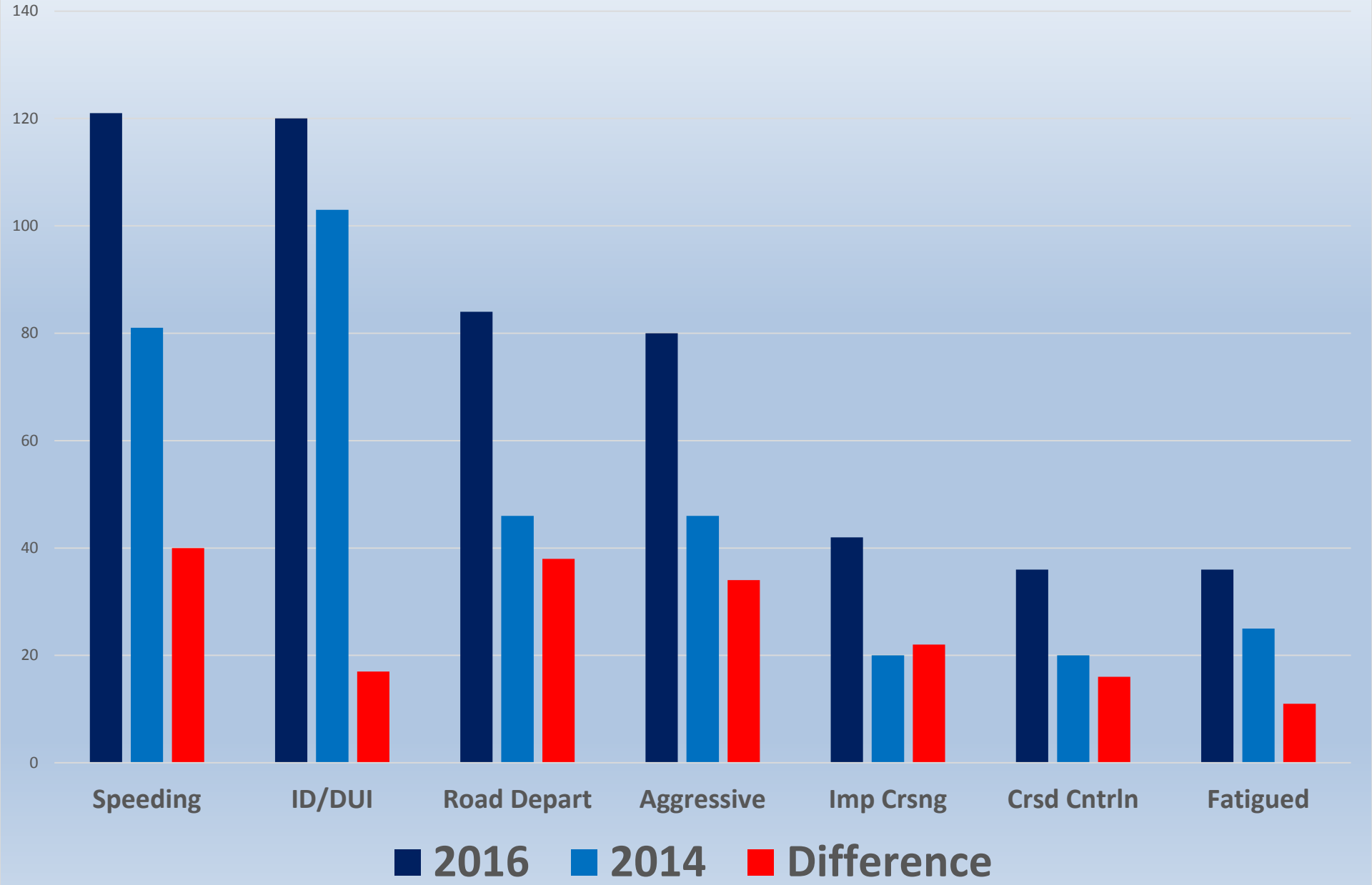


C015: Primary Contributing Circumstance
Fatal Crashes in 2016 > 35

Value	2016	2014	Difference
Speeding	121	81	40
ID/DUI	120	103	17
Road Depart	84	46	38
Aggressive	80	46	34
Imp Crsng	42	20	22
Crsd Cntrln	36	20	16
Fatigued	36	25	11

2016 to 2015 Fatal Crash Differential by PCC

Primary Contributing Circumstance Values with >35 Fatal Crashes in 2016



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2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/201

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

C015: Primary Contributing Circumstance Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Over Speed Limit	121	16.99	2287	4.71	3.608*	87.463
DUI	120	16.85	4244	8.74	1.928*	57.764
E Aggressive Operation	80	11.24	2352	4.84	2.319*	45.509
E Improper Crossing	42	5.90	155	0.32	18.478*	39.727
E Ran off Road	84	11.80	3326	6.85	1.722*	35.226
Traveling Wrong Way/Wro...	26	3.65	680	1.40	2.607*	16.028
E Crossed Centerline	36	5.06	1921	3.96	1.278	7.830
E Over Correcting/Over Ste...	26	3.65	1503	3.10	1.180	3.959
E Ran Stop Sign	21	2.95	1330	2.74	1.077	1.496
E Fatigued/Asleep	36	5.06	2645	5.45	0.928	-2.787
Driving too Fast for Conditions	32	4.49	4786	9.86	0.456*	-38.184
E Failed to Yield Right-of-W...	24	3.37	6349	13.08	0.258*	-69.104
E Failed to Yield Right-of-W...	34	4.78	7170	14.77	0.323*	-71.144
Unseen Object/Person/Veh...	30	4.21	9805	20.19	0.209*	-113.784

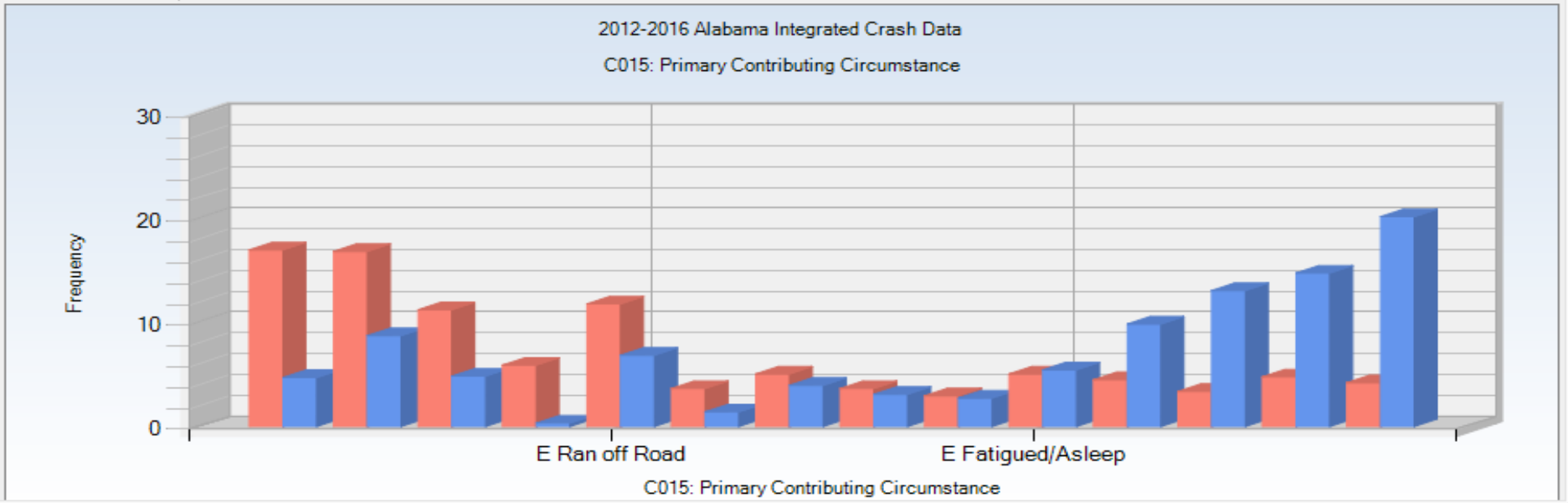
C015: Primary Contributing Circumstance

What Causes Fatalities?

Comparing <u>fatal</u> crashes (in red) with <u>non-fatal</u> crashes (in blue) all in 2016 – all PCCs with > 20 fatal crashes in 2016

Sort by Sum of Max Gain

Display Filter

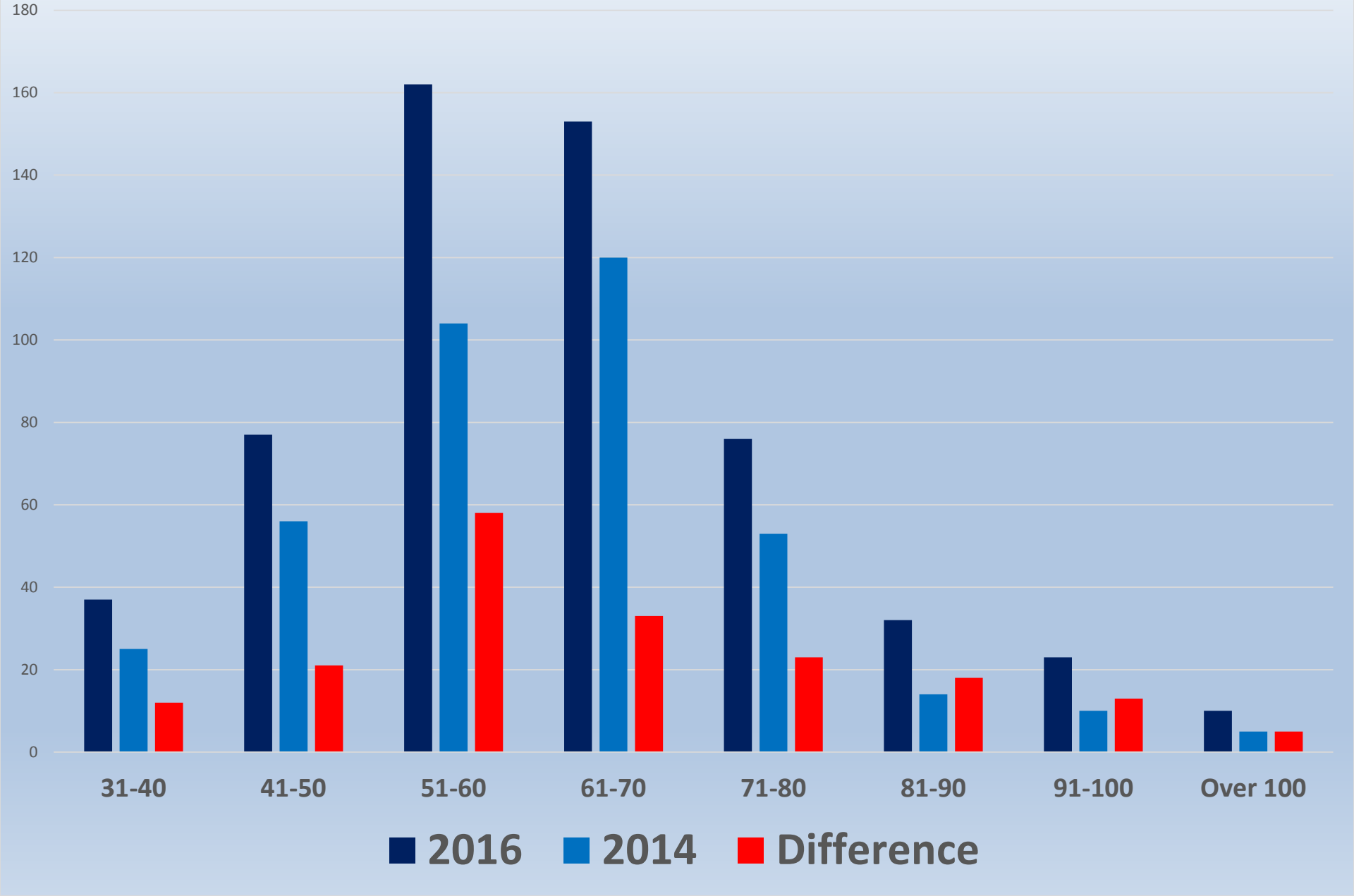


C224 Impact Speeds

Value (MPH)	2016	2014	Difference
31-40	37	25	12
41-50	77	56	21
51-60	162	104	58
61-70	153	120	33
71-80	76	53	23
81-90	32	14	18
91-100	23	10	13
Over 100	10	5	5

2016 to 2014 Fatal Differential by Impact Speed

All speeds above 31 MPH in order of impact speed



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fat...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012

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

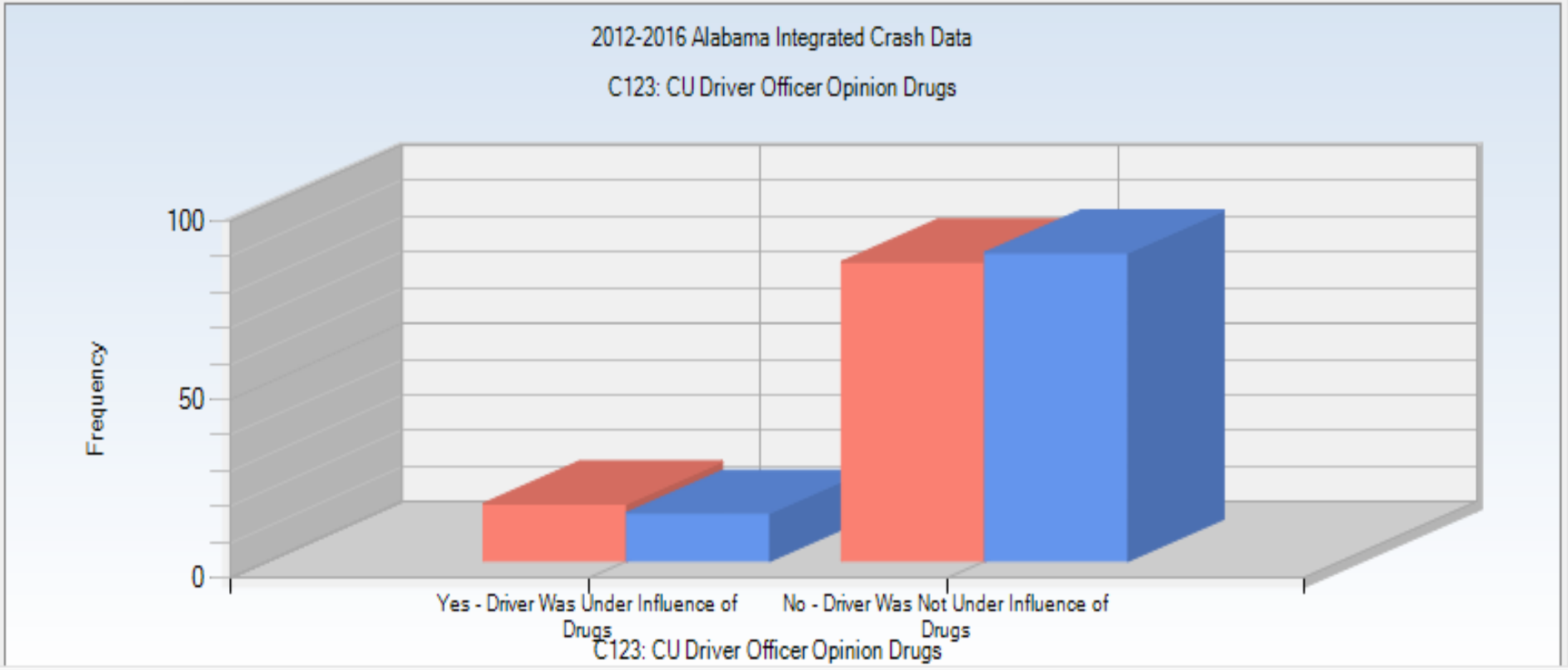
C123: CU Driver Officer Opinion Drugs	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Yes - Driver Was Under In...	75	16.09	50	13.51	1.191	12.027
No - Driver Was Not Und...	391	83.91	320	86.49	0.970	-12.027

C123: CU Driver Officer Opinion Drugs

Sort by Sum of Max Gain

Fatal Crashes in 2016 (red) compared to fatal crashes in 2014 (blue)

Displ



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fat...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012

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

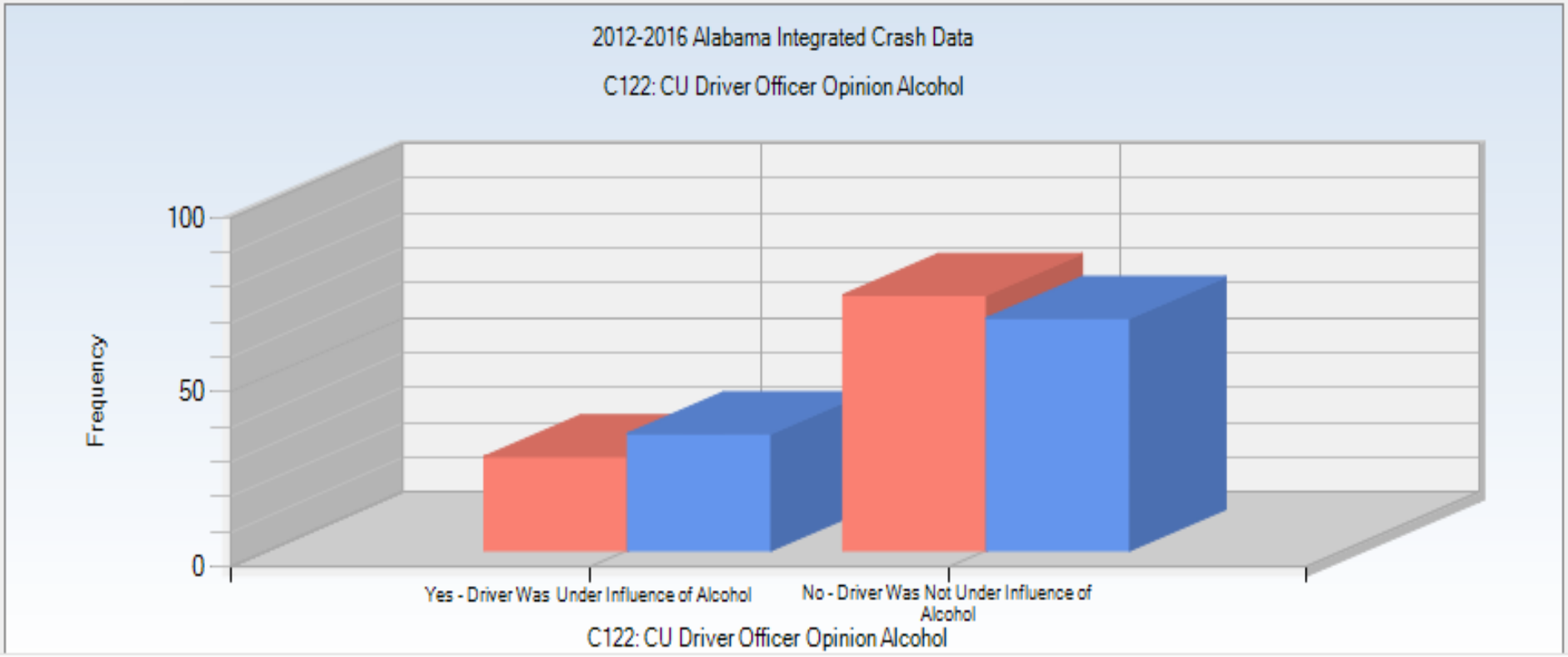
C122: CU Driver Officer Opinion Alcohol	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Yes - Driver Was Under In...	152	26.86	150	33.48	0.802	-37.509
No - Driver Was Not Unde...	414	73.14	298	66.52	1.100	37.509

C122: CU Driver Officer Opinion Alcohol

Sort by Sum of Max Gain

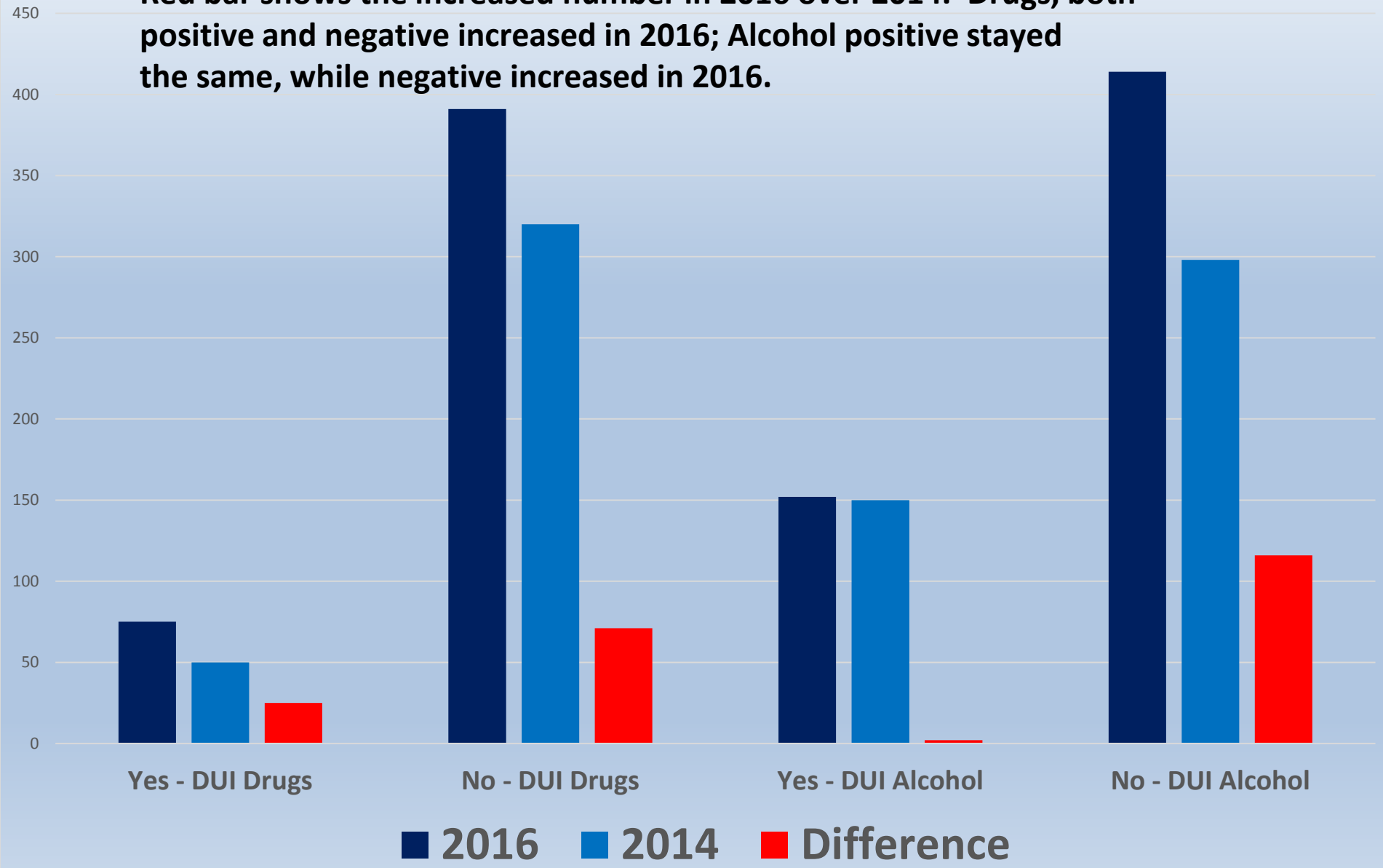
Fatal Crashes in 2016 (red) compared to fatal crashes in 2014 (blue)

Displ



2016 to 2014 C122-3 Officer's Opinion Drug and Alcohol Use
2016 Fatal vs 2014 Fatal Crashes Comparisons

Red bar shows the increased number in 2016 over 2014. Drugs, both positive and negative increased in 2016; Alcohol positive stayed the same, while negative increased in 2016.



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Cras...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

C121: CU Driver Condition Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Under the Influence of Alcohol/Drugs	160	30.25	4935	3.56	8.507*	141.191
E Asleep/Fainted/Fatigued	33	6.24	2484	1.79	3.486*	23.533
Illness	20	3.78	598	0.43	8.775*	17.721
E Physical Impairment	5	0.95	349	0.25	3.759	3.670
E Emotional (Depressed/Angry/Disturbed)	5	0.95	456	0.33	2.877	3.262
CU is Unknown	7	1.32	5507	3.97	0.334	-13.989
Apparently Normal	299	56.52	124446	89.66	0.630*	-175.304

C121: CU Driver Condition

Fatal (red bars) vs non-fatal (blue bars) CY 2016

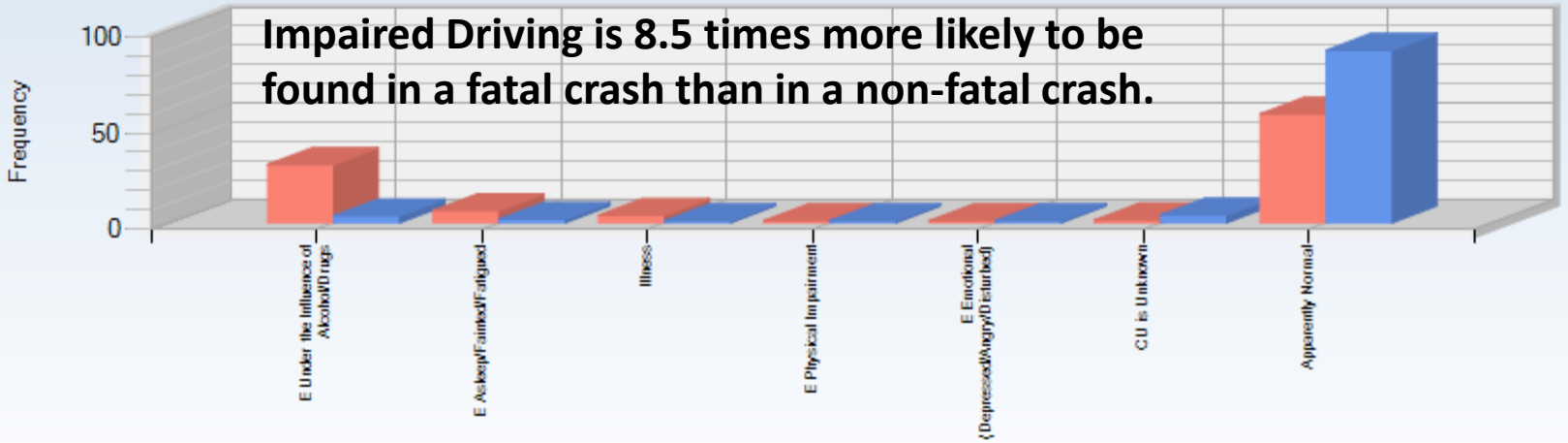
Sort by Sum of Max Gain

Display Filter N

2012-2016 Alabama Integrated Crash Data

C121: CU Driver Condition

Impaired Driving is 8.5 times more likely to be found in a fatal crash than in a non-fatal crash.



C121: CU Driver Condition

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

C224: CU Estimated Speed at Impact	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
1 to 5 MPH	17	2.66	14765	18.07	0.147	-98.665
6 to 10 MPH	18	2.81	9661	11.83	0.238	-57.682
11 to 15 MPH	16	2.50	6361	7.79	0.321	-33.830
16 to 20 MPH	9	1.41	4794	5.87	0.240	-28.555
21 to 25 MPH	7	1.09	4233	5.18	0.211	-26.160
26 to 30 MPH	3	0.47	4632	5.67	0.083	-33.286
31 to 35 MPH	15	2.34	5237	6.41	0.366	-26.025
36 to 40 MPH	22	3.44	4815	5.89	0.583*	-15.719
41 to 45 MPH	36	5.63	7305	8.94	0.629*	-21.225
46 to 50 MPH	41	6.41	3568	4.37	1.467*	13.049
51 to 55 MPH	101	15.78	5835	7.14	2.210*	55.290
56 to 60 MPH	61	9.53	2715	3.32	2.868*	39.731
61 to 65 MPH	65	10.16	2936	3.59	2.826*	42.000
66 to 70 MPH	88	13.75	3394	4.15	3.310*	61.412
71 to 75 MPH	36	5.63	663	0.81	6.931*	30.806
76 to 80 MPH	40	6.25	427	0.52	11.958*	36.655
81 to 85 MPH	13	2.03	149	0.18	11.138	11.833
86 to 90 MPH	19	2.97	103	0.13	23.548	18.193
91 to 95 MPH	7	1.09	19	0.02	47.030	6.851
96 to 100 MPH	16	2.50	56	0.07	36.472	15.561
Over 100 MPH	10	1.56	30	0.04	42.551	9.765

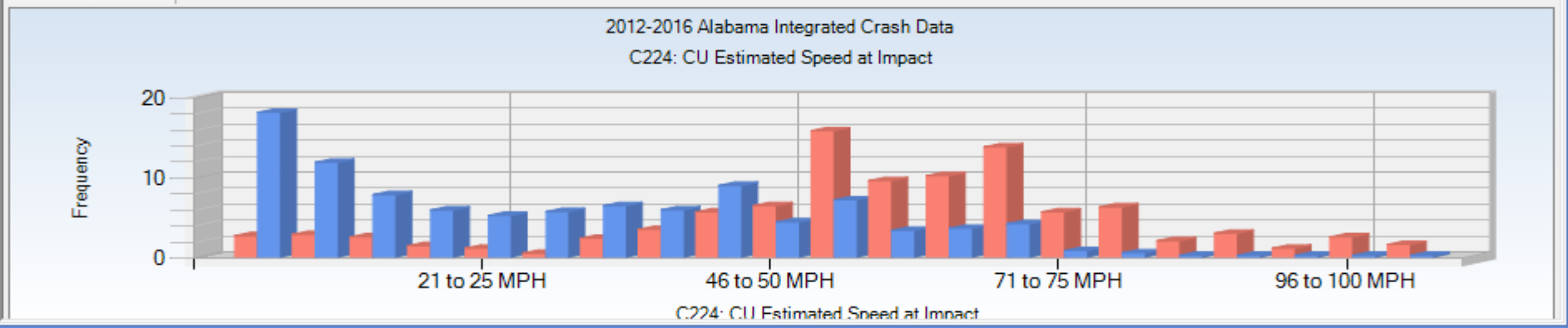
C224: CU Estimated Speed at Impact

Fatal (red bars) vs non-fatal (blue bars) for CY 2016

Exponential Increase: Odds ratio doubles for every increase of 10 MPH

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fat...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012

Order: Subset Frequency | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

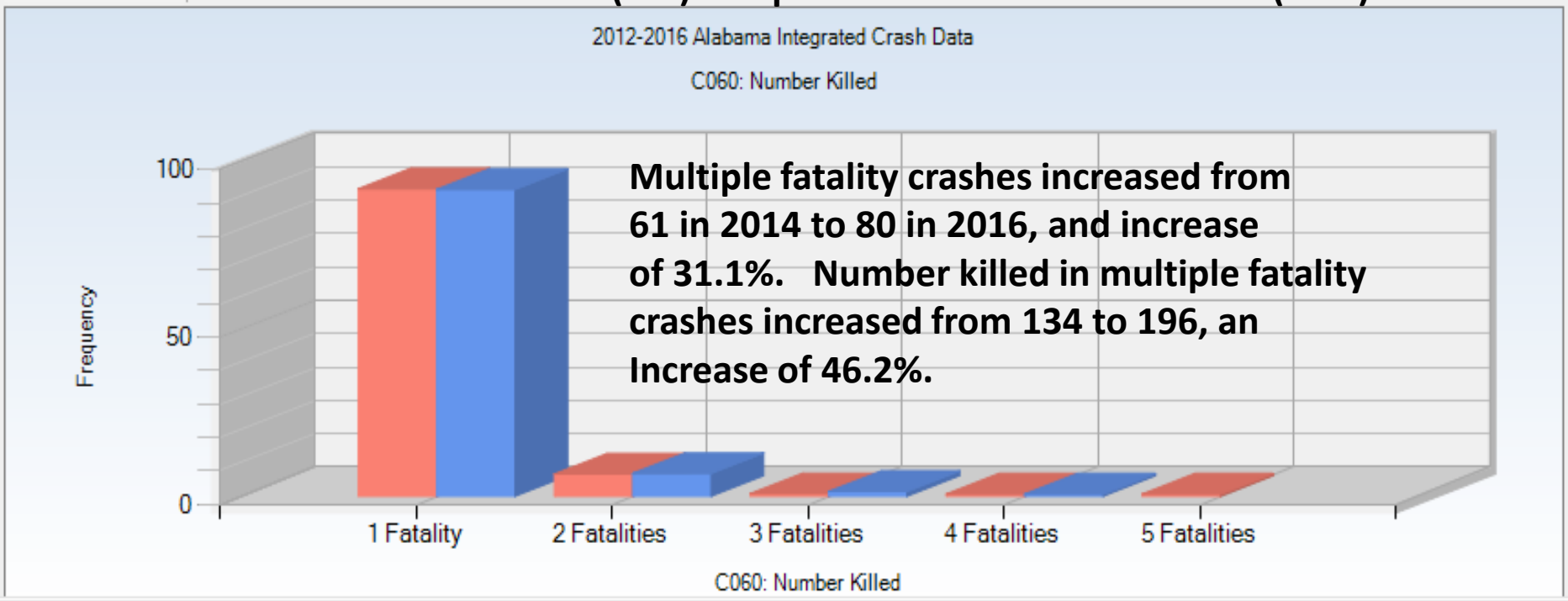
C060: Number Killed	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
1 Fatality	912	91.94	678	91.75	1.002	1.884
2 Fatalities	65	6.55	50	6.77	0.968	-2.118
3 Fatalities	7	0.71	10	1.35	0.521	-6.424
4 Fatalities	5	0.50	1	0.14	3.725	3.658
5 Fatalities	3	0.30	0	0.00	0.000	3.000

C221: CU Had Oversized Load Permit
C417: E CU Workers Present
C056: Number of Pedestrians
C406: CU Contributing Material Source
C060: Number Killed
C061: Number of Railroad Trains
C405: CU Contributing Material in Road

Sort by Sum of Max Gain

Fatal crashes in 2016 (red) compared to fatal crashes in 2014 (blue)

Displ



Multiple fatality crashes increased from 61 in 2014 to 80 in 2016, and increase of 31.1%. Number killed in multiple fatality crashes increased from 134 to 196, an Increase of 46.2%.

Driver Demographics

CAPS
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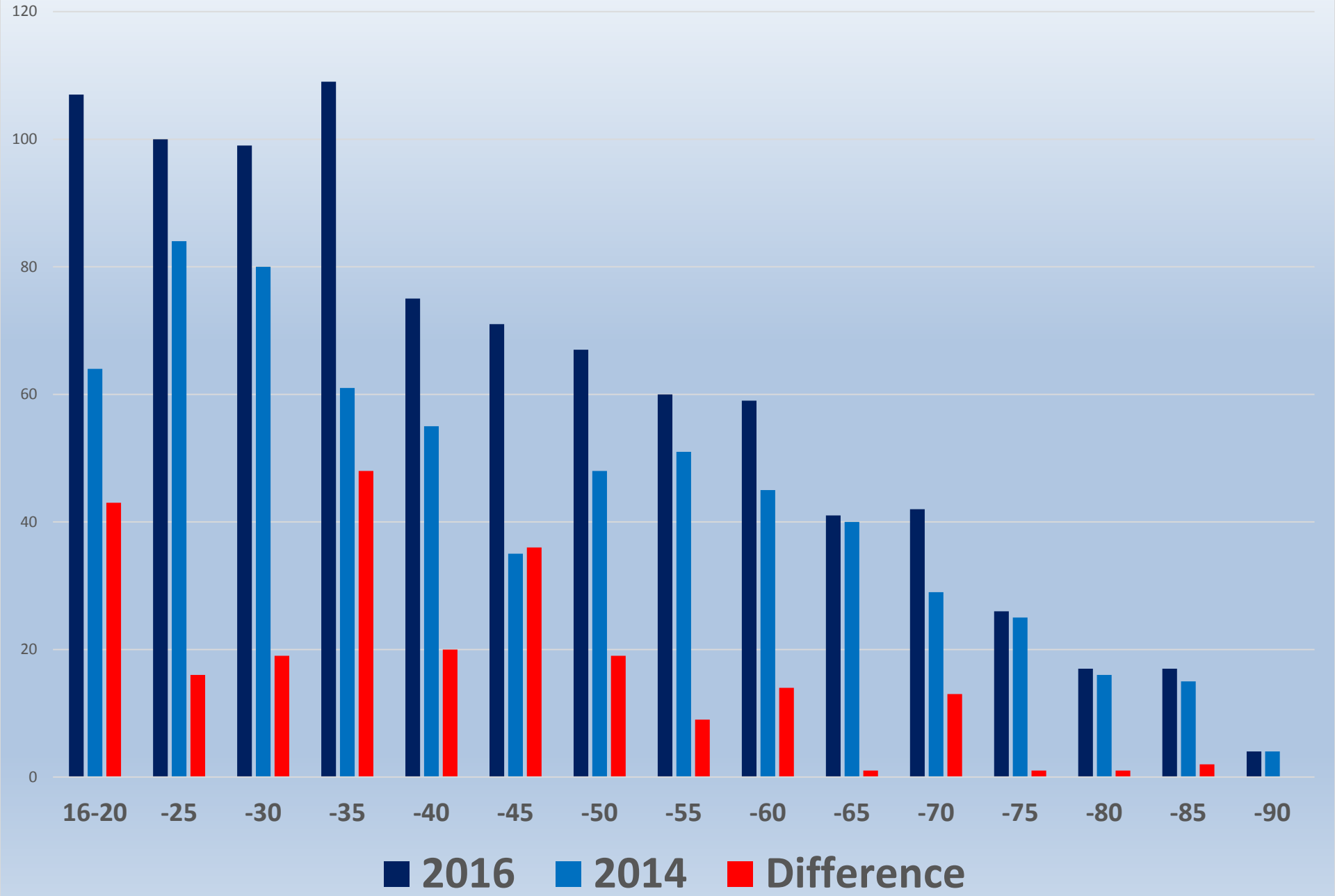
- AGE
  - ✓ Critical Ages 31-35; 16-20 and 41-45
  - ✓ Ages 16-20 Have High Number but Under-Represented
  - ✓ Ranking on Next Page by Increase of 2016 over 2014
  - ✓ Potential Problem Addicts:
    - 21-30 are typical social drinkers, numbers consistently high
    - 31-35 alarming for the increase: potential problems
    - 41-45 getting to a point beyond rehabilitation
- GENDER
  - ✓ Males 36% higher than expected

C106: CU Driver Age (5-year intervals)				
Value	2016	2014	Difference	Rank
11 to 15 Years	9	2	7	
16 to 20 Years	107	64	43	B
21 to 25 Years	100	84	16	
26 to 30 Years	99	80	19	D
31 to 35 Years	109	61	48	A
36 to 40 Years	75	55	20	D
41 to 45 Years	71	35	36	C
46 to 50 Years	67	48	19	D
51 to 55 Years	60	51	9	
56 to 60 Years	59	45	14	
61 to 65 Years	41	40	1	
66 to 70 Years	42	29	13	
71 to 75 Years	26	25	1	
76 to 80 Years	17	16	1	
81 to 85 Years	17	15	2	
86 to 90 Years	4	4	0	

2016 to 2015 Fatal Crash Differential by Age



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

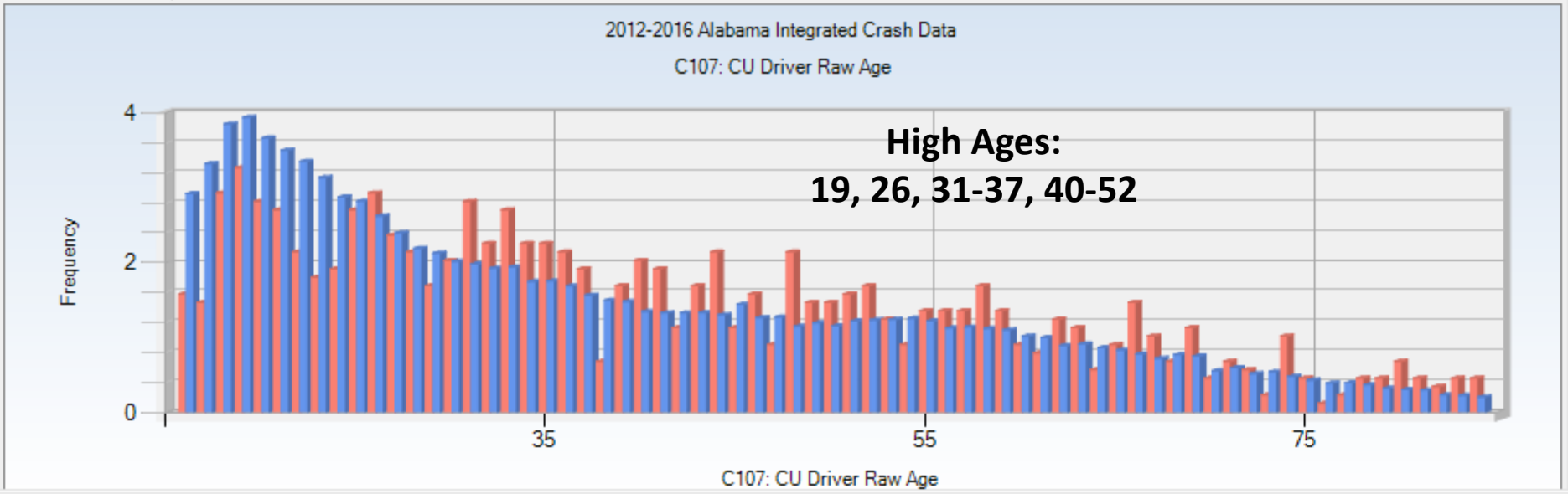
C107: CU Driver Raw Age Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
29	15	1.69	2889	2.12	0.796	-3.853
30	18	2.03	2742	2.02	1.006	0.106
31	25	2.82	2692	1.98	1.423	7.433
32	20	2.25	2615	1.92	1.172	2.935
33	24	2.70	2642	1.94	1.392	6.759
34	20	2.25	2371	1.74	1.293	4.528
35	20	2.25	2379	1.75	1.288	4.475
36	19	2.14	2292	1.68	1.270	4.043
37	17	1.91	2124	1.56	1.226	3.139
38	6	0.68	2028	1.49	0.453	-7.234

C107: CU Driver Raw Age

Fatal (red bars) vs non-fatal (blue bars) CY 2016

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

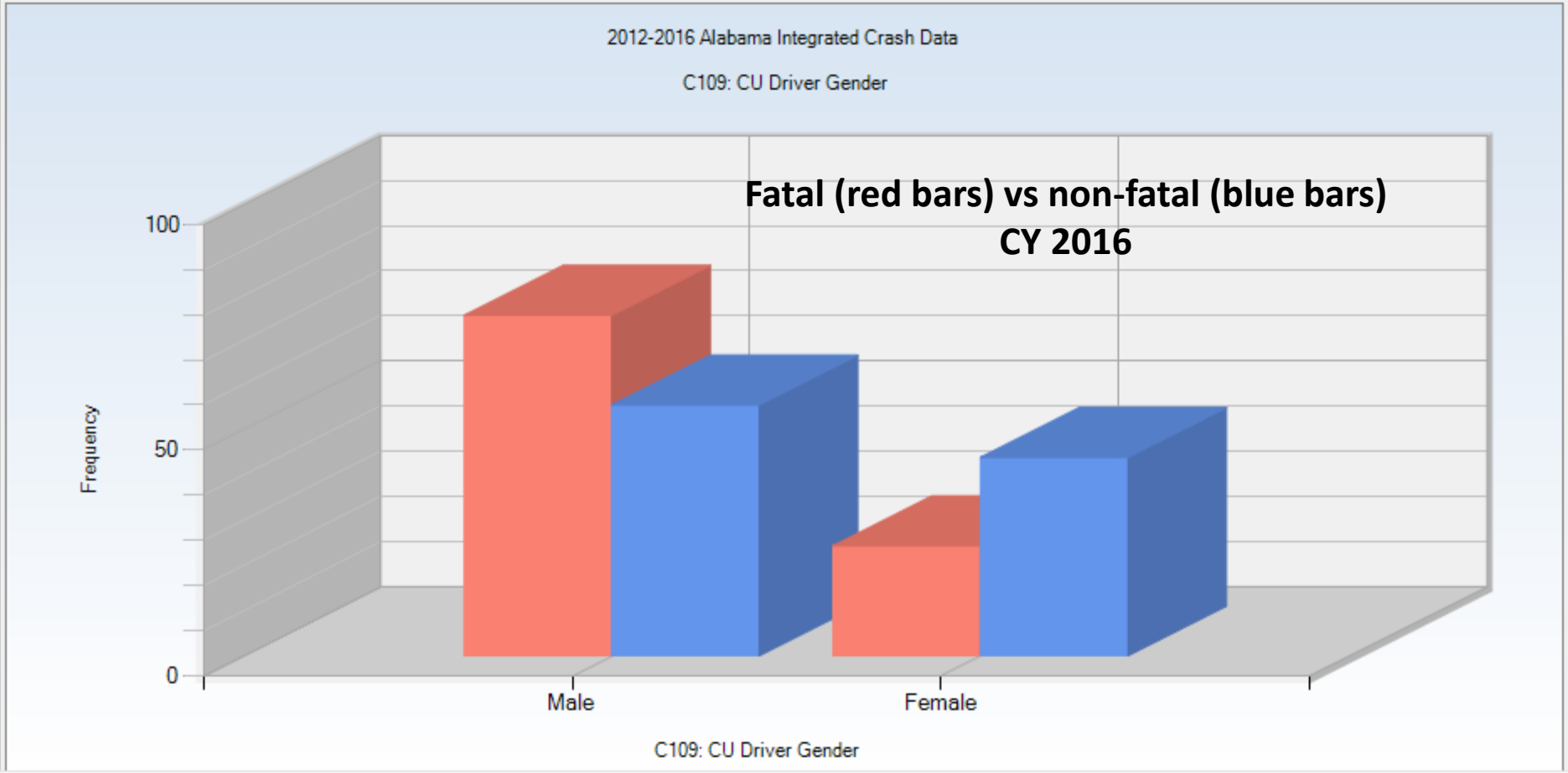
Order: Max Gain | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C109: CU Driver Gender	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Male	684	75.58	77229	55.66	1.358*	180.236
Female	221	24.42	61111	44.05	0.554*	-177.627

C109: CU Driver Gender

Sort by Sum of Max Gain

Display Filter Name



Time Considerations

CAPS
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- **In 2016 Times of Fatal Crashes Shifted toward:**
  - ✓ **Morning: 4:00 AM to 8:00 AM**
  - ✓ **Early afternoon: 2:00 PM to 5:00 PM**
- **Comparing Fatal with Non-Fatal**
  - ✓ **Fatal crashes reflect DUI pattern**
  - ✓ **Tend to exaggerate it**
- **Day-of-the-Week also Reflects Typical DUI Pattern**
- **Shift in Months**
  - ✓ **Toward August through October**
  - ✓ **Away from colder months of November through February**

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012

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

C008: Time of Day	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
4:00 AM to 4:59 AM	37	3.73	18	2.44	1.531	12.838
5:00 AM to 5:59 AM	42	4.23	17	2.30	1.840	19.180
6:00 AM to 6:59 AM	35	3.53	18	2.44	1.449	10.838
7:00 AM to 7:59 AM	51	5.14	29	3.92	1.310	12.072
8:00 AM to 8:59 AM	27	2.72	26	3.52	0.774	-7.901
9:00 AM to 9:59 AM	25	2.52	25	3.38	0.745	-8.559
10:00 AM to 10:59 AM	31	3.13	32	4.33	0.722	-11.955
11:00 AM to 11:59 AM	43	4.33	21	2.84	1.525	14.811
12:00 Noon to 12:59 PM	38	3.83	35	4.74	0.809	-8.982
1:00 PM to 1:59 PM	44	4.44	33	4.47	0.993	-0.298
2:00 PM to 2:59 PM	47	4.74	22	2.98	1.592	17.468
3:00 PM to 3:59 PM	47	4.74	31	4.19	1.129	5.387
4:00 PM to 4:59 PM	57	5.75	30	4.06	1.415	16.729

C003: Year
C002: City
C040: Agency ORI
C028: Mileposted Route
C007: Week of the Year
C050: E MapClick Used
C208: CU Model Year
C015: Primary Contributing Circumstanc
C107: CU Driver Raw Age
C001: County
C202: CU Contributing Circumstance
C008: Time of Day
C017: First Harmful Event
C201: CU Vehicle Most Harmful Event
C209: CU Make
C005: Day of Month
C106: CU Driver Age Range 2

Sort by Sum of Max Gain

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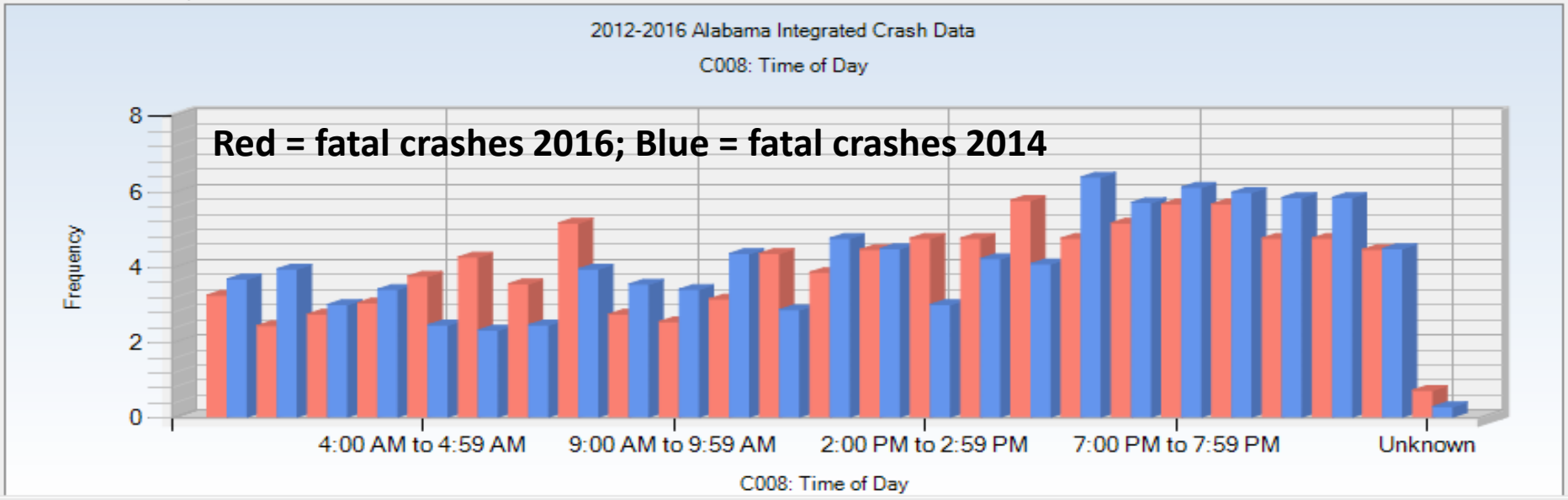


CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

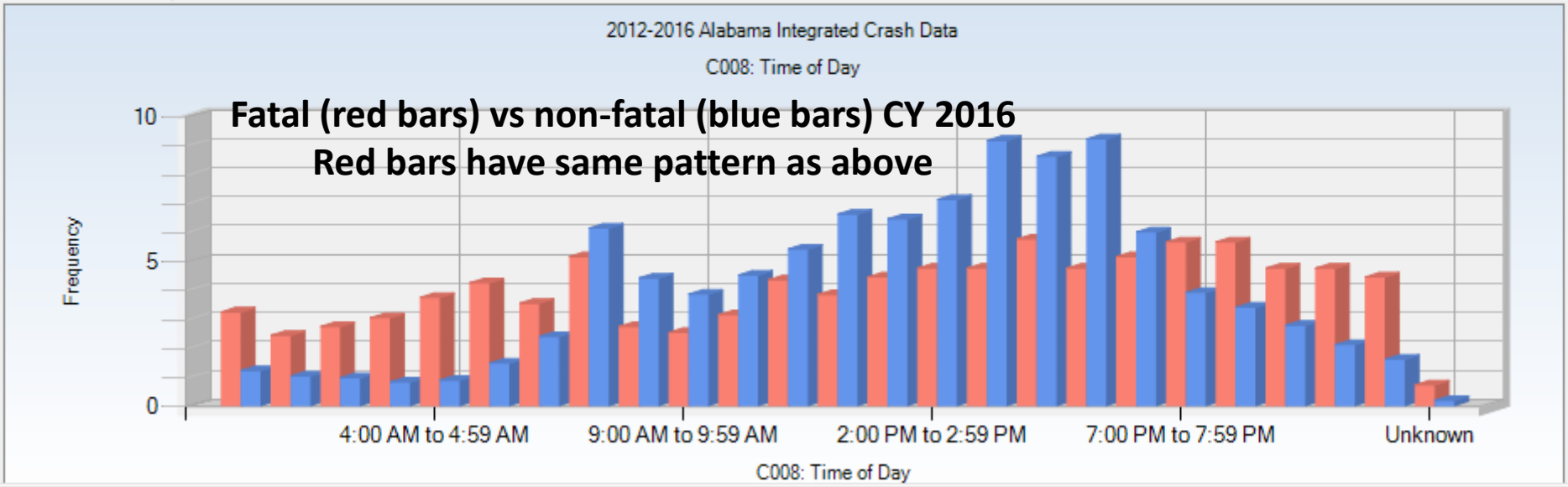
Order: Natural Order | Ascending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C008: Time of Day	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
12:00 Midnight to 12:59 AM	32	3.23	1861	1.20	2.684*	20.079
1:00 AM to 1:59 AM	24	2.42	1575	1.02	2.379*	13.911
2:00 AM to 2:59 AM	27	2.72	1481	0.96	2.846*	17.513
3:00 AM to 3:59 AM	30	3.02	1247	0.81	3.756*	22.012
4:00 AM to 4:59 AM	37	3.73	1351	0.87	4.275*	28.346
5:00 AM to 5:59 AM	42	4.23	2257	1.46	2.905*	27.542
6:00 AM to 6:59 AM	35	3.53	3688	2.38	1.482*	11.375
7:00 AM to 7:59 AM	51	5.14	9487	6.13	0.839	-9.772
8:00 AM to 8:59 AM	27	2.72	6814	4.40	0.619*	-16.649
9:00 AM to 9:59 AM	25	2.52	5949	3.84	0.656	-13.108

C203: CU First Harmful Event Location
C018: Location First Harmful Event Rel to Roadway
C034: Police Arrival Delay
C011: Highway Classifications
C231: E CU Areas Damaged #2
C027: At Intersection
C409: CU Traffic Control
C001: County
C109: CU Driver Gender
C008: Time of Day
C413: E CU Turn Lanes
C029: Lighting Conditions
C020: E Distracted Driving Opinion

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

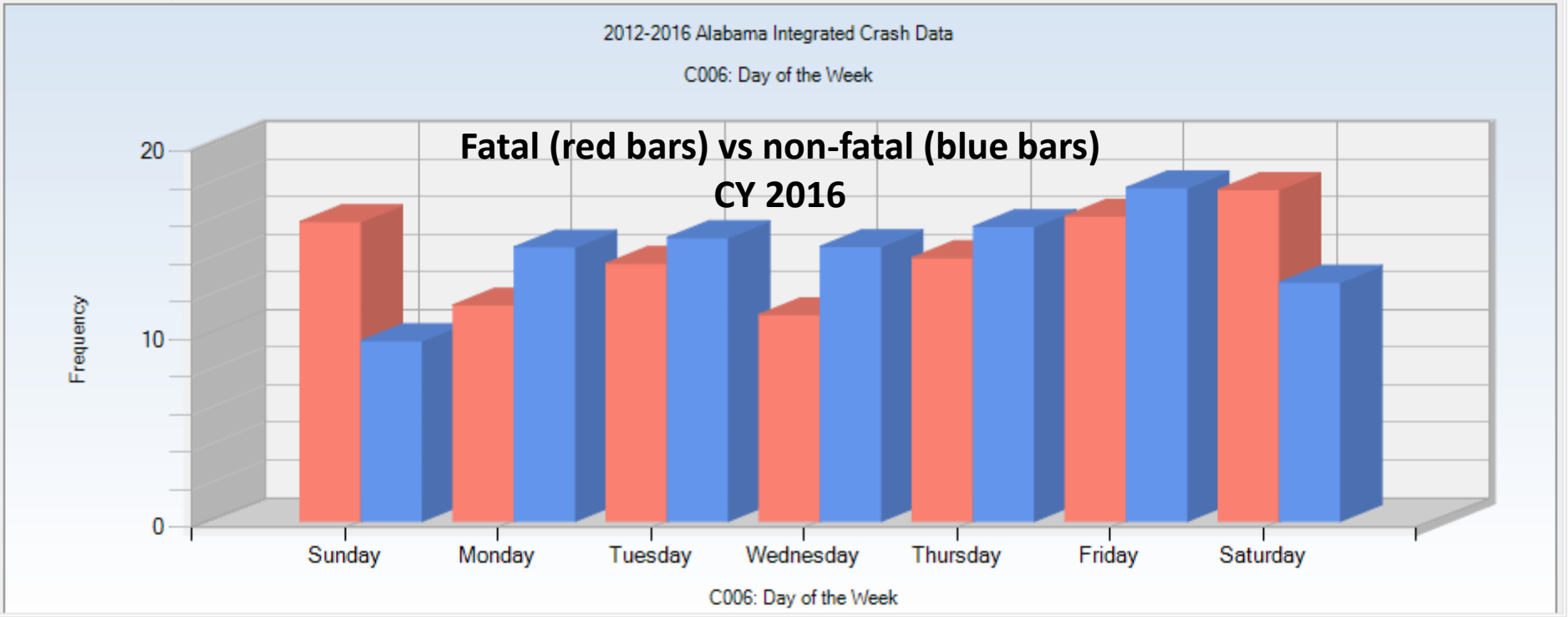
Order: Natural Order | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C006: Day of the Week	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Sunday	158	15.93	14869	9.60	1.659*	62.752
Monday	114	11.49	22577	14.58	0.788*	-30.624
Tuesday	136	13.71	23354	15.08	0.909	-13.602
Wednesday	109	10.99	22626	14.61	0.752*	-35.938
Thursday	139	14.01	24274	15.67	0.894	-16.495
Friday	161	16.23	27475	17.74	0.915	-15.000
Saturday	175	17.64	19684	12.71	1.388*	48.908

C111: CU Driver License State
C042: Highway Patrol Troops
C007: Week of the Year
C112: CU Driver First License Class
C006: Day of the Week
C116: CU DL Restriction Violations #1
C104: CU Left Scene
C213: CU Vehicle Usage
C022: E Type of Roadway Junction/Feature
C115: CU Driver CDL Status

Sort by Sum of Max Gain

Display Filter Name



File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/20

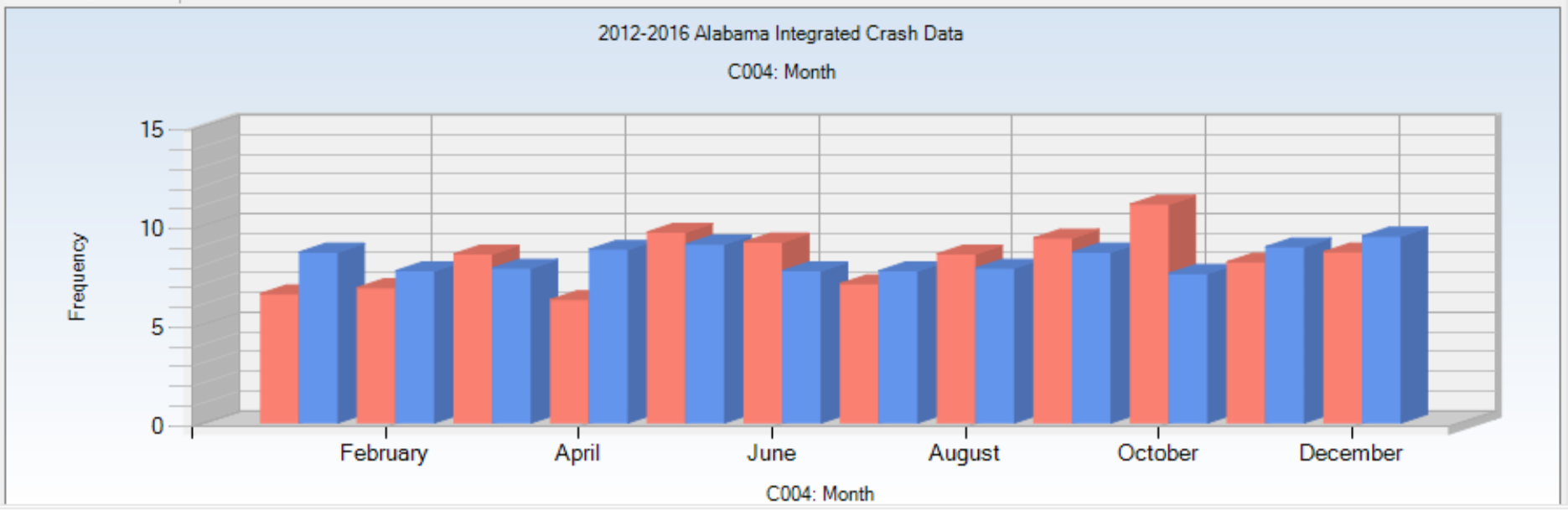
Order: Natural Order | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C004: Month Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
January	65	6.55	64	8.66	0.757	-20.911
February	68	6.85	57	7.71	0.889	-8.514
March	85	8.57	58	7.85	1.092	7.143
April	62	6.25	65	8.80	0.711	-25.253
May	96	9.68	67	9.07	1.067	6.062
June	91	9.17	57	7.71	1.189	14.486
July	70	7.06	57	7.71	0.915	-6.514
August	85	8.57	58	7.85	1.092	7.143
September	93	9.38	64	8.66	1.083	7.089
October	110	11.09	56	7.58	1.463*	34.828
November	81	8.17	66	8.93	0.914	-7.595
December	86	8.67	70	9.47	0.915	-7.965

C204: E CU Sequence of Events #1
C105: CU Driver Age Range 1
C563: V2 Estimated Speed at Impact
C224: CU Estimated Speed at Impact
C004: Month
C043: Highway Patrol Posts
C127: E CU Driver Drug Test Results
C048: Regional Planning Organization
C045: ALDOT Area
C501: Vehicle 2 (V2) Type
C233: CU Point of Initial Impact
C128: CU Vehicle Initial Travel Direction
C020: E Distracted Driving Opinion
C203: CU First Harmful Event Location
C125: E CU Driver Drug Test Type Given
C006: Day of the Week

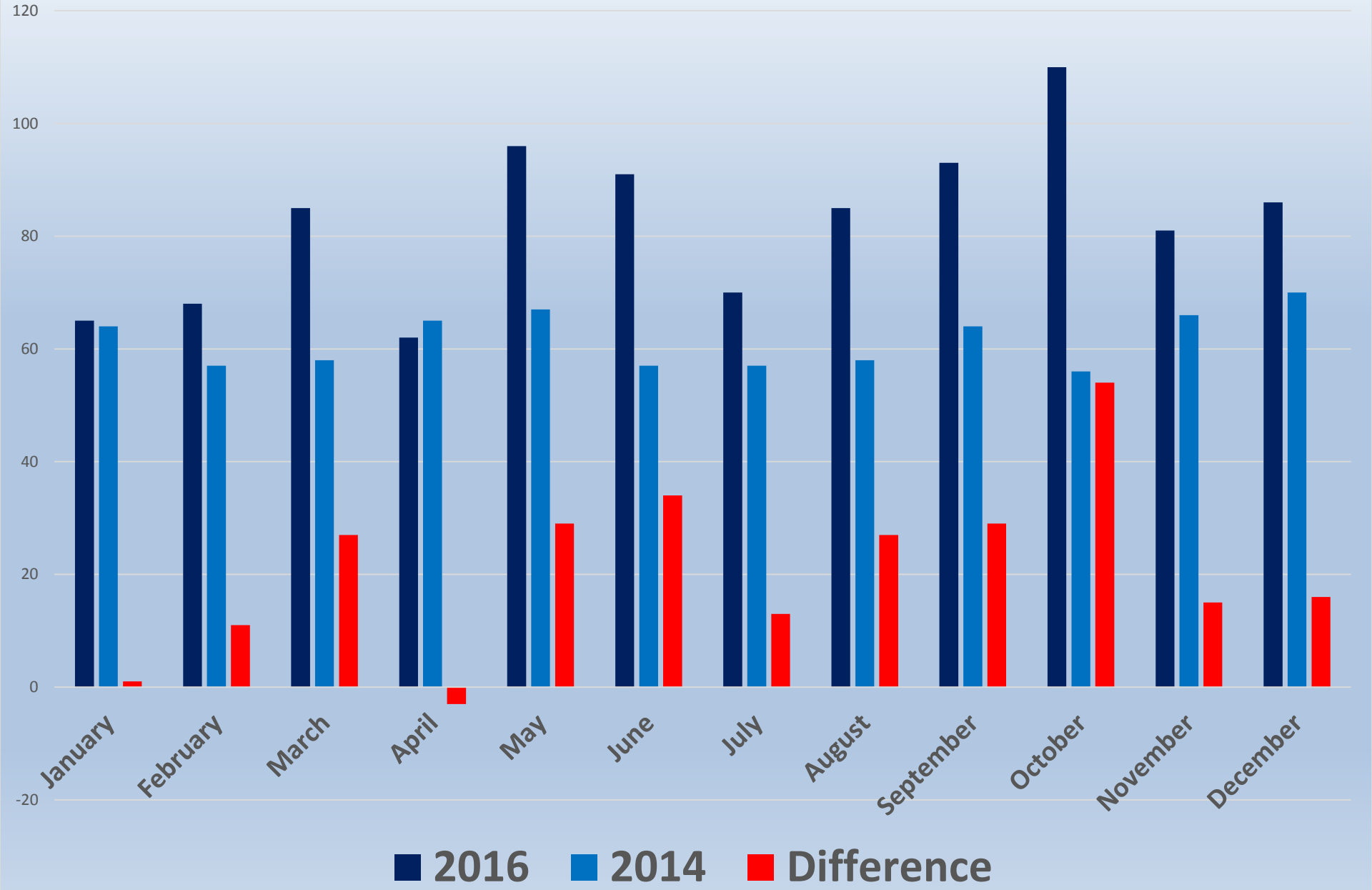
Sort by Sum of Max Gain

Display Filte



2016 to 2014 Fatal Differentials by C004 Month

Greatest increases: Oct, Jun, May/Sep, Mar/Aug



Geographical Features

CAPS
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Geographical Characteristics

- Counties with significantly higher proportions:
  - ✓ Talladega, Limestone, Etowah, Russell and Baldwin
- Counties that have about doubled their fatal crashes
  - ✓ Etowah, Talladega, Calhoun, Russell and Limestone
- Rural Areas of Counties Have More Fatal Crash Issues
  - ✓ Confirmed by comparing rural increases for each county
  - ✓ Confirmed by general rural-urban fatal crash comparison
  - ✓ Confirmed by Locale = Open Country over-representation

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

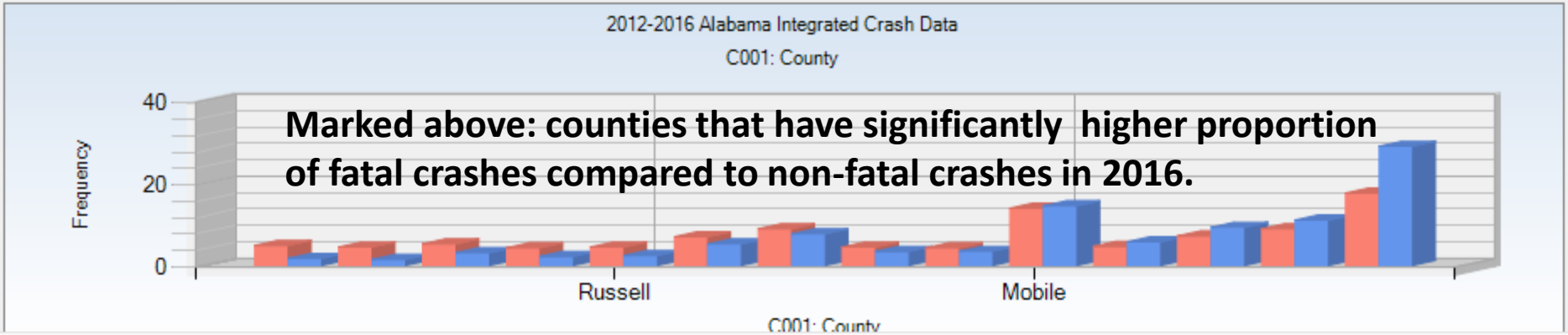
C001: County	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Talladega	25	4.84	1842	1.68	2.870*	16.291
Limestone	23	4.45	1568	1.43	3.102*	15.586
Etowah	27	5.22	3367	3.08	1.696*	11.080
Cullman	22	4.26	2390	2.19	1.947*	10.699
Russell	23	4.45	2611	2.39	1.863*	10.654
Baldwin	36	6.96	5687	5.20	1.339	9.110
Tuscaloosa	46	8.90	8370	7.65	1.162	6.424
Houston	23	4.45	3711	3.39	1.311	5.453
Calhoun	22	4.26	3740	3.42	1.244	4.316
Mobile	72	13.93	15849	14.49	0.961	-2.939
Shelby	24	4.64	6278	5.74	0.809	-5.684
Montgomery	37	7.16	10129	9.26	0.773	-10.893
Madison	46	8.90	12074	11.04	0.806	-11.089
Jefferson	91	17.60	31726	29.02	0.607*	-59.010

C001: County

Fatal (red bars) vs non-fatal (blue bars) CY 2016 Counties with 20 or more fatal crashes

Sort by Sum of Max Gain

Display Filter Name



Marked above: counties that have significantly higher proportion of fatal crashes compared to non-fatal crashes in 2016.

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashes ...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

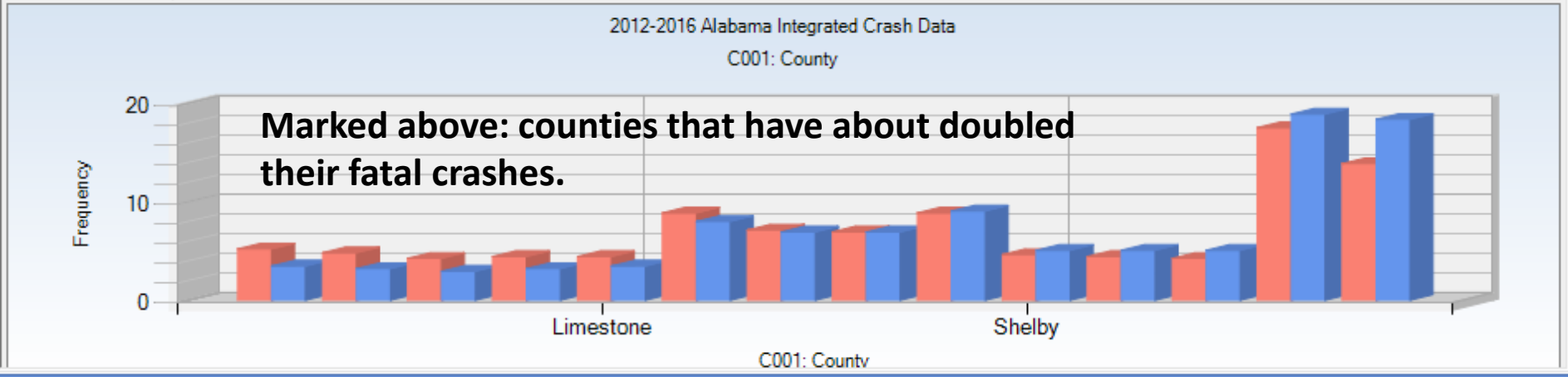
C001: County	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Etowah	27	5.22	13	3.48	1.502	9.029
Talladega	25	4.84	12	3.21	1.507	8.412
Calhoun	22	4.26	11	2.94	1.447	6.794
Russell	23	4.45	12	3.21	1.387	6.412
Limestone	23	4.45	13	3.48	1.280	5.029
Madison	46	8.90	30	8.02	1.109	4.529
Montgomery	37	7.16	26	6.95	1.029	1.059
Baldwin	36	6.96	26	6.95	1.002	0.059
Tuscaloosa	46	8.90	34	9.09	0.979	-1.000
Shelby	24	4.64	19	5.08	0.914	-2.265
Houston	23	4.45	19	5.08	0.876	-3.265
Cullman	22	4.26	19	5.08	0.838	-4.265
Jefferson	91	17.60	71	18.98	0.927	-7.147
Mobile	72	13.93	69	18.45	0.755	-23.382

C001: County

2016 Fatal (red bars) vs 2014 Fatal (blue bars) Counties with 20 or more fatal crashes

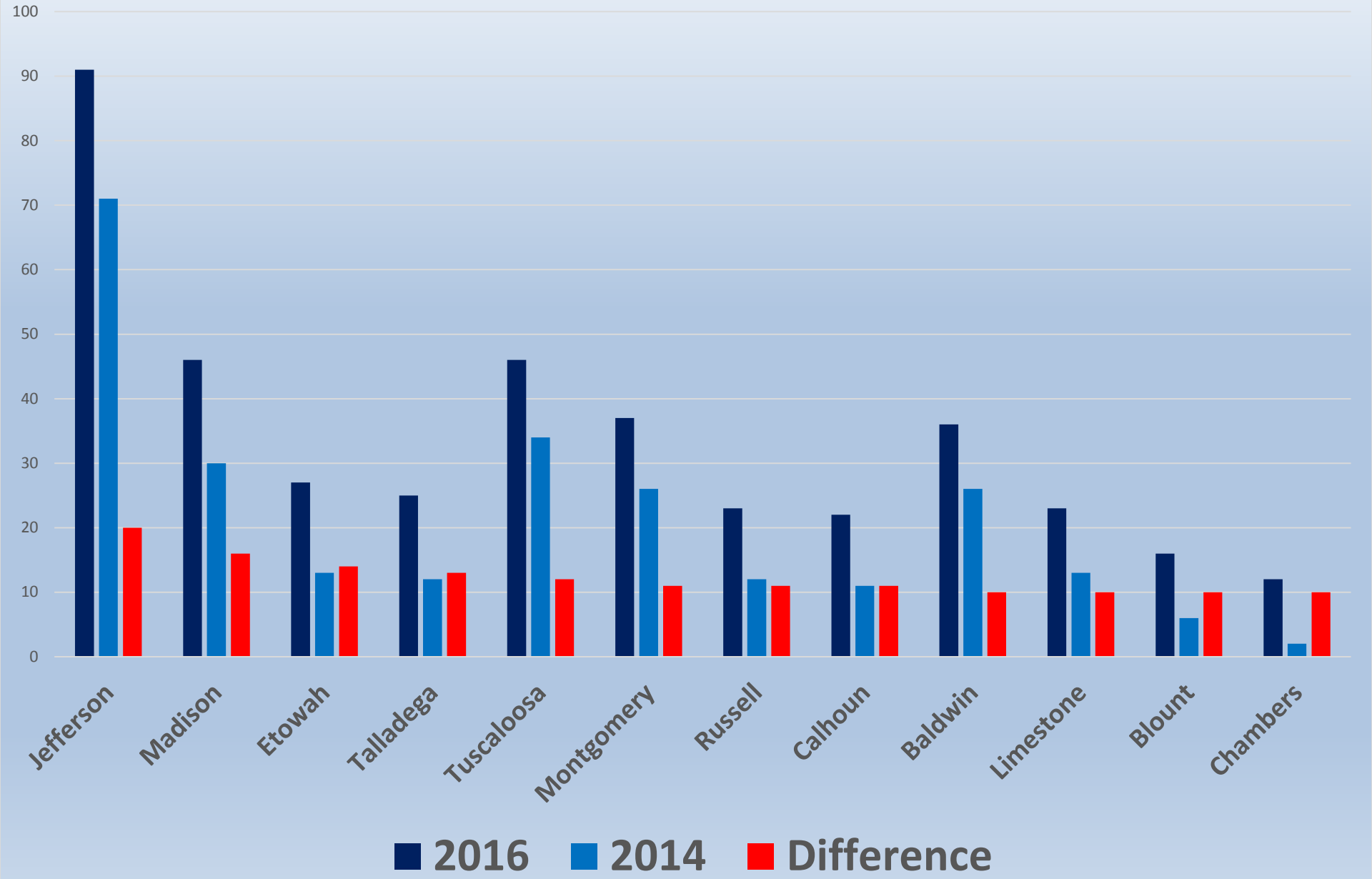
Sort by Sum of Max Gain

Display Filter Name



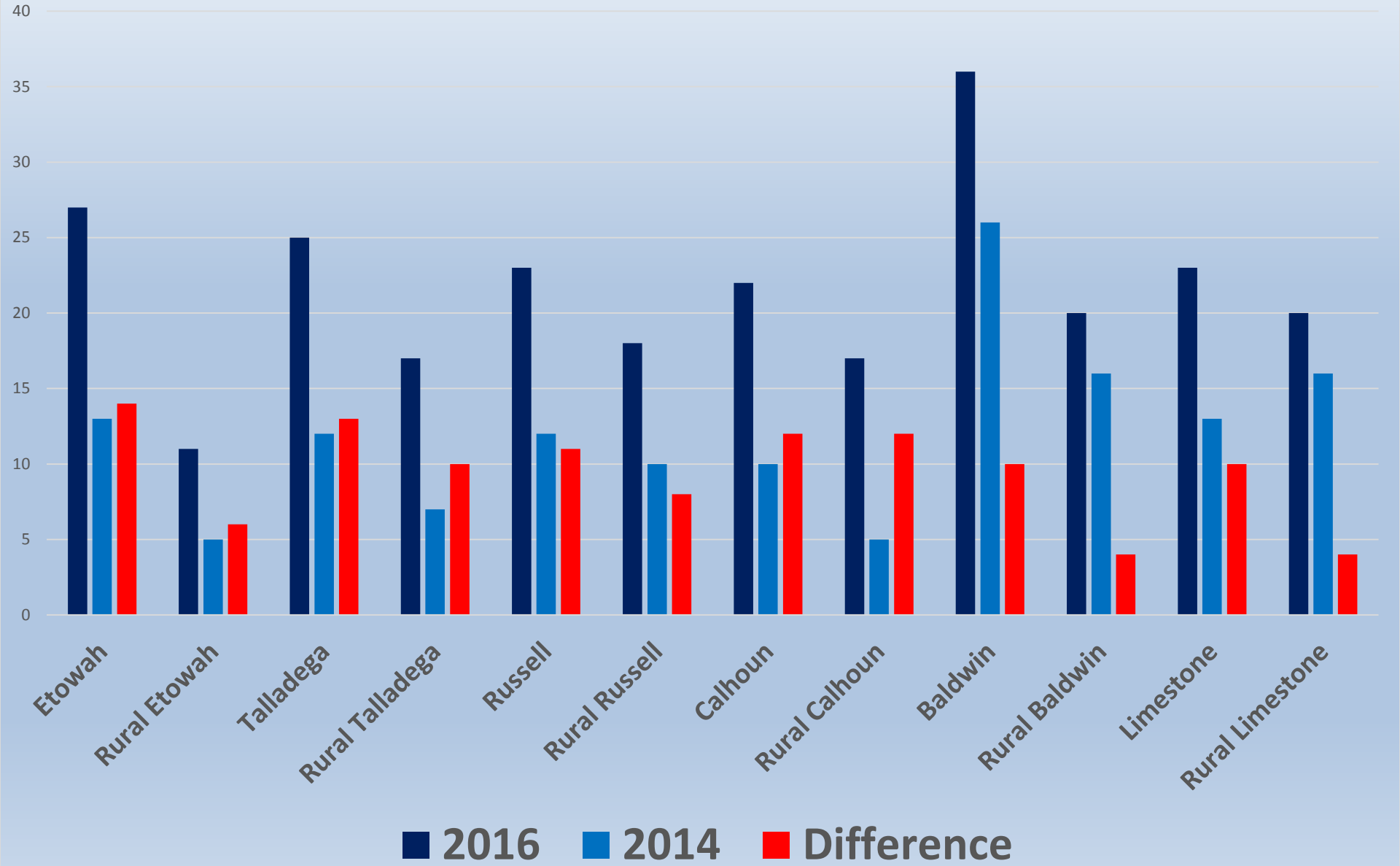
2016 to 2014 Fatal Crash Differential by County

Counties with an Increase of at Least 10 Fatal Crashes in 2016



2016 to 2014 Fatal Crash by County & Rural Areas

Counties with an Increase of at Least 10 Fatal Crashes in 2016
Ordered by County Increase in 2016 over 2014



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

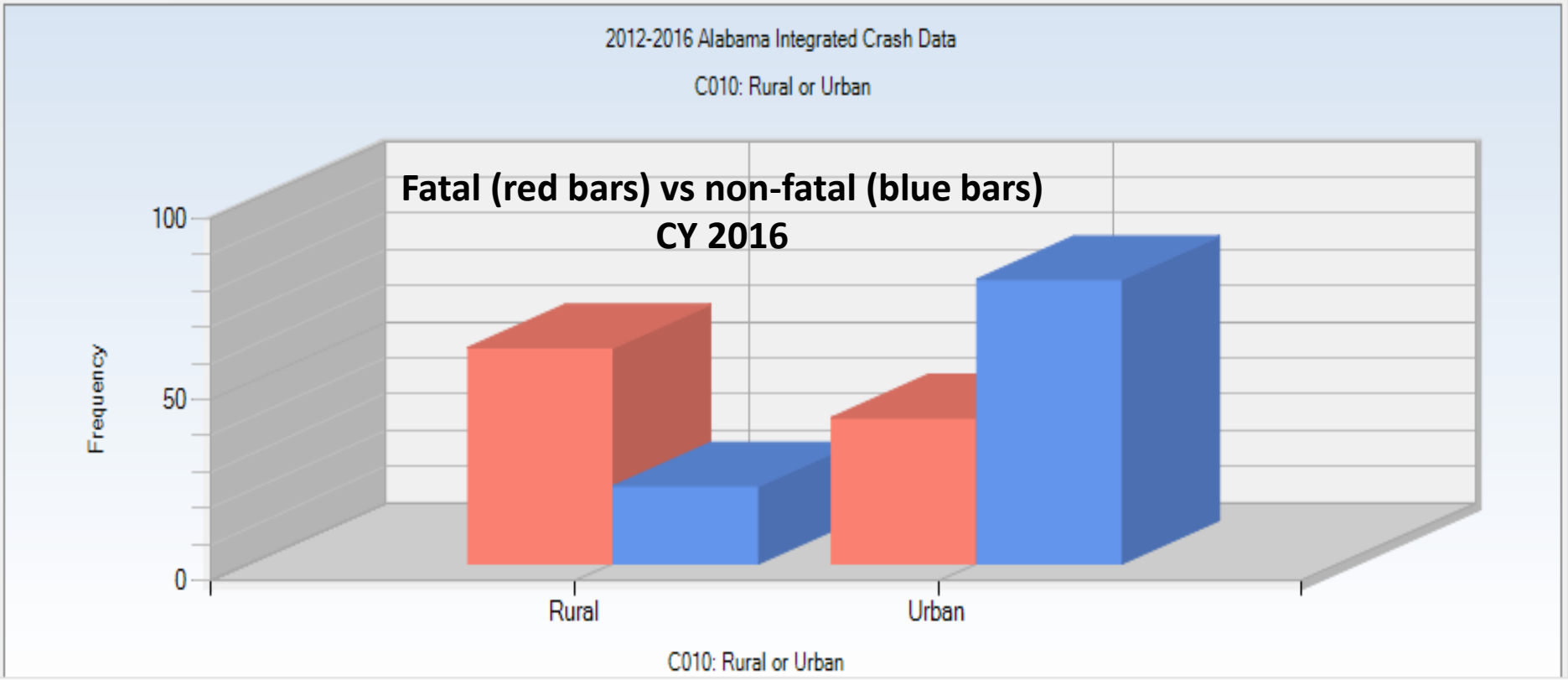
Order: Natural Order | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C010: Rural or Urban Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Rural	592	59.68	33196	21.44	2.784*	379.352
Urban	400	40.32	121663	78.56	0.513*	-379.352

C510: V2 Driver Residence Distance
C206: E CU Sequence of Events #3
C010: Rural or Urban
C052: Number of Drivers Recorded

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

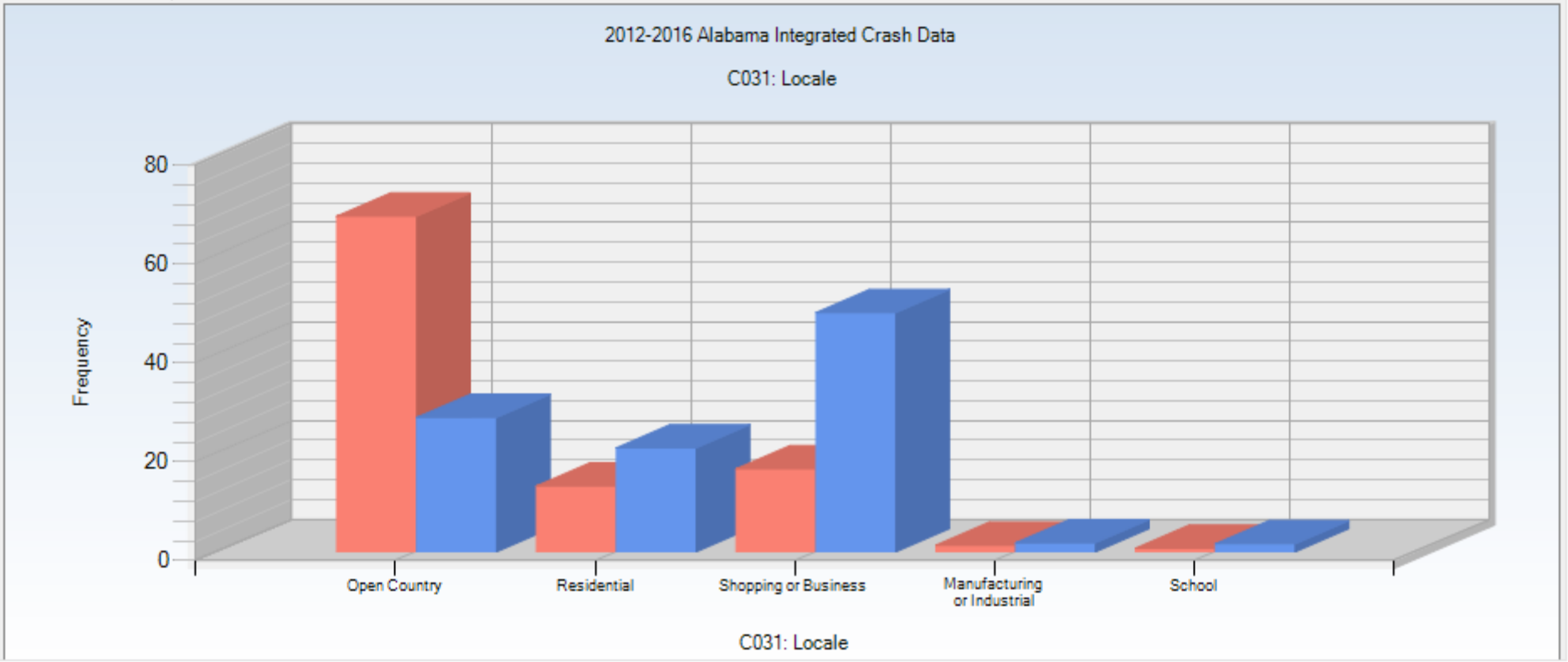
C031: Locale Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Open Country	668	67.89	41628	27.16	2.499*	400.699
Residential	131	13.31	32203	21.01	0.634*	-75.781
Shopping or Business	165	16.77	74141	48.38	0.347*	-311.072
Manufacturing or Industrial	13	1.32	2784	1.82	0.727	-4.877
School	7	0.71	2435	1.59	0.448	-8.636

C031: Locale

Fatal (red bars) vs non-fatal (blue bars) CY 2016

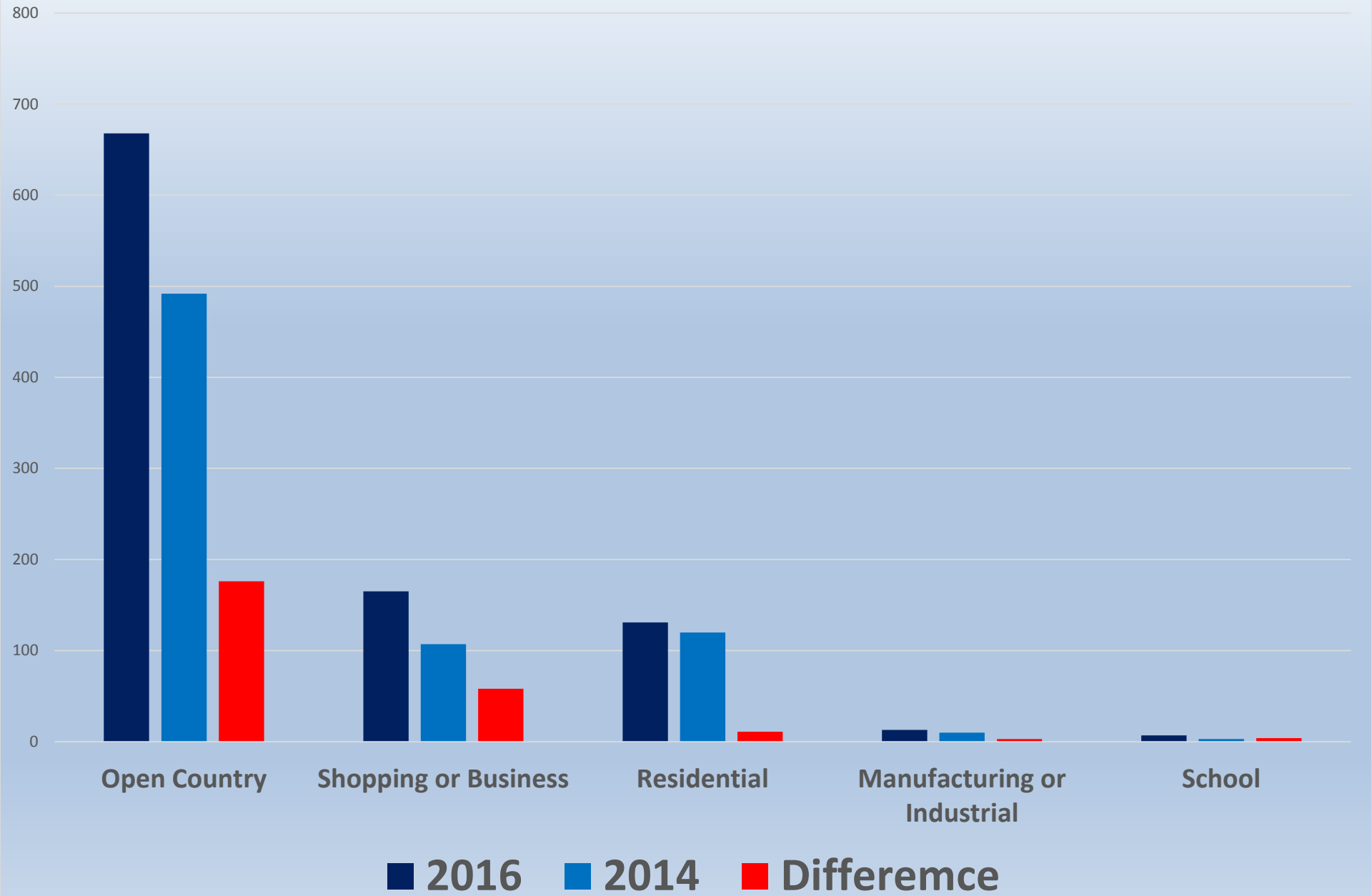
Sort by Sum of Max Gain

Display Filter Name



2016 to 2014 Fatal Differentials by C031 Locale

All classifications had increases



Roadway Features

- **Fatality Over-Represented Hiway Classes**
  - ✓ County, state, federal, Interstate
- **Most Increased in 2016: State and Federal**
- **Over-Represented:**
  - ✓ Event Location: Off Roadway and Shoulder
  - ✓ Traffic Control: No-Passing and Lane Control
  - ✓ Curves, especially on down-grades
  - ✓ Non-intersection crashes
- **Most Increased Routes**
  - ✓ I-65; S006, S008; S002

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

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2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

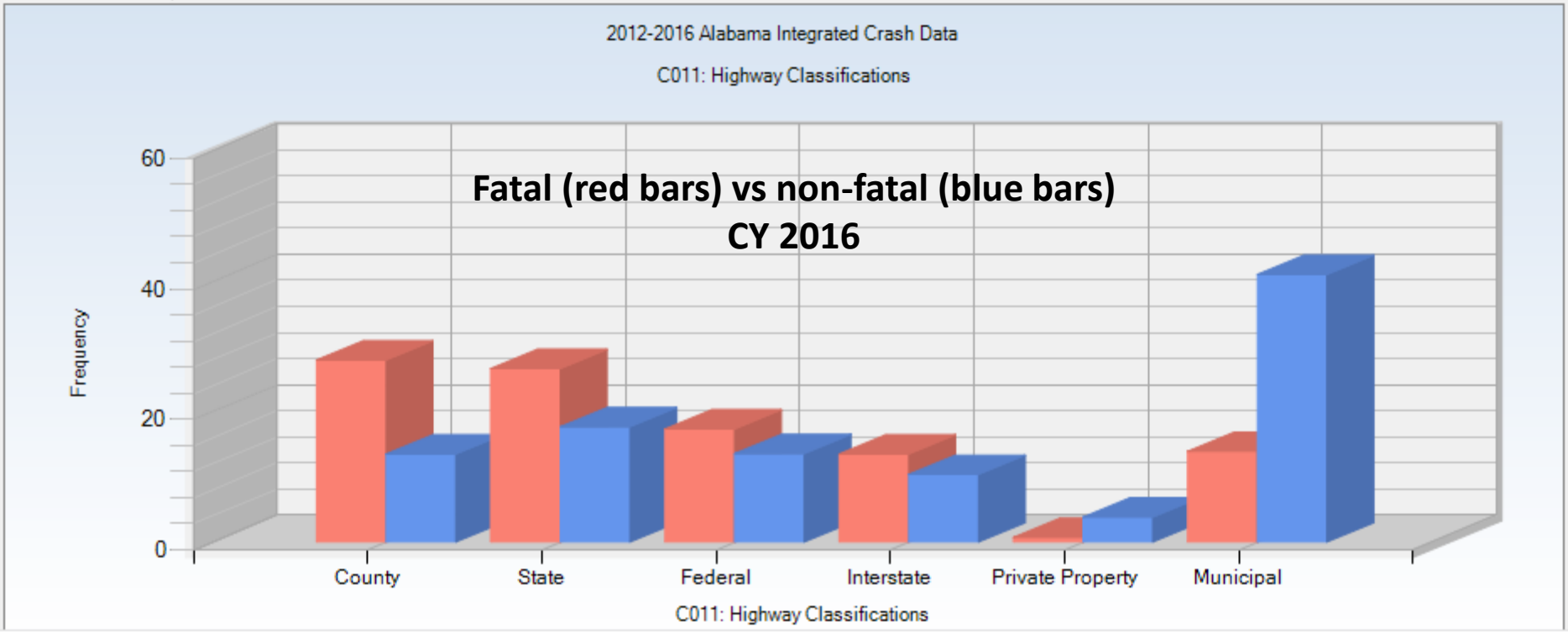
Order: Max Gain | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C011: Highway Classifications	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
County	277	27.92	20906	13.50	2.068*	143.080
State	264	26.61	27387	17.69	1.505*	88.564
Federal	172	17.34	21007	13.57	1.278*	37.433
Interstate	134	13.51	16068	10.38	1.302*	31.071
Private Property	7	0.71	5908	3.82	0.185	-30.846
Municipal	138	13.91	63583	41.06	0.339*	-269.302

C203: CU First Harmful Event Location
C018: Location First Harmful Event Rel to Roadway
C034: Police Arrival Delay
C011: Highway Classifications
C231: E CU Areas Damaged #2
C027: At Intersection
C409: CU Traffic Control
C001: County

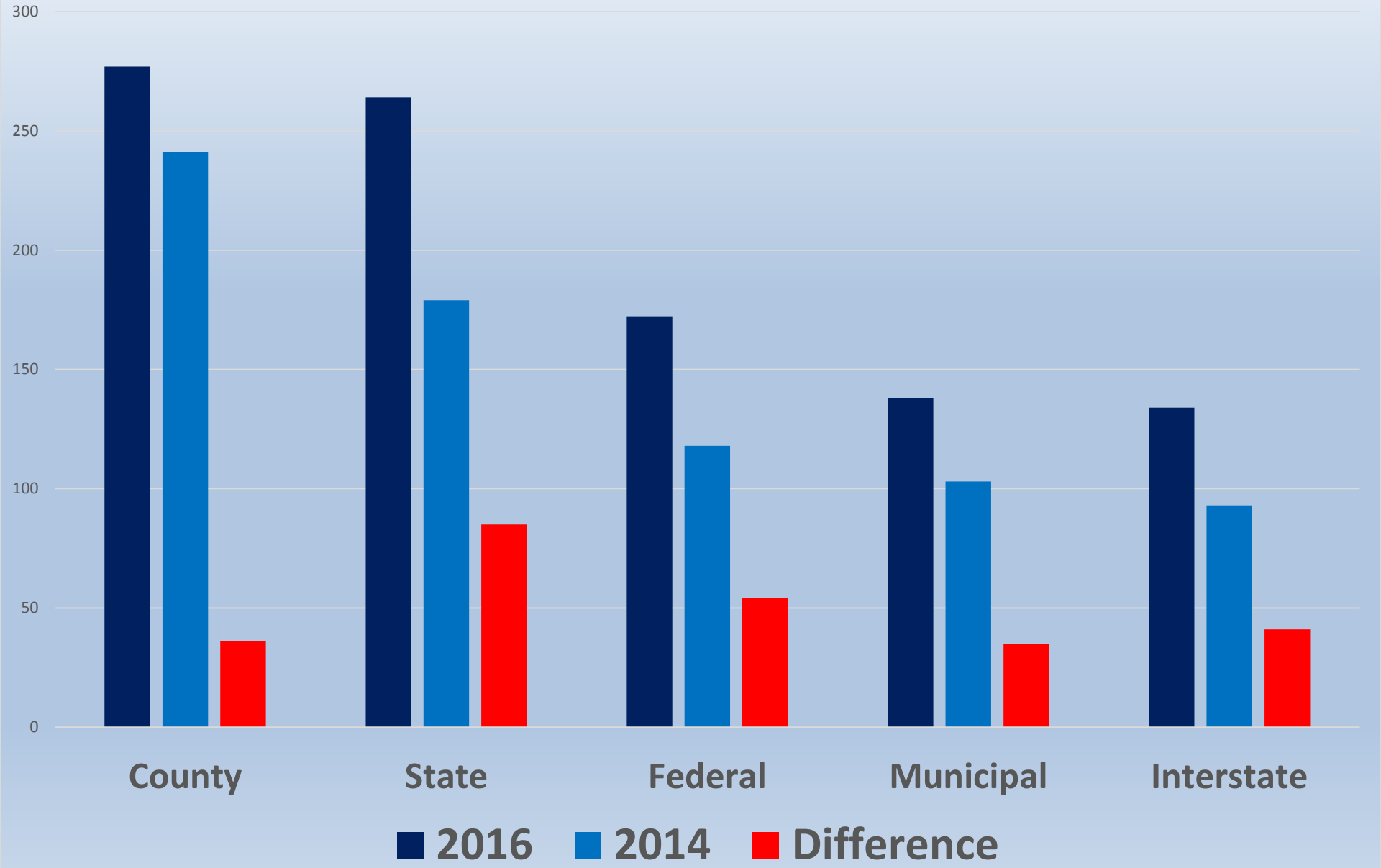
Sort by Sum of Max Gain

Display Filter Name



2016 to 2014 Fatal Crashes C011 Hiway Class

All classifications had increases



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

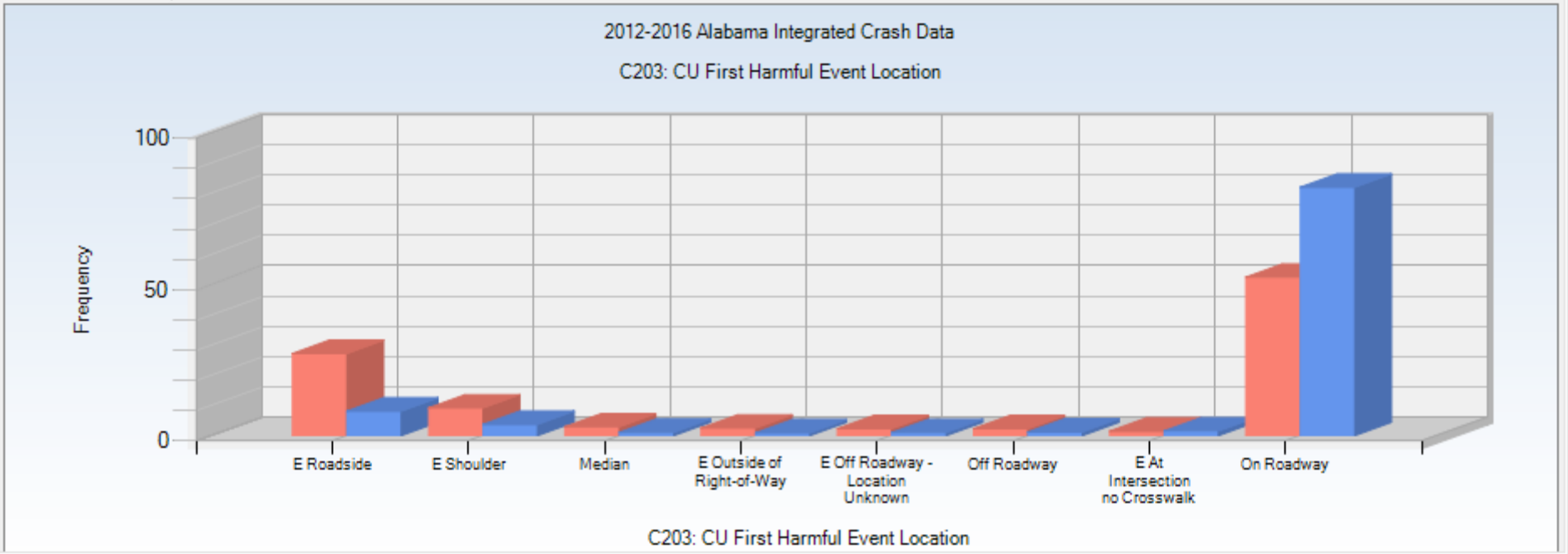
C203: CU First Harmful Event Location	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Roadside	264	27.13	11625	8.08	3.356*	185.343
E Shoulder	89	9.15	5319	3.70	2.473*	53.011
Median	28	2.88	1497	1.04	2.764*	17.871
E Outside of Right-of-Way	24	2.47	1248	0.87	2.842*	15.556
E Off Roadway - Location Unknown	22	2.26	1415	0.98	2.298*	12.426
Off Roadway	22	2.26	1686	1.17	1.929*	10.592
E At Intersection no Crosswalk	14	1.44	2171	1.51	0.953	-0.689
On Roadway	510	52.42	118189	82.19	0.638*	-289.685

C203: CU First Harmful Event Location

Fatal (red bars) vs non-fatal (blue bars) CY 2016

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

C409: CU Traffic Control	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
No Passing Zone	267	27.99	11704	8.48	3.301*	186.126
Lane Control Device	42	4.40	2491	1.80	2.440*	24.787
No Controls Present	529	55.45	75093	54.39	1.019	10.112
Stop Sign	67	7.02	13334	9.66	0.727*	-25.137
Traffic Signals	49	5.14	34959	25.32	0.203*	-192.565

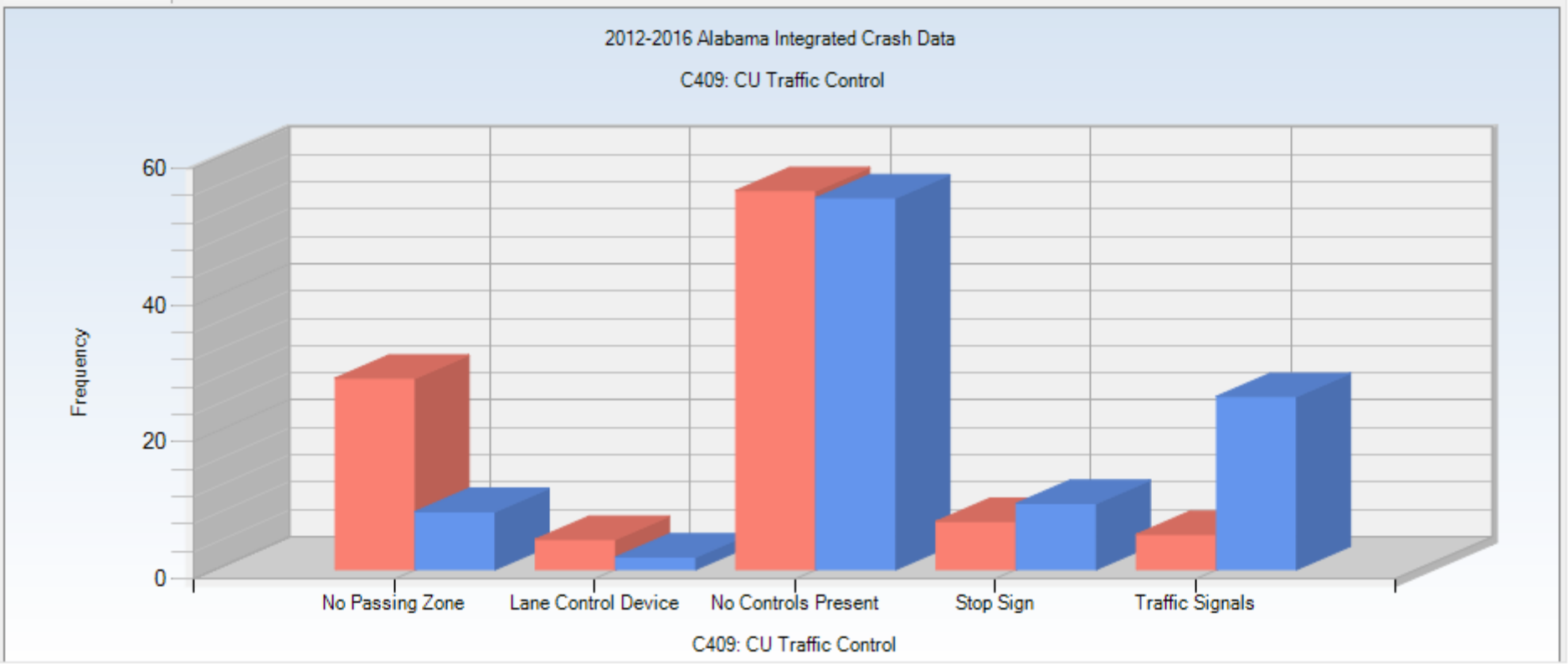
C409: CU Traffic Control

Fatal (red bars) vs non-fatal (blue bars) CY 2016

10 or more Fatal Crashes

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

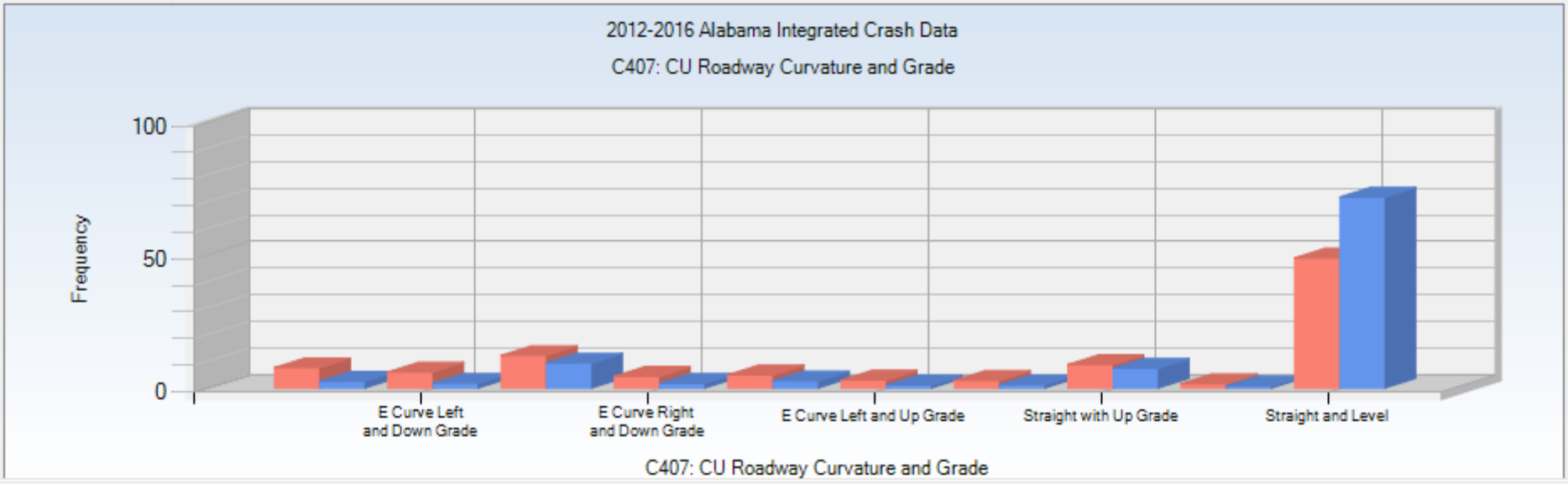
C407: CU Roadway Curvature and Grade	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Curve Left and Level	73	7.60	3539	2.48	3.067*	49.195
E Curve Left and Down Grade	57	5.94	2490	1.74	3.403*	40.251
Straight with Down Grade	117	12.19	13354	9.36	1.303*	27.174
E Curve Right and Down Grade	42	4.38	2399	1.68	2.603*	25.863
E Curve Right and Level	47	4.90	3750	2.63	1.863*	21.776
E Curve Left and Up Grade	28	2.92	1437	1.01	2.897*	18.334
E Curve Right and Up Grade	27	2.81	1602	1.12	2.506*	16.224
Straight with Up Grade	84	8.75	10451	7.32	1.195	13.701
Straight at Hillcrest	15	1.56	1013	0.71	2.201	8.186
Straight and Level	470	48.96	102626	71.91	0.681*	-220.314

C407: CU Roadway Curvature and Grade

Fatal (red bars) vs non-fatal (blue bars) CY 2016

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

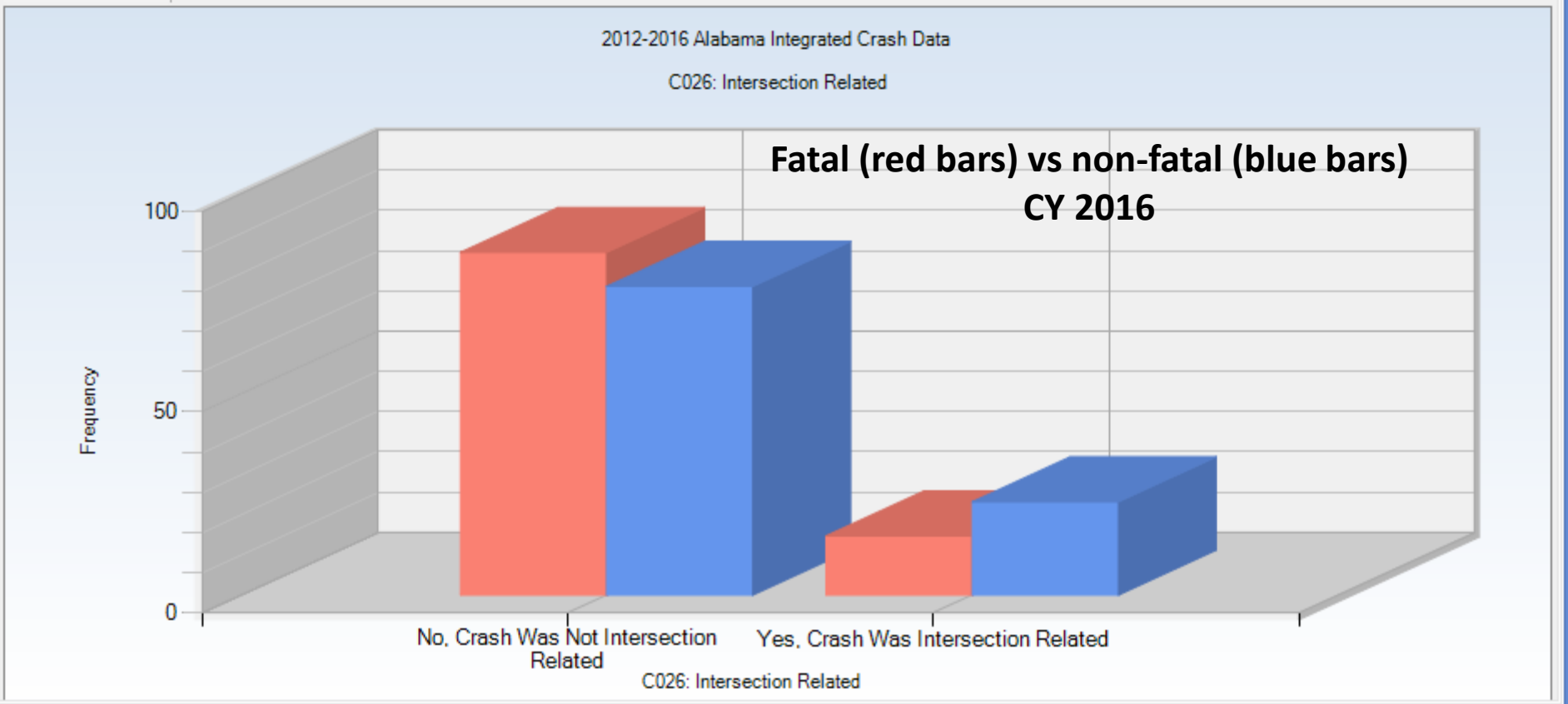
Order: Subset Frequency | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C026: Intersection Related	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
No, Crash Was Not Interse...	846	85.28	118944	76.81	1.110*	84.065
Yes, Crash Was Intersecti...	146	14.72	35915	23.19	0.635*	-84.065

C225: CU Citation Issued
C103: CU Commercial Motor Vehicle Indicator
C450: CU CMV Indicator
C026: Intersection Related
C215: E CU Placard Required
C217: CU Hazardous Cargo
C222: CU Contributing Vehicle Defect

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012

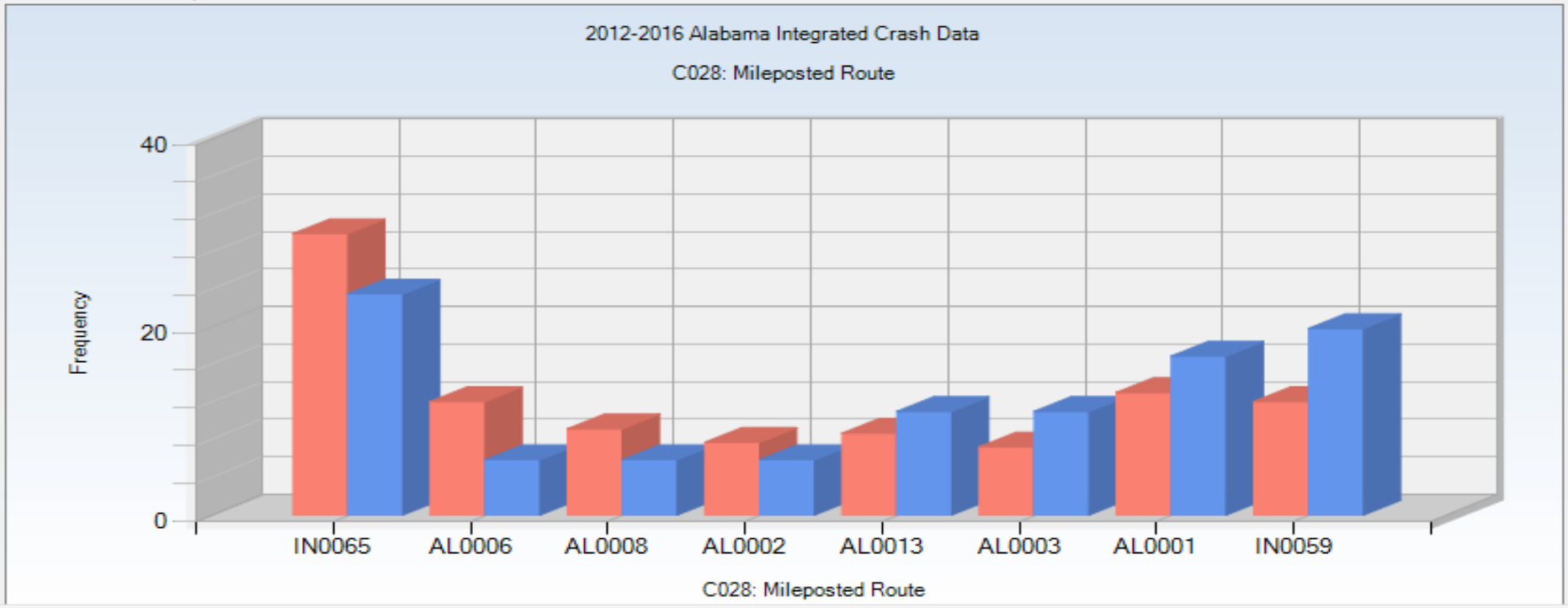
Order: Max Gain | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C028: Mileposted Route	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
IN0065	62	29.95	32	23.53	1.273	13.294
AL0006	25	12.08	8	5.88	2.053	12.824
AL0008	19	9.18	8	5.88	1.560	6.824
AL0002	16	7.73	8	5.88	1.314	3.824
AL0013	18	8.70	15	11.03	0.788	-4.831
AL0003	15	7.25	15	11.03	0.657	-7.831
AL0001	27	13.04	23	16.91	0.771	-8.007
IN0059	25	12.08	27	19.85	0.608	-16.096

C028: Mileposted Route

Mileposted roadways with 15 or more fatal crashes in 2016

Sort by Sum of Max Gain



Crash Characteristics

CAPS
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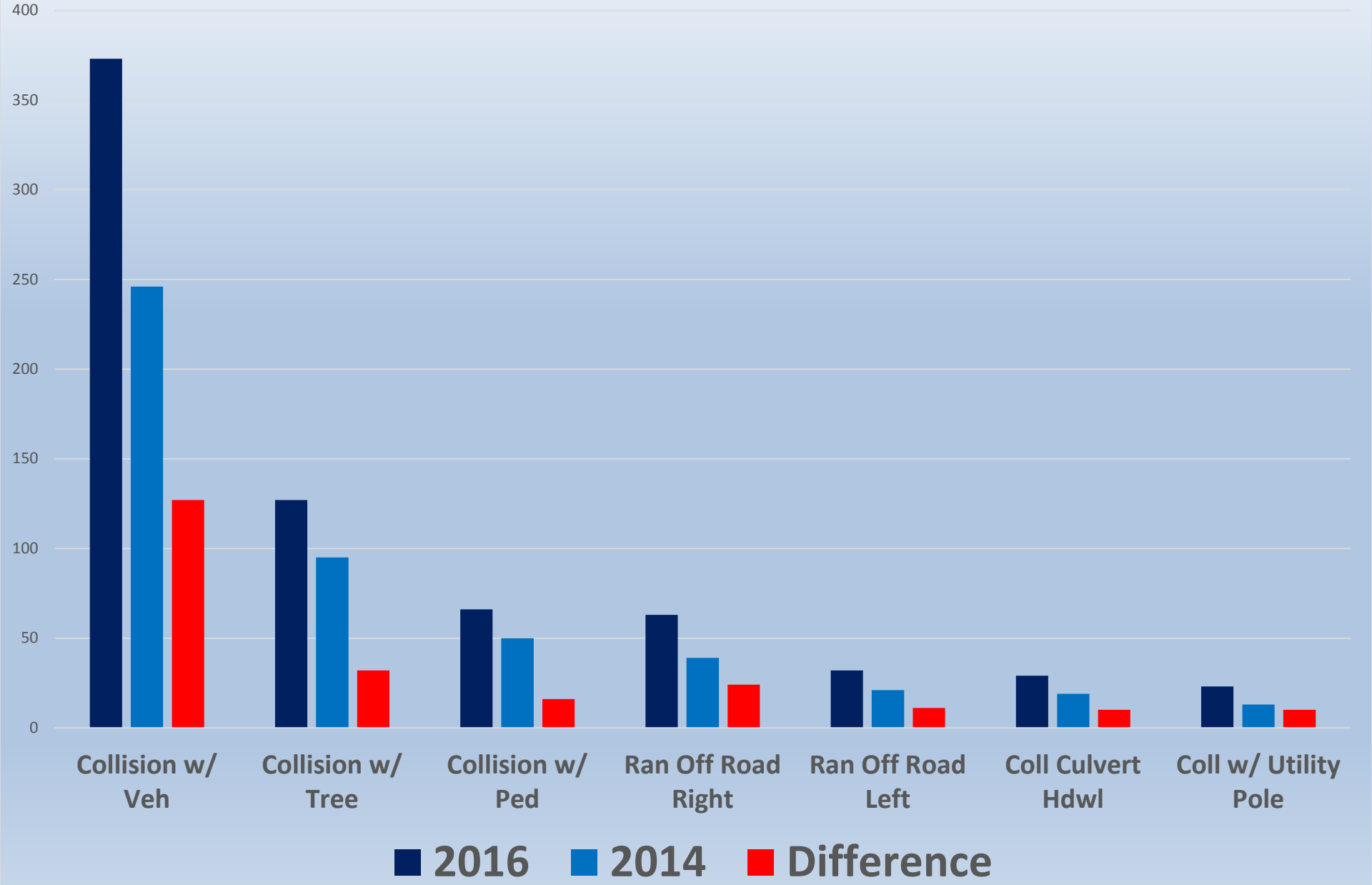
- **Largest Increases in 2016**
  - ✓ Collision w/ vehicle (373), tree (127), pedestrian (66)
- **Over-Represented 2016 Fatal Crashes vs Nonfatal**
  - ✓ Single-vehicle crashes (3 times expected)
  - ✓ Ran-off-the road left and right (> 3 times expected)
  - ✓ Head-on (5 times expected)
  - ✓ Negotiating a curve (4 times expected)
  - ✓ Overtaking/passing (2 times expected)

C017: First Harmful Event

Value	2016	2014	Difference
Collide w/ Vehicle	373	246	127
Collide w/ Tree	127	95	32
Collide Pedestrian	66	50	16
Ran Off Road Right	63	39	24
Ran Off Road Left	32	21	11
Coll Culvert Hdwl	29	19	10
Coll w/ Utility Pole	23	13	10

2016-2015 Fatal Differential by 1st Harmful Event

Values with Incrase of at least 10 Fatal Crashes in 2016



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

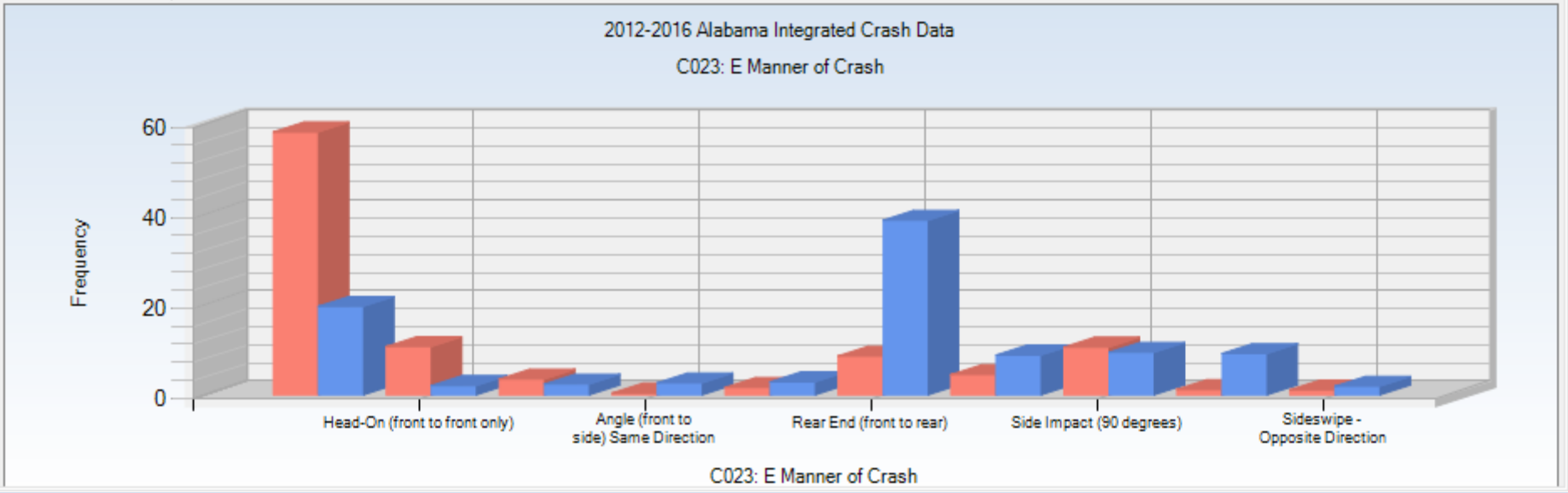
C023: E Manner of Crash	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Single Vehicle Crash (all types)	535	58.15	28838	19.58	2.969*	354.831
Head-On (front to front only)	98	10.65	2996	2.03	5.236*	79.282
Angle Oncoming (frontal)	32	3.48	3486	2.37	1.469	10.221
Angle (front to side) Same Dir...	2	0.22	3899	2.65	0.082	-22.359
Angle (front to side) Opposite ...	15	1.63	4225	2.87	0.568	-11.396
Rear End (front to rear)	79	8.59	56872	38.62	0.222*	-276.315
Side Impact (angled)	41	4.46	12947	8.79	0.507*	-39.888
Side Impact (90 degrees)	97	10.54	13803	9.37	1.125	10.764
Sideswipe - Same Direction	11	1.20	13441	9.13	0.131	-72.974
Sideswipe - Opposite Direction	10	1.09	2780	1.89	0.576	-7.368

C023: E Manner of Crash

Fatal (red bars) vs non-fatal (blue bars) CY 2016

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

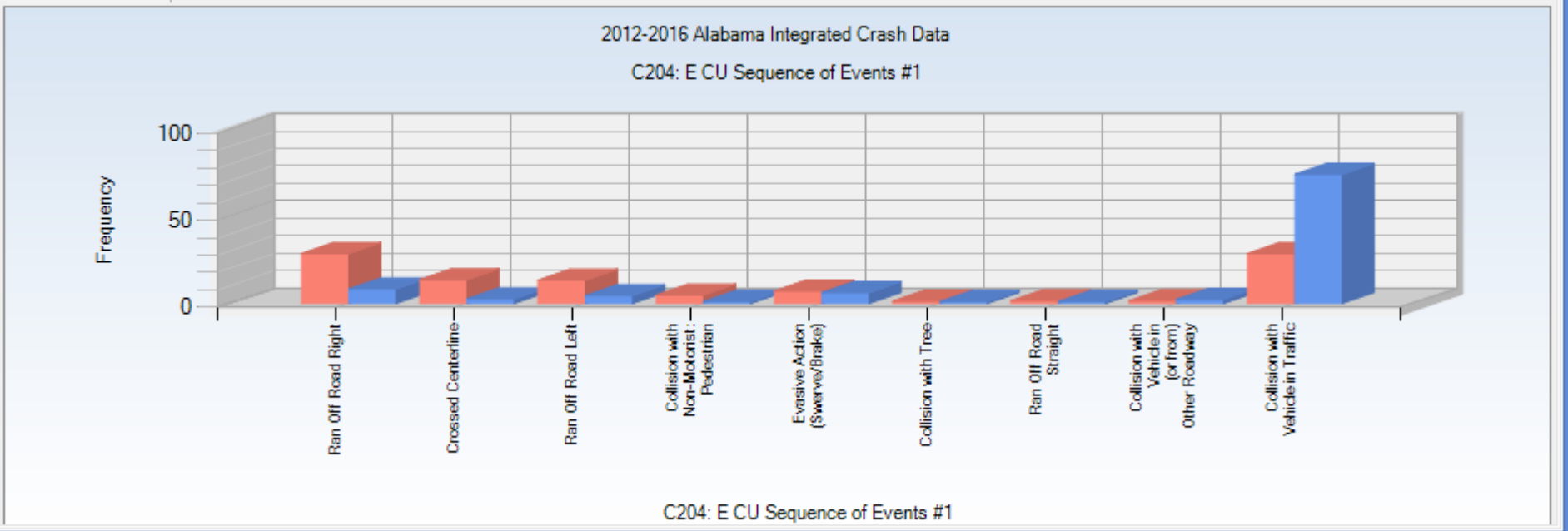
C204: E CU Sequence of Events #1	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Ran Off Road Right	255	28.62	10703	8.19	3.495*	182.033
Crossed Centerline	121	13.58	3315	2.54	5.354*	98.400
Ran Off Road Left	118	13.24	5726	4.38	3.023*	78.963
Collision with Non-Motorist: P...	42	4.71	469	0.36	13.136*	38.803
Evasive Action (Swerve/Brake)	63	7.07	7912	6.05	1.168	9.060
Collision with Tree	11	1.23	452	0.35	3.570	7.919
Ran Off Road Straight	13	1.46	870	0.67	2.192	7.069
Collision with Vehicle in (or fro...	13	1.46	2930	2.24	0.651	-6.975
Collision with Vehicle in Traffic	255	28.62	96783	74.05	0.386*	-404.813

C204: E CU Sequence of Events #1

Fatal (red bars) vs non-fatal (blue bars) CY 2016

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

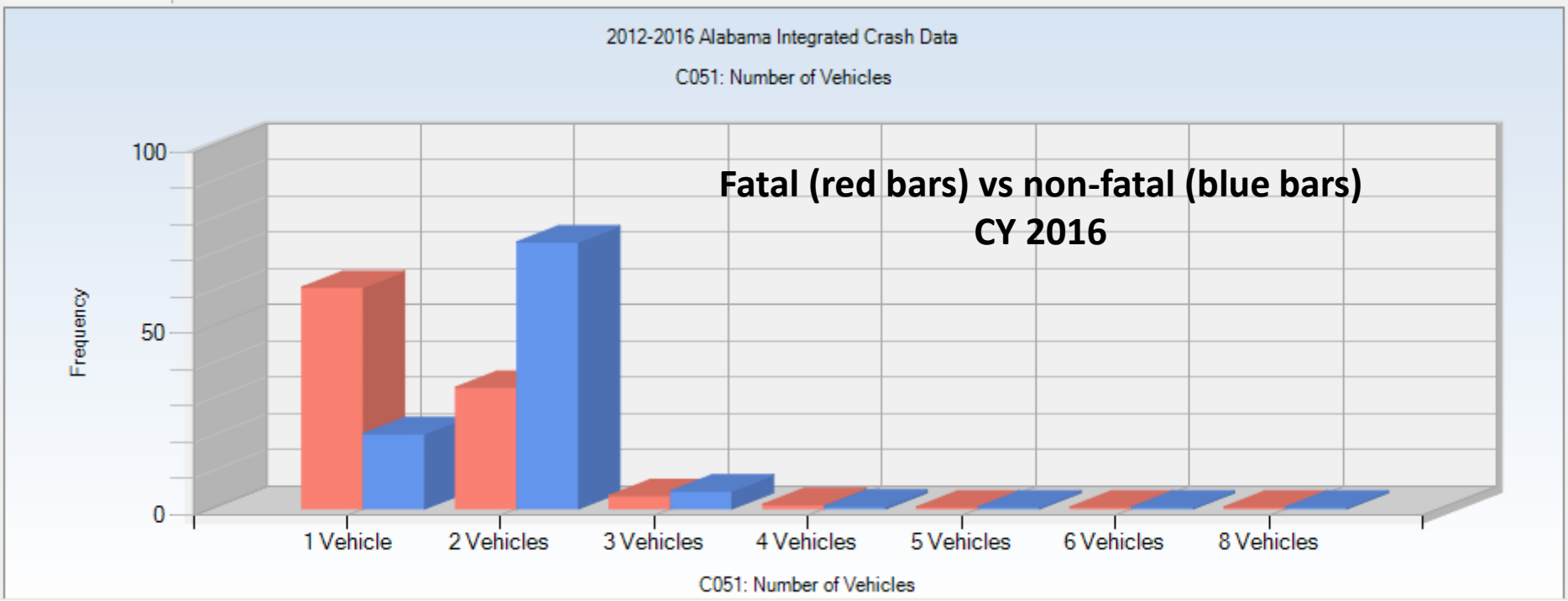
Order: Natural Order | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C051: Number of Vehicles	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
1 Vehicle	606	61.09	32039	20.69	2.953*	400.764
2 Vehicles	332	33.47	113954	73.59	0.455*	-397.970
3 Vehicles	36	3.63	7582	4.90	0.741	-12.569
4 Vehicles	12	1.21	1050	0.68	1.784	5.274
5 Vehicles	4	0.40	174	0.11	3.589	2.885
6 Vehicles	1	0.10	40	0.03	3.903	0.744
8 Vehicles	1	0.10	2	0.00	78.054	0.987

C541: V2 Vehicle Most Harmful Event
C556: V2 Hazardous Cargo
C559: V2 Oversized Load Requiring Permit
C542: V2 Contributing Circumstance
C051: Number of Vehicles
C511: V2 Driver License State
C588: V2 Vision Obscured By
C583: V2 Roadway Condition
C031: Locale
C564: V2 Citation Issued

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

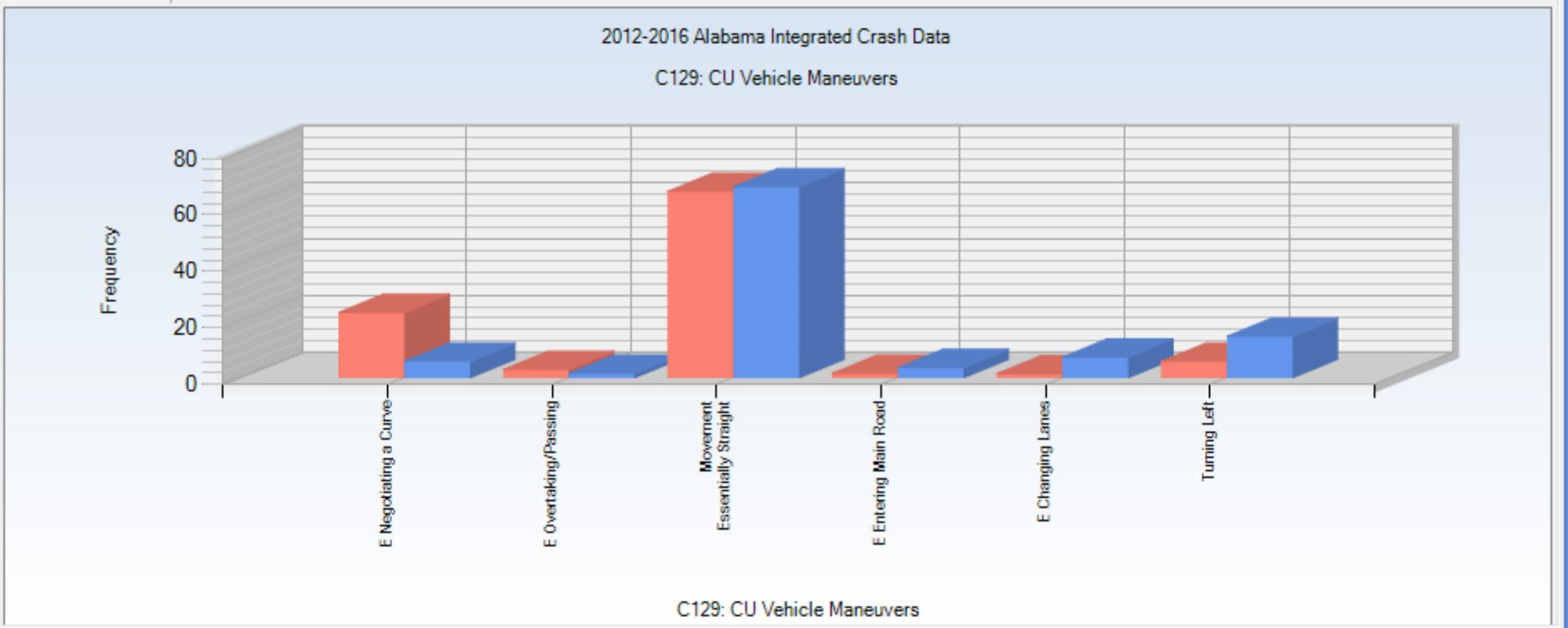
C129: CU Vehicle Maneuvers	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
E Negotiating a Curve	199	23.01	6662	5.69	4.041*	149.759
E Overtaking/Passing	24	2.77	1610	1.38	2.017*	12.100
Movement Essentially Straight	570	65.90	79026	67.53	0.976	-14.102
E Entering Main Road	12	1.39	4056	3.47	0.400	-17.979
E Changing Lanes	11	1.27	8422	7.20	0.177	-51.249
Turning Left	49	5.66	16985	14.51	0.390*	-76.541

C129: CU Vehicle Maneuvers

Fatal (red bars) vs non-fatal (blue bars) CY 2016

Sort by Sum of Max Gain

Display Filter Name



Pedestrian Behavior

- Increased Ped Fatal Crashes from 96 to 120
- # Ped Involved in fatal crash from 96 to 136
- Over-Rep Ped Behavior in Fatal Crashes:
  - ✓ Improper crossing (36)
  - ✓ In roadway (15)
  - ✓ Not visible (6)

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fat...

File Dashboard Filters Analysis Impact Locations Tools Window Help

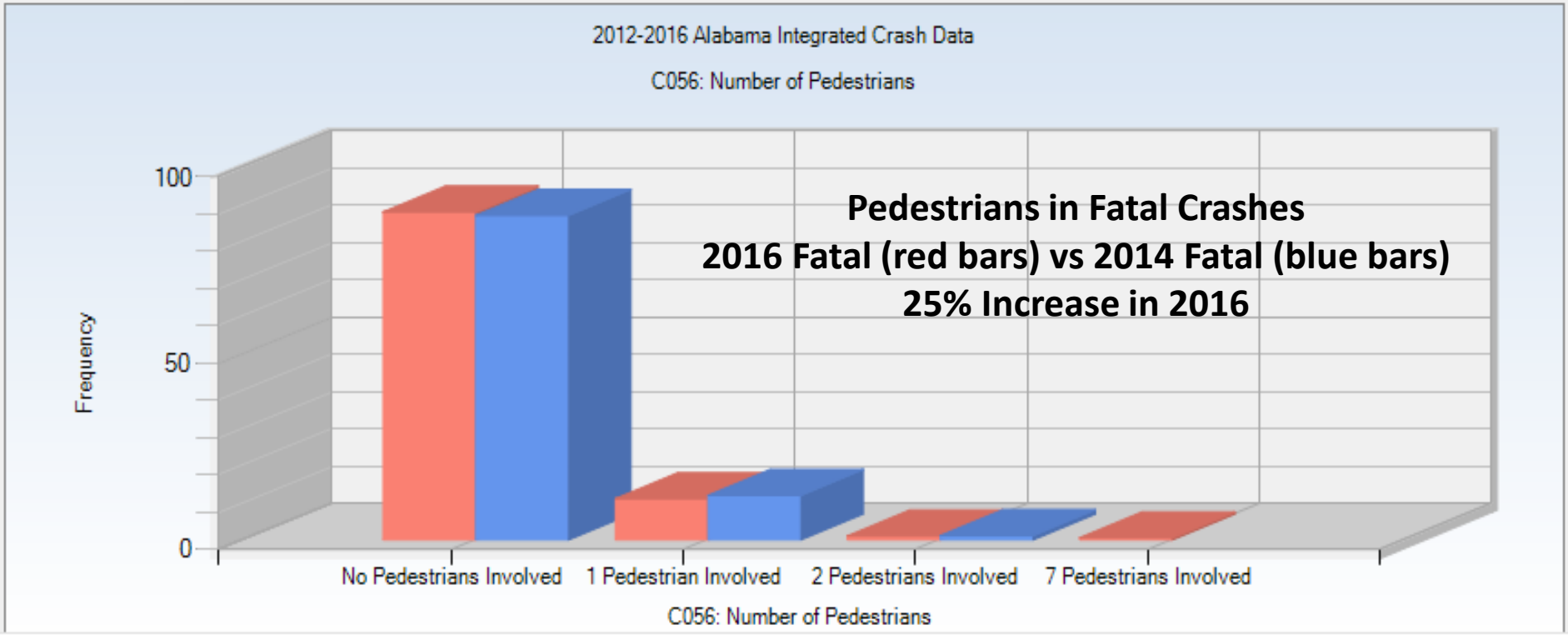
2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012

Order: Subset Frequency | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C056: Number of Pedestrians	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
No Pedestrians Involved	872	87.90	643	87.01	1.010	8.866
1 Pedestrian Involved	109	10.99	88	11.91	0.923	-9.127
2 Pedestrians Involved	10	1.01	8	1.08	0.931	-0.739
7 Pedestrians Involved	1	0.10	0	0.00	0.000	1.000

C221: CU Had Oversized Load Permit
C417: E CU Workers Present
C056: Number of Pedestrians
C406: CU Contributing Material Source
C060: Number Killed
C061: Number of Railroad Trains
Sort by Sum of Max Gain

Displ



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

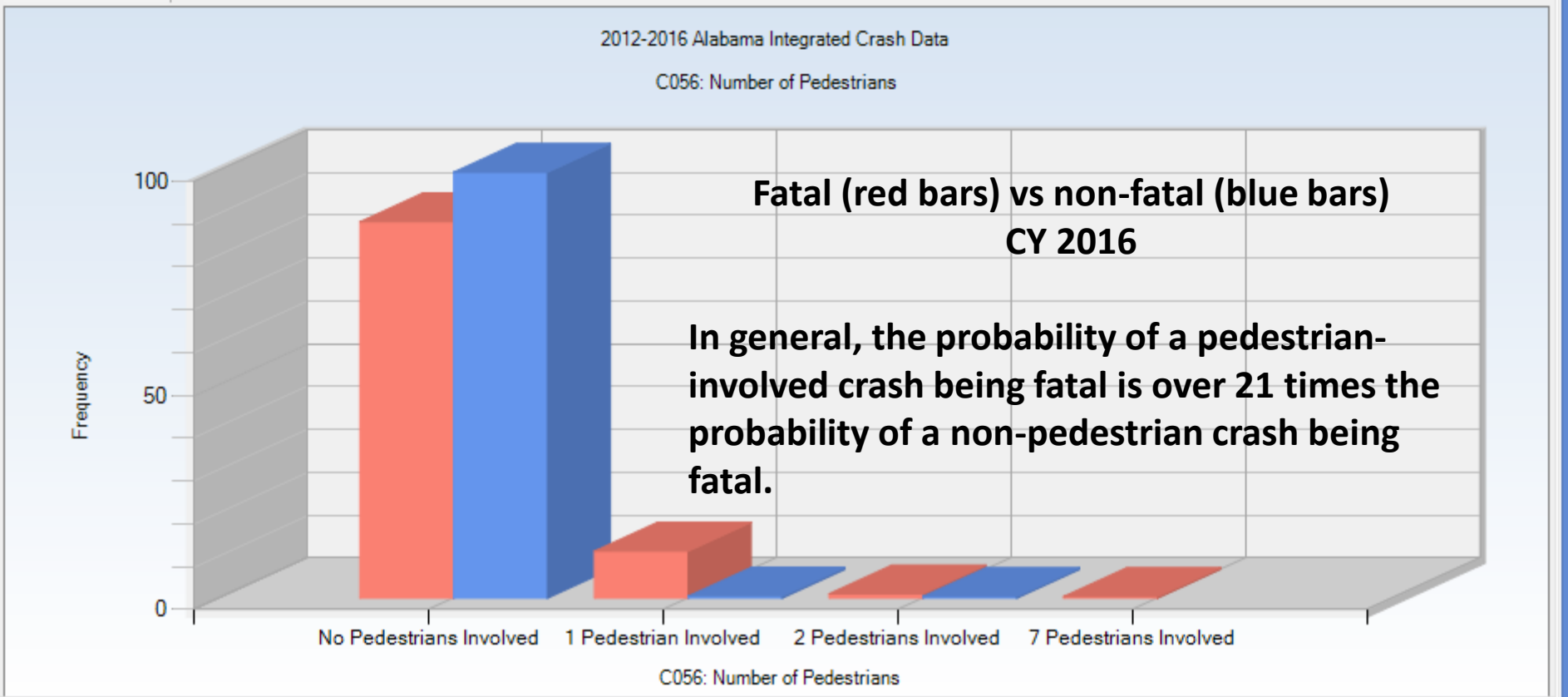
Order: Natural Order | Descending | Suppress Zero-Valued Rows | Significance: Over Representation | Threshold: 2.0

C056: Number of Pedestrians	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
No Pedestrians Involved	872	87.90	154109	99.52	0.883*	-115.196
1 Pedestrian Involved	109	10.99	725	0.47	23.470*	104.356
2 Pedestrians Involved	10	1.01	25	0.02	62.443	9.840
7 Pedestrians Involved	1	0.10	0	0.00	0.000	1.000

C212: CU License Tag State
C055: Number of Non-Motorists Recorded
C128: CU Vehicle Initial Travel Direction
C056: Number of Pedestrians
C111: CU Driver License State
C042: Highway Patrol Troops

Sort by Sum of Max Gain

Display Filter Name



Fatal (red bars) vs non-fatal (blue bars)
CY 2016

In general, the probability of a pedestrian-involved crash being fatal is over 21 times the probability of a non-pedestrian crash being fatal.

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

C304: E CU Non-Motorist Action at Time of Crash #1	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Improper Crossing	36	50.70	134	35.64	1.423*	10.697
In Roadway (Standing/On Knees/Lying)	15	21.13	50	13.30	1.589	5.559
Not Visible (Dark Clothing)	6	8.45	23	6.12	1.382	1.657
Inattentive (Talking/Eating)	1	1.41	5	1.33	1.059	0.056
Darting	6	8.45	37	9.84	0.859	-0.987
Wrong Side of Road	1	1.41	20	5.32	0.265	-2.777
Failure to Yield Right-Of-Way	6	8.45	62	16.49	0.512	-5.707

C304: E CU Non-Motorist Action at Time of

Fatal (red bars) vs non-fatal (blue bars) CY 2016

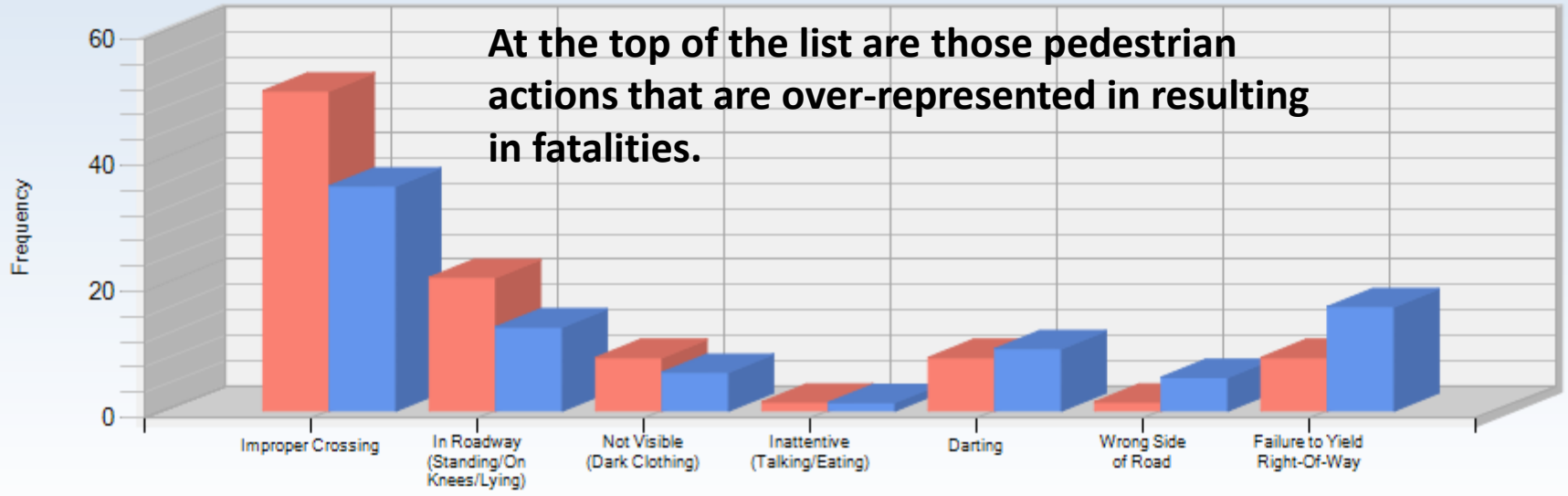
Sort by Sum of Max Gain

Display Filter Name

2012-2016 Alabama Integrated Crash Data

C304: E CU Non-Motorist Action at Time of Crash #1

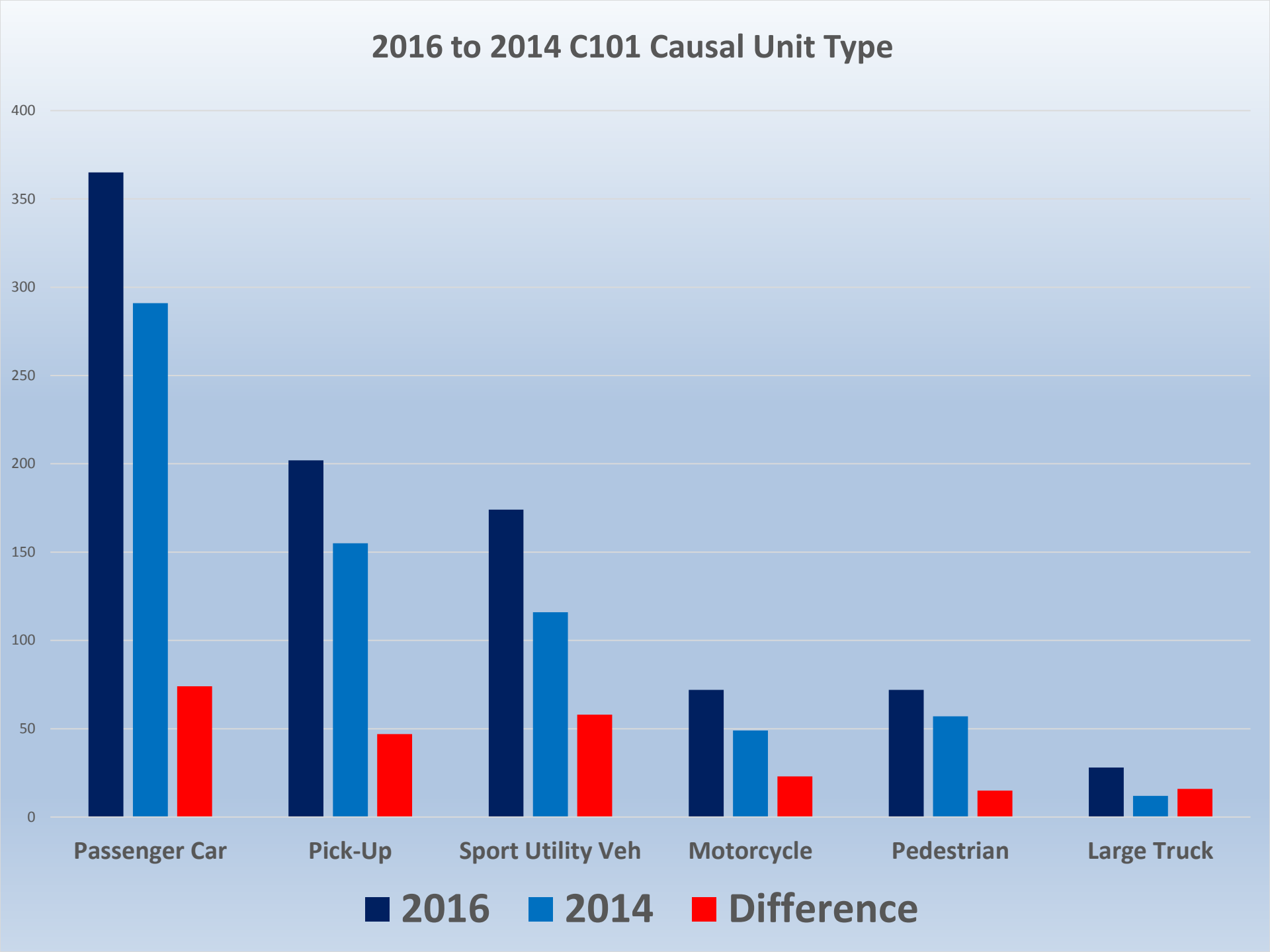
At the top of the list are those pedestrian actions that are over-represented in resulting in fatalities.



C304: E CU Non-Motorist Action at Time of Crash #1

Vehicle Characteristics

- **Passenger Car: Largest Number and Increase**
- **Most Vulnerable to Involved in Fatality**
  - ✓ Pedestrian (41 time expected)
  - ✓ Motorcycle (10 times expected)
  - ✓ ATV off road (14 times expected)
- **Over-Represented Model Years**
  - ✓ All model years before 2004
  - ✓ Highly over-represented (22-55%): 1999-2003


2016 to 2014 C101 Causal Unit Type
400
350
300
250
200
150
100
50
0
Passenger Car
Pick-Up
Sport Utility Veh
Motorcycle
Pedestrian
Large Truck
2016
2014
Difference

CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

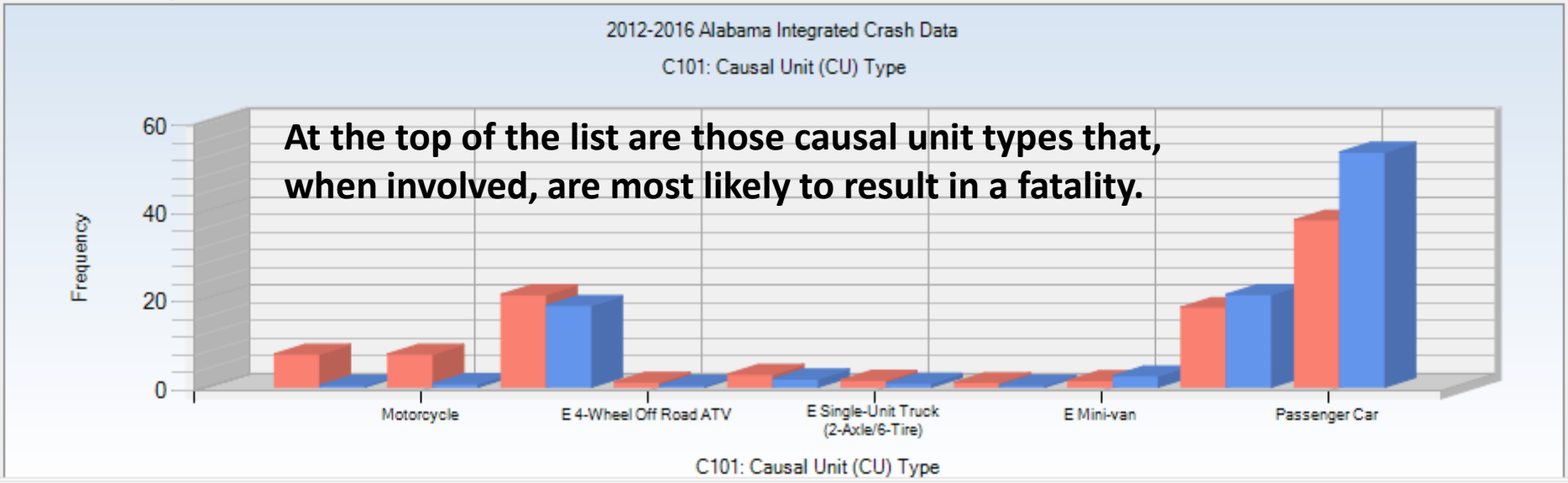
C101: Causal Unit (CU) Type	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Pedestrian	72	7.48	262	0.18	41.252*	70.255
Motorcycle	72	7.48	1123	0.78	9.624*	64.519
Pick-Up (Four-Tire Light Truck)	202	20.98	26741	18.50	1.134	23.857
E 4-Wheel Off Road ATV	11	1.14	114	0.08	14.484	10.241
E Tractor/Semi-Trailer	28	2.91	2693	1.86	1.561*	10.060
E Single-Unit Truck (2-Axle/6-...	15	1.56	1243	0.86	1.811	6.719
E Single-Unit Truck (3 Axles o...	10	1.04	623	0.43	2.409	5.850
E Mini-van	14	1.45	3655	2.53	0.575	-10.349
E Sport Utility Vehicle (SUV)	174	18.07	30366	21.01	0.860	-28.292
Passenger Car	365	37.90	77010	53.27	0.711*	-148.024

C101: Causal Unit (CU) Type

Fatal (red bars) vs non-fatal (blue bars) CY 2016

Sort by Sum of Max Gain

Display Filter Name



CARE 10.1.0.19 - [IMPACT Results - 2012-2016 Alabama Integrated Crash Data - 2016 Fatal Crashe...

File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data | 2016 Fatal Crashes | 1/ 1/2012 | 12/31/2016

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

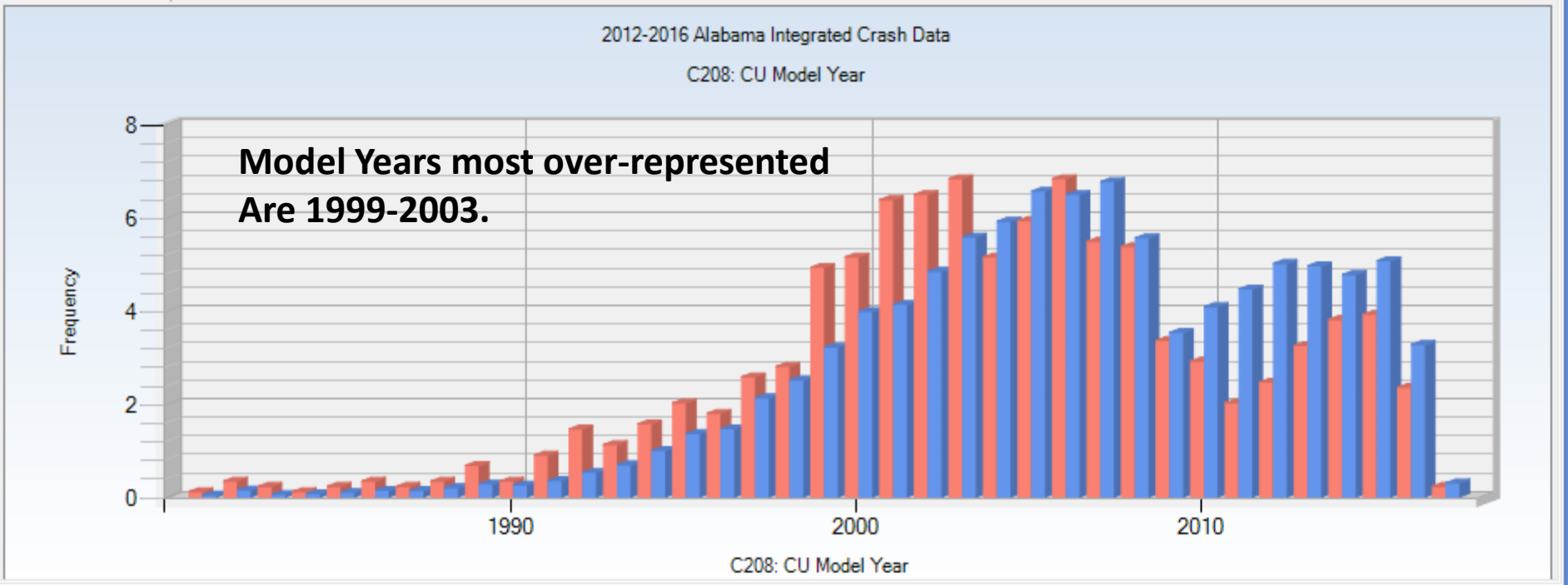
C208: CU Model Year	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
1998	25	2.80	3498	2.51	1.115	2.585
1999	44	4.93	4482	3.22	1.532*	15.279
2000	46	5.15	5548	3.98	1.294	10.448
2001	57	6.38	5758	4.13	1.545*	20.102
2002	58	6.49	6750	4.84	1.341	14.746
2003	61	6.83	7776	5.58	1.224	11.171
2004	46	5.15	8246	5.92	0.871	-6.841

C208: CU Model Year

Fatal (red bars) vs non-fatal (blue bars) CY 2016 1999-2003 Over-represented

Sort by Sum of Max Gain

Display Filter Name



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THANK YOU

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