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PUBLIC SAFETY

CAPS ADECA TRCC Support

**ADECA TRAFFIC RECORDS
COORDINATING COMMITTEE
MEETING**

November 8, 2017

THE UNIVERSITY OF
ALABAMA

Agenda for the Meeting

- Opening Remarks – Terry Henderson
- Traffic Records Assessment Announcement
- PPT: Fatalities 2017 vs 2016 – Dave Brown
 - ✓ Fatality picture for 2017 based on first 9 months
 - ✓ Analysis of the data
 - 2014 vs 2016 complete years
 - 2016 vs 2017 first 9 months
 - Thanksgiving analysis
 - ✓ Countermeasure recommendations
- Questions and Discussions
- Closing Remarks – Terry Henderson

TRA Announcement

- **Federal Register: Comments on Advisory**
 - ✓ “Description of the ideal traffic records system”
 - ✓ “Associated assessment questions in the Advisory”
- **Comments Directly until December 26, 2017**
- **Two Ways to Respond**
 - ✓ Through ADECA/CAPS: brown@cs.ua.edu
 - ✓ Directly to NHTSA (URL in Minutes to this meeting)

Introduction: PPT Organization

- **Rationale for Comparisons**
 - ✓ 2016 vs 2014 complete year to further compare with ...
 - ✓ 2017 vs 2016 first 9 months*
- **CUCC = Causal Unit Contributing Circumstances**
- **CUCC Differences in Fatal Crashes**
- **IMPACT and Frequency Comparison Results**
 - ✓ IMPACT comparisons of proportions
 - ✓ Straight numerical and percentage comparisons
- **Presentation Approach**
 - ✓ Summary given first for each section
 - ✓ Analytical support for conclusions

** 2017" always means first 9 months of 2017
2017 comparisons are against first 9 months of 2016*

Analysis Organization

- **High Level CU Contributing Circumstances**
- **Driver Behavior**
 - ✓ CUCCs, DUI, Speed, etc.
- **Geographical Characteristics**
 - ✓ County, Rural/Urban
- **Crash Severity Causes**
 - ✓ Restraints and Helmets
- **Pedestrian Behavior**
- **Thanksgiving Study Results**

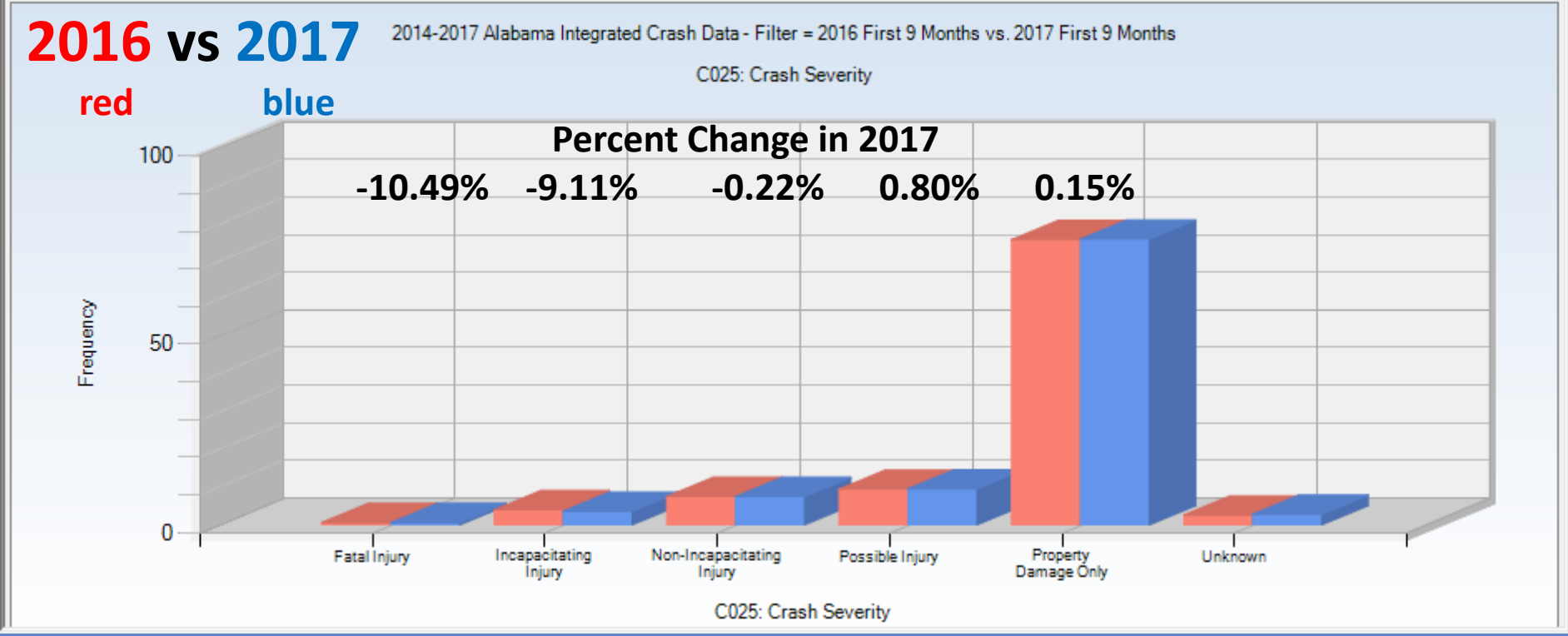
Order: Max Gain Descending ☐ Suppress Zero-Valued Rows Significance: Over Representation Threshold: 2.0

C025: Crash Severity	Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Fatal Injury	2016	715	0.62	2017	640	1.117	74.708
Incapacitating Injury		4608	3.97		4188	1.100*	418.087
Non-Incapacitating Injury		8730	7.52		8711	1.002	15.021
Possible Injury		11002	9.48		11090	0.992	-93.066
Property Damage Only		88006	75.81		88141	0.998	-175.261
Unknown		3023	2.60		3261	0.927*	-239.490

C025: Crash Severity

**2016 (red bars) vs
2017 (blue bars)
Severity comparisons**

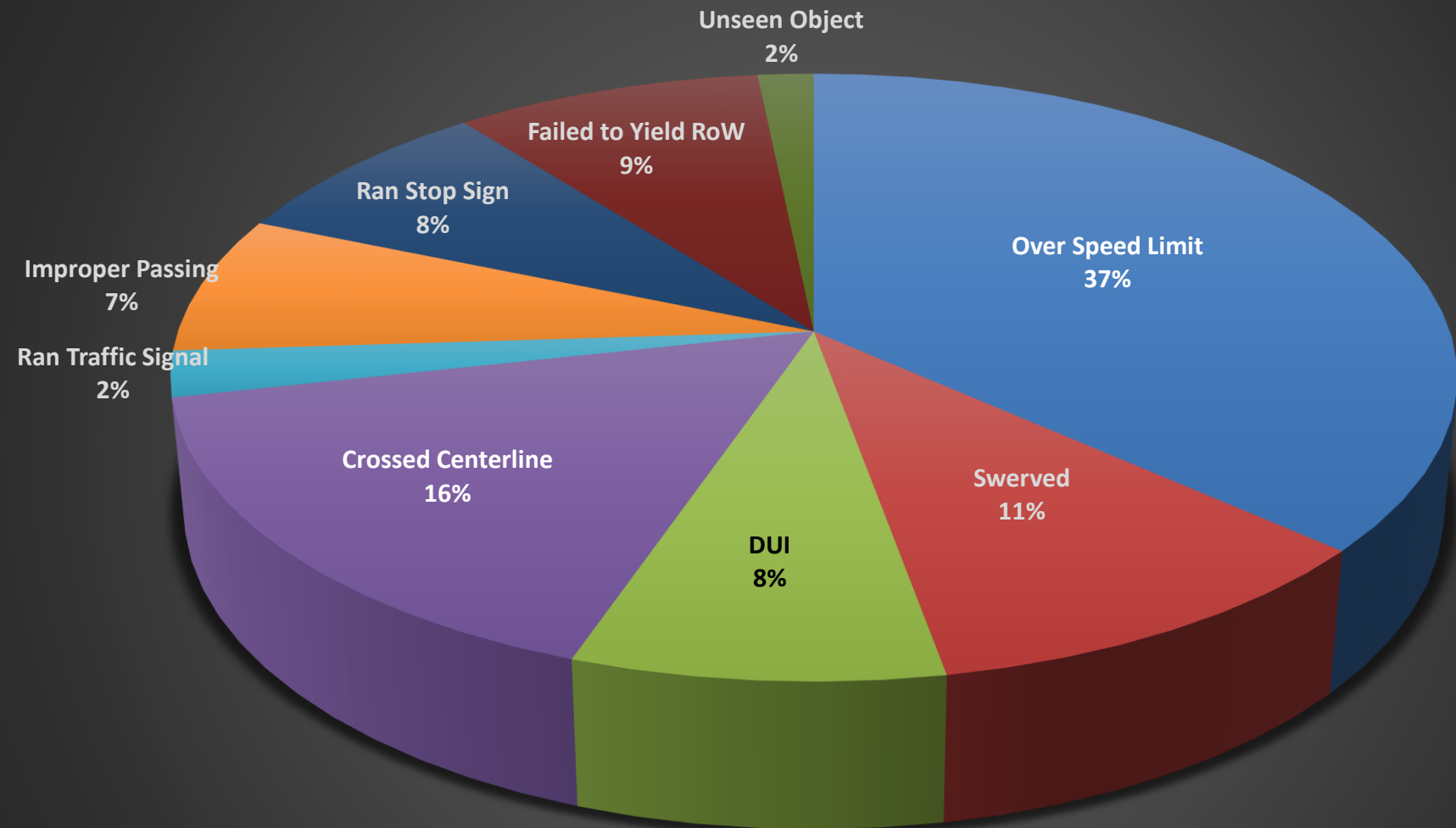
☐ Sort by Sum of Max Gain



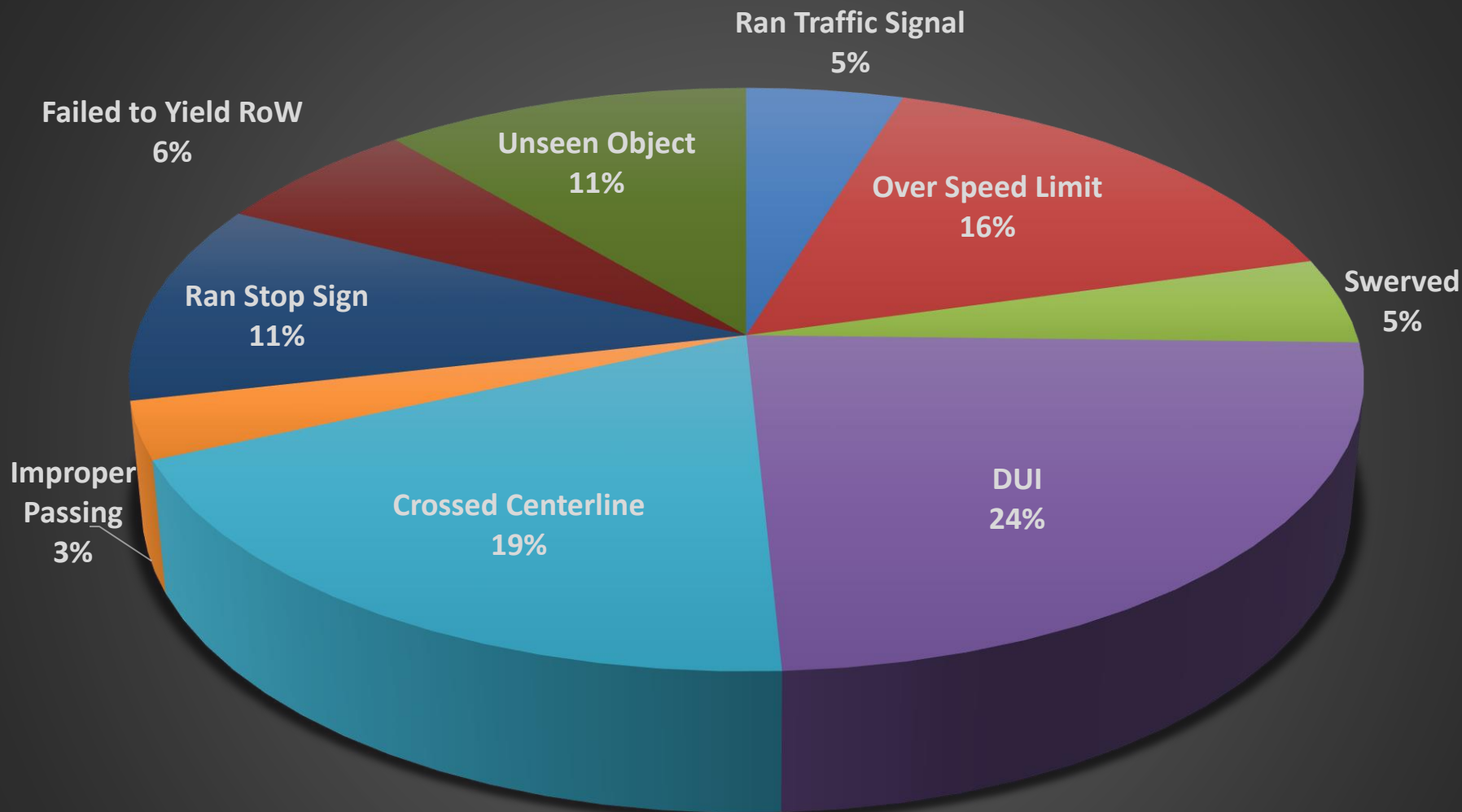
Highest Level View

- **2016-2017 Crashes by Severity**
 - ✓ Good news: 10% reduction in fatal and incapacitating
 - ✓ No significant changes in the other categories
- **CUCC Largest Increases for 2014 to 2016:**
 - ✓ Speed 37%; Crossed Centerline 16%; Fail to Yield 11%
 - ✓ Swerved 9%; DUI 8%; Ran Stop Sign 8%
- **CUCC Largest Decreases for 2016 to 2017**
 - ✓ Speed -16%; Crossed Centerline -19%; Fail Yield -6%; Swerved -5%; DUI -24%; Ran Stop Sign -11%;

2014 vs 2016 Percent INCREASE in Fatal Crashes



2016 vs 2017 Percent Reduction in Fatal Crashes



2014-2016 Crash Percent Increase by CUCC

2016-2017 Compares First 9 Months

		Per Cent Crash Increase*		
	<u>Contrib Circumstances</u>	<u>2014-2016</u>		<u>2016-2017</u>
	Speed	37%		-16%
	DUI	8%		-24%
	Crossed Centerline	16%		-19%
	Failed to Yield RoW	11%		-6%
	Over Steering/Swerved	9%		-5%
	Ran Stop Sign	8%		-11%
	*Percentages are of the overall increase or reduction in CU Contributing Circumstances			

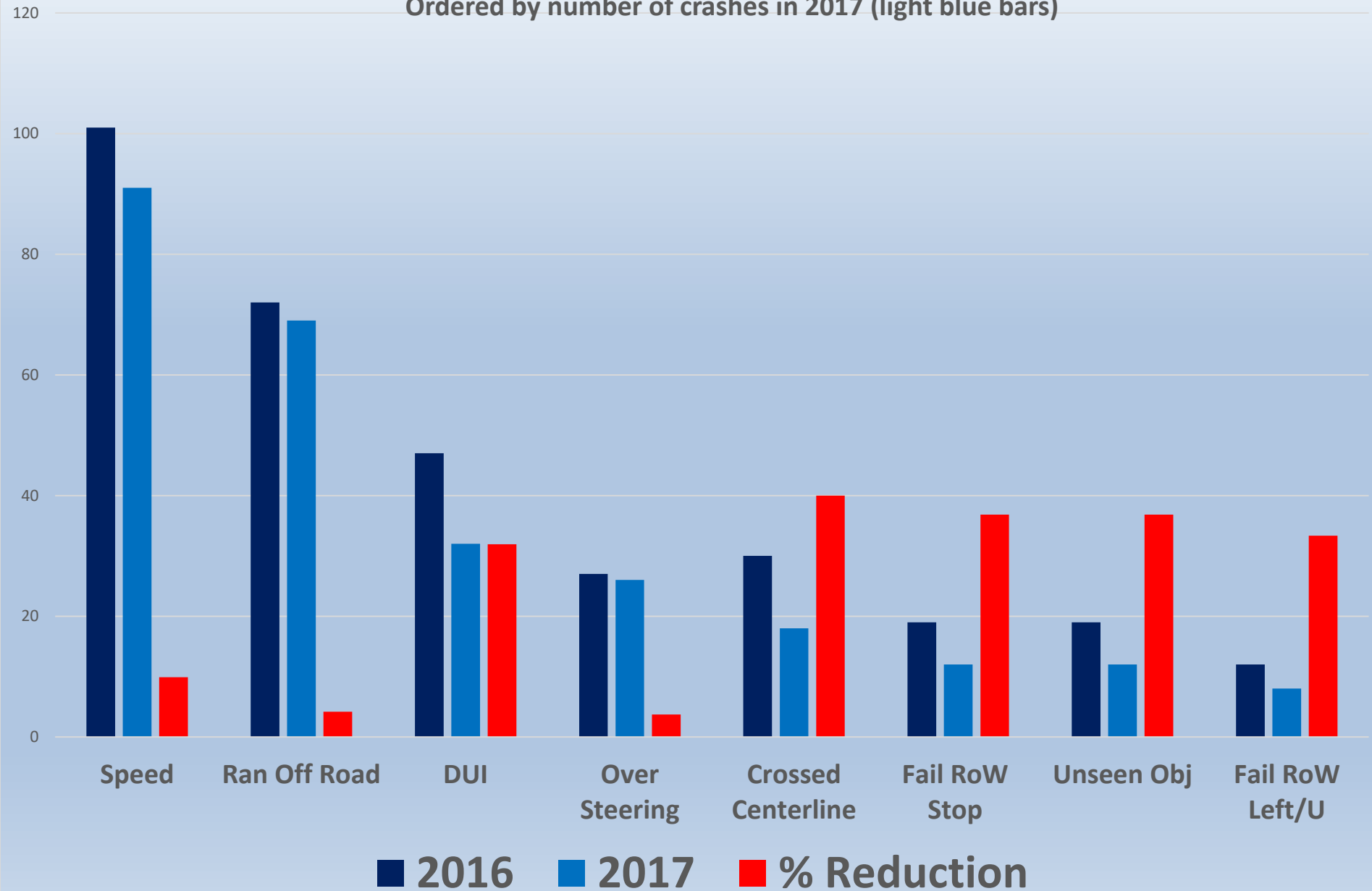
**Driver Behavior
Geographical Features
Restraints and Helmets
Pedestrian Behavior
Thanksgiving Report**

Driver Behavior

- **Top CUCCs have strong speed cofactors**
- **Unseen Object/Person/Vehicle = Proxy for DD**
- **Major Cause of Death**
 - ✓ Speed, DUI, Aggressive, Pedestrians, Ran off Road, Wrg Way
 - ✓ Very similar Fatality CUCCs in 2016 and 2017
- **For Fatality Crashes:**
 - ✓ DUI/ID Increase in Drug Use in 2014 to 2016
 - ✓ ID Decrease both Drugs & Alcohol 2016 to 2017
 - ✓ ID had the Largest Improvement 2016 to 2017
 - Major changes discovered in ID impact speeds

2016 to 2017 Fatal Differential by CUCC

Ordered by number of crashes in 2017 (light blue bars)



File

Dashboard

Filters

Analysis

Impact

Locations

Tools

Window

Help

2014-2017 Alabama Integrated Crash Data

2017 First 9 Months And Fatal Crashes

1/ 1/2014

10/16/2017

Order: Max Gain

Descending

☒ Suppress Zero-Valued Rows

Significance: Over Representation

Threshold: 2.0

C202: CU Contributing Circumstance

		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
	Over Speed Limit	Fatal 91	23.10	Non 1810	5.98	3.864*	67.448
	E Ran off Road	69	17.51	3008	9.93	1.763*	29.860
	E Aggressive Operation	41	10.41	1559	5.15	2.021*	20.714
*	E Improper Crossing	20	5.08	103	0.34	14.923*	18.660
	Traveling Wrong Way/Wrong...	18	4.57	456	1.51	3.034	12.067
	E Not Visible	11	2.79	59	0.19	14.328	10.232
	E Over Correcting/Over Steeri...	26	6.60	1528	5.05	1.308	6.118
	DUI	32	8.12	2206	7.29	1.115	3.296
	E Crossed Centerline	18	4.57	1263	4.17	1.095	1.566
	E Fatigued/Asleep	17	4.31	1555	5.14	0.840	-3.233
	Defective Equipment	9	2.28	1644	5.43	0.421	-12.392
	Driving too Fast for Conditions	18	4.57	3707	12.24	0.373	-30.235
	E Failed to Yield Right-of-Way...	12	3.05	4252	14.04	0.217	-43.327
	Unseen Object/Person/Vehicle	12	3.05	7130	23.55	0.129	-80.775

C202: CU Contributing Circumstance

What Causes Fatalities?

Update

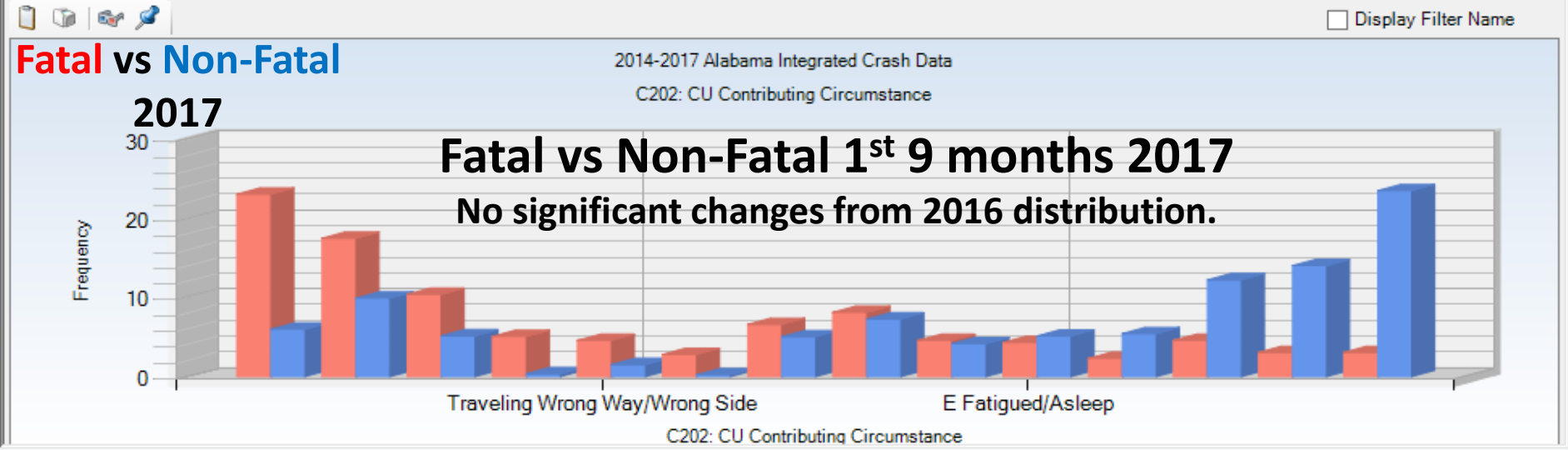
All data from first 9 months of 2017

Comparing fatal crashes (in red) with non-fatal crashes (in blue)

☐ Sort by Sum of Max Gain

What Causes Fatalities?
Update
All data from first 9 months of 2017

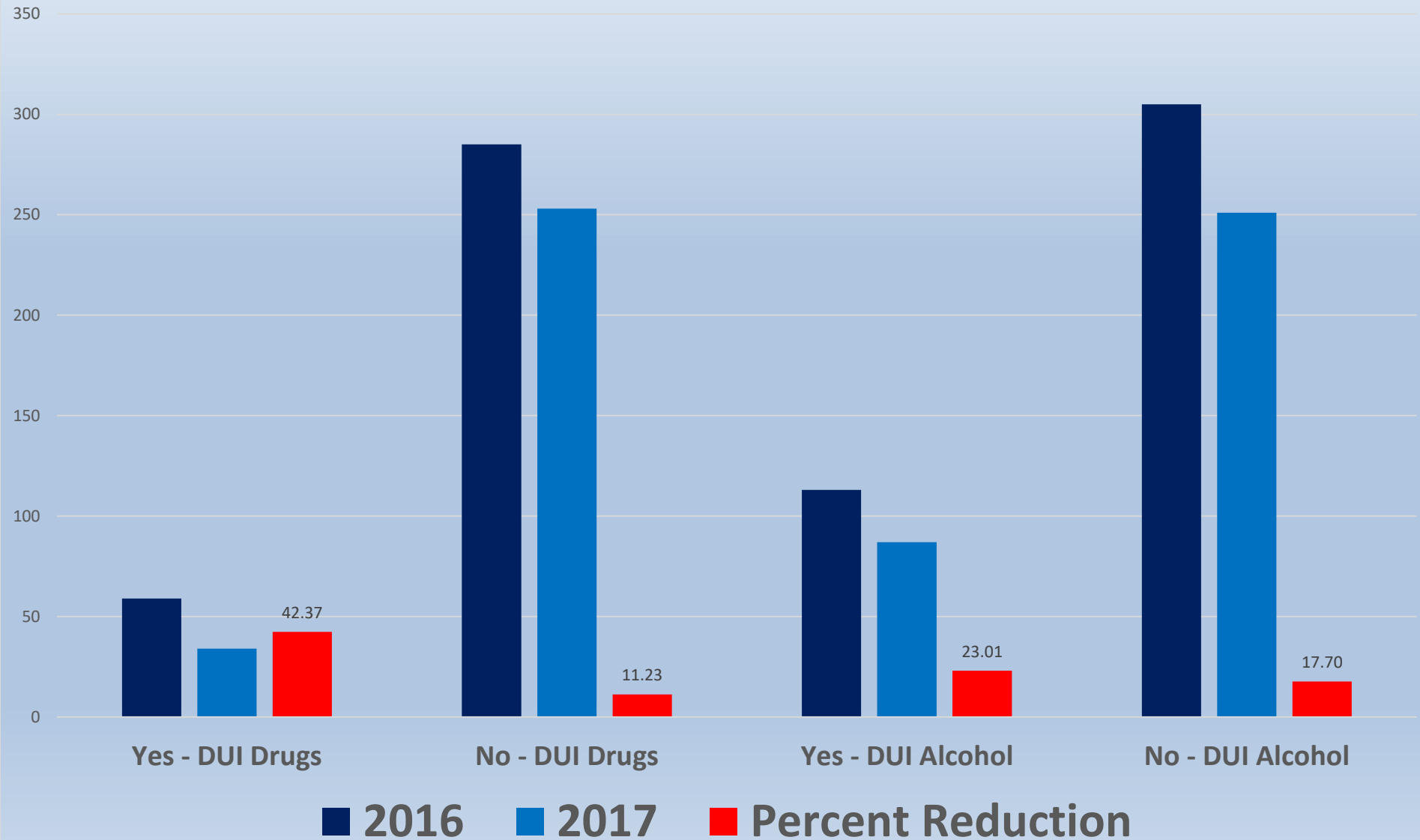
Comparing fatal crashes (in red) with non-fatal crashes (in blue)



2016 to 2017 C122-3 Officer's Opinion Drug and Alcohol Use

Dark blue bars still represent 2016

Reductions seen in all categories; largest is that of drugs



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

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

C121: CU Driver Condition

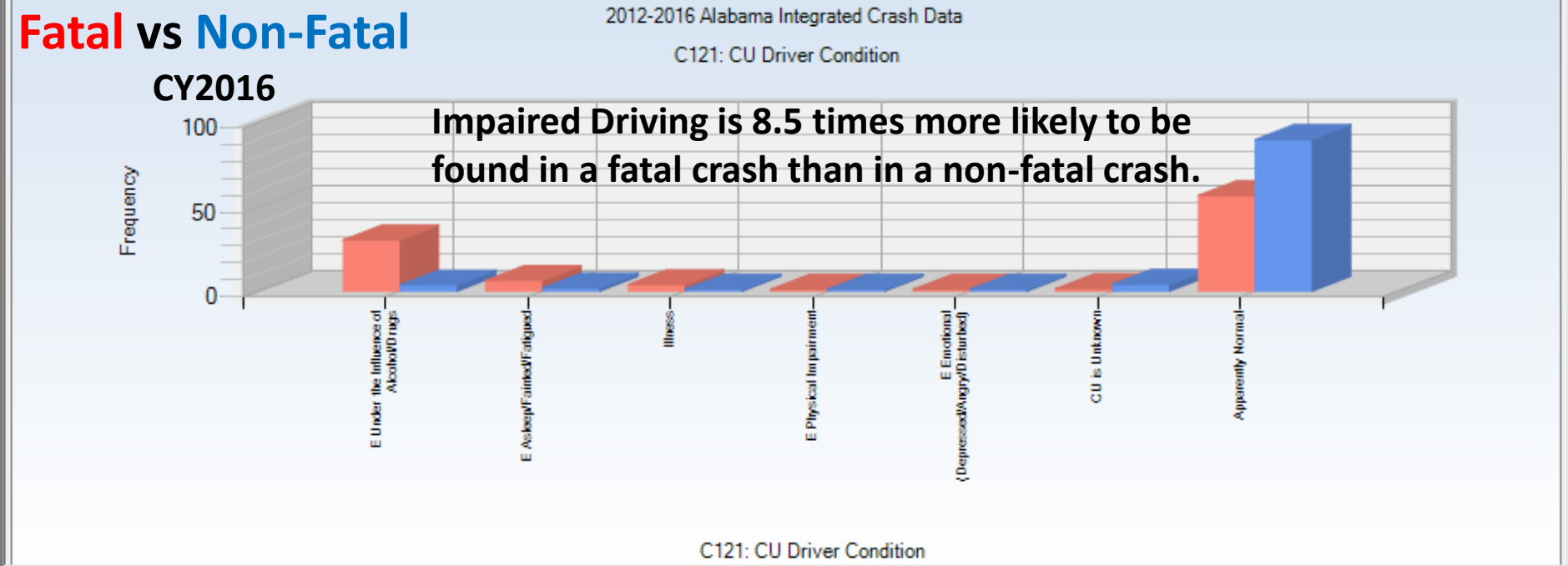
Fatal (red bars) vs non-fatal (blue bars) CY 2016

☐ Sort by Sum of Max Gain

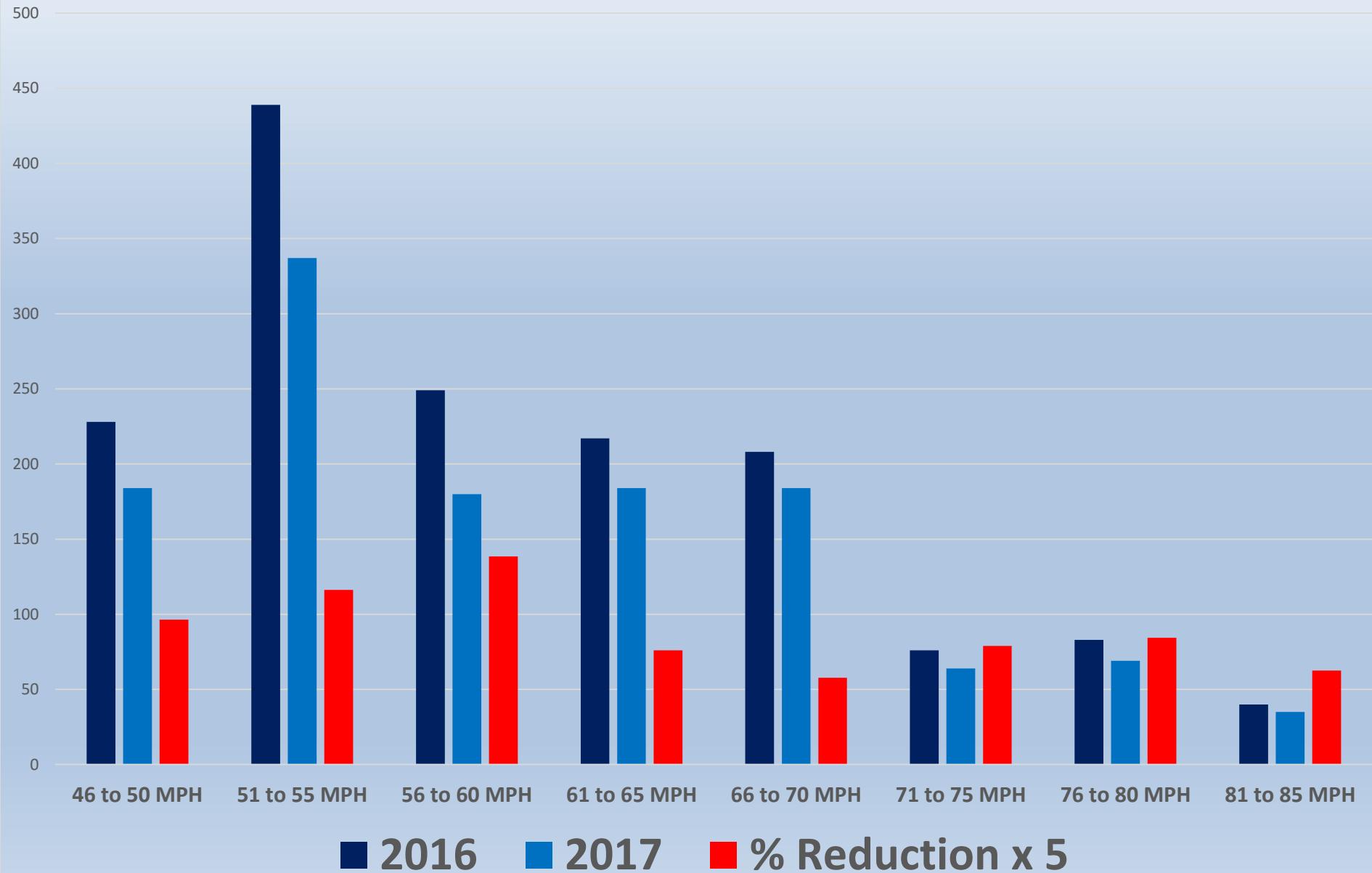
Display Filter N

Fatal vs Non-Fatal

CY2016



2016 to 2017 Impact Speed Reduction for Impaired Driving



Geographical Features

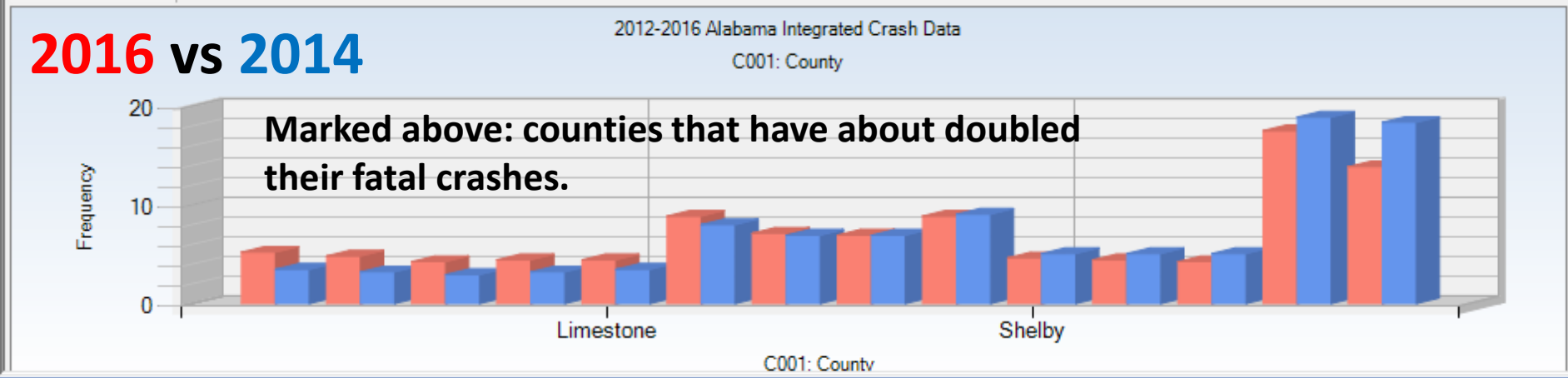
- **Counties that about doubled fatal crashes in 2016**
 - ✓ Talladega, Limestone, Etowah, Calhoun and Russell
- **Greatest Increases in 2016 Most Increased First**
 - ✓ Jefferson, Madison, Etowah, Talladega, Tuscaloosa, Montgomery
 - ✓ Russell, Calhoun, Baldwin Limestone, Blount, Chambers
- **Greatest Reductions in 2017 Most Reduced First**
 - ✓ Montgomery, Elmore, Jefferson, Mobile, Houston, Dale
 - ✓ Baldwin, Chilton, Tallapoosa, Tuscaloosa, Etowah, Russell
- **Rural Areas are Over-Represented by About 3x**

C001: County	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Etowah	2016 27	5.22	2014 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

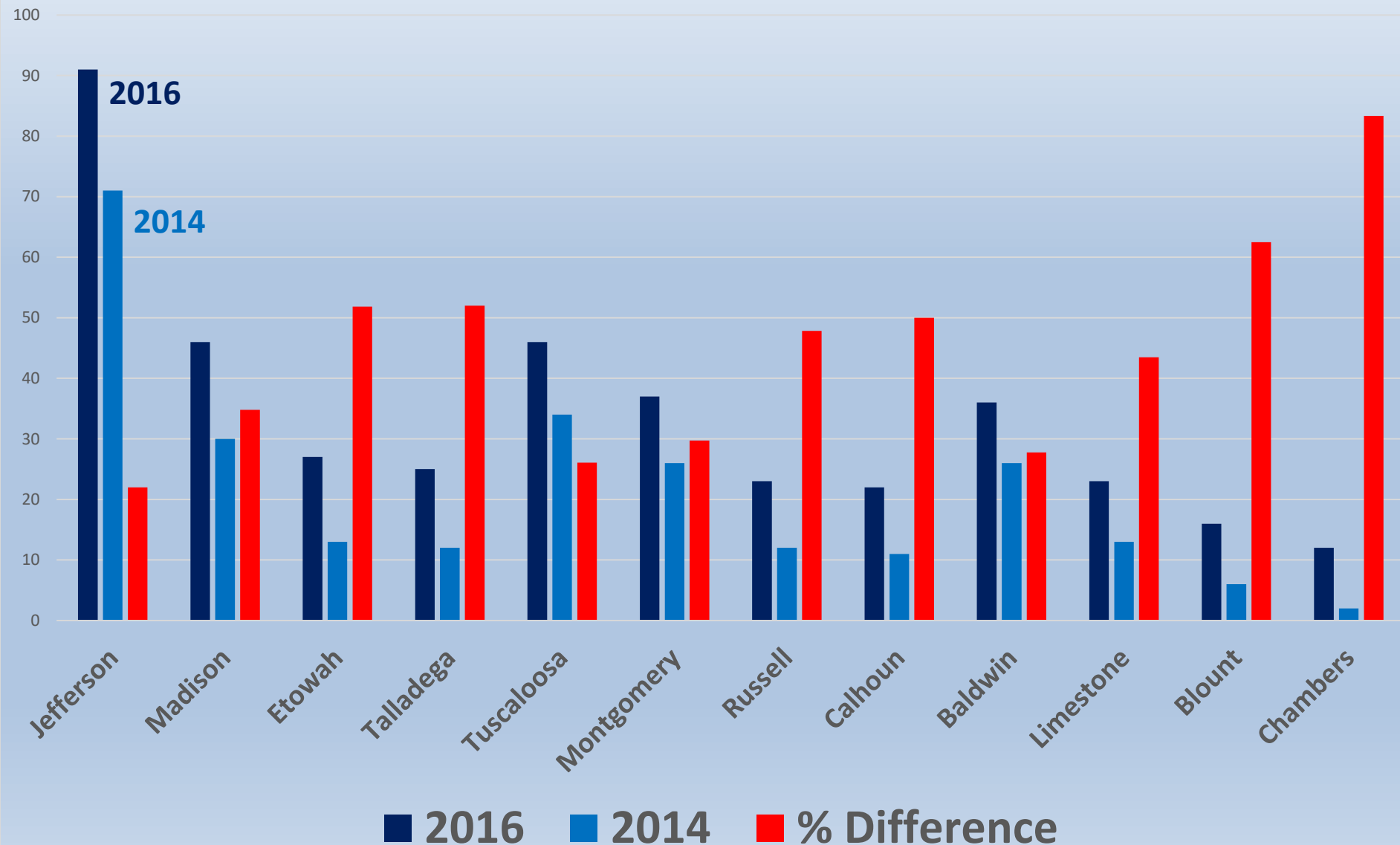


2014 to 2016 Fatal Crash Increase by County

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

Ordered by Numeric Increase

Red bars are the Percent Increase

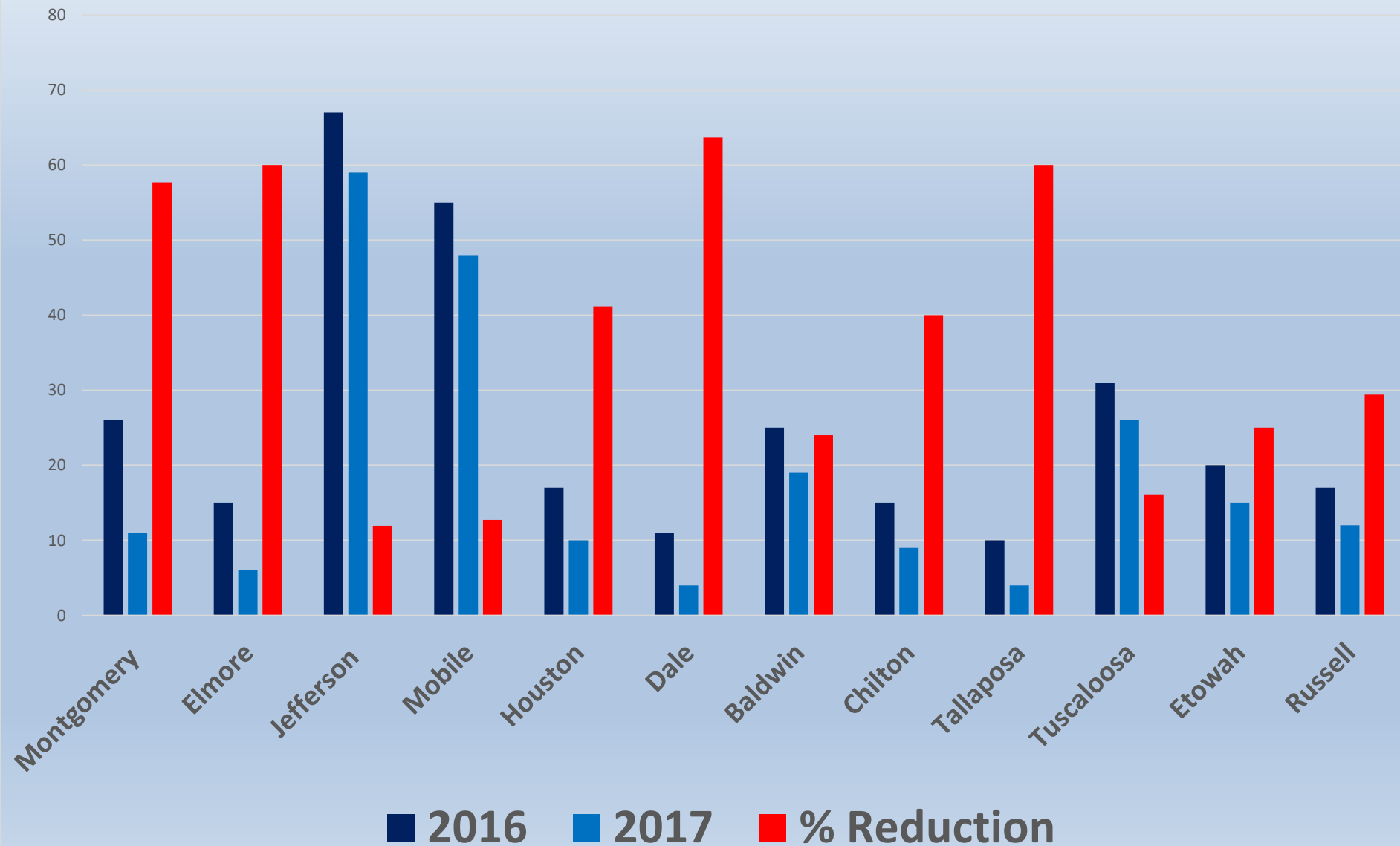


2016 to 2017 Fatal Crash Decrease by County

Counties with an Decrease of at Least 5 Fatal Crashes in 2017

Ordered by Numeric Decrease in 2017

Red Bars are the Percent Reductions in 2017

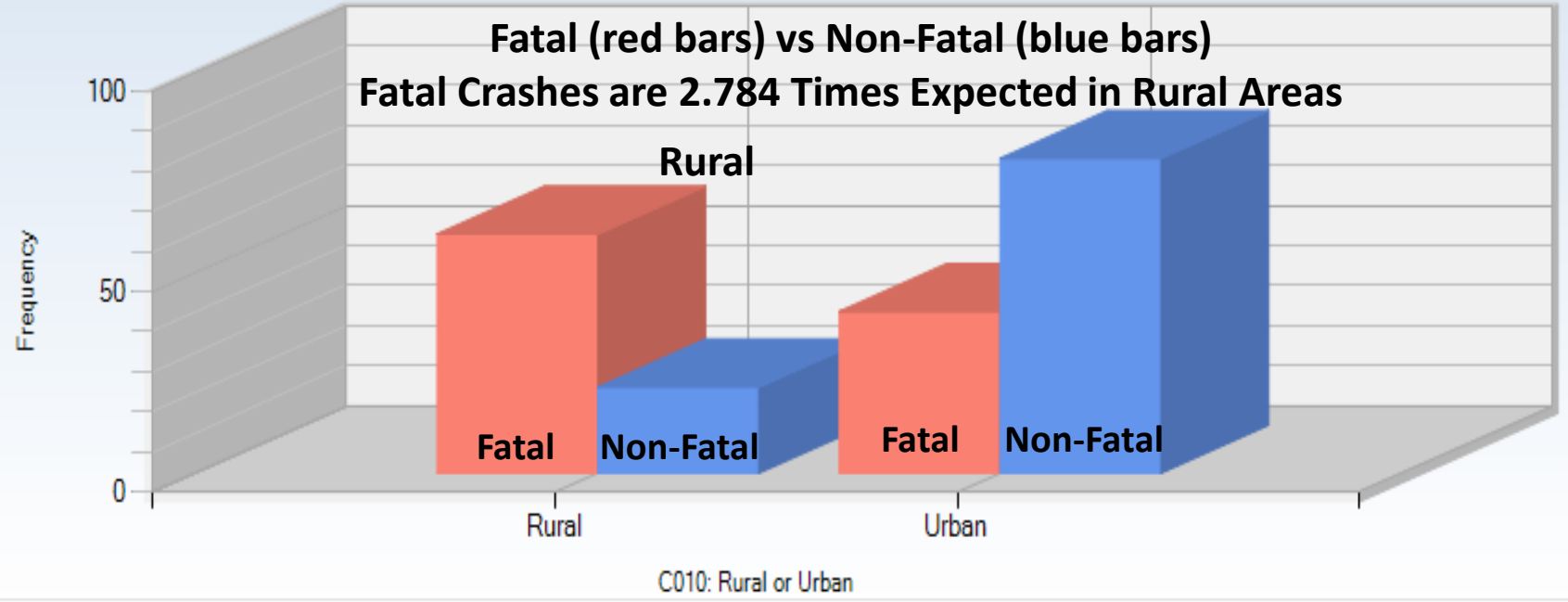


C010: Rural or Urban			Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
	Rural	Fatal	592	59.68	Non33196	21.44	2.784*	379.352
	Urban		400	40.32	121663	78.56	0.513*	-379.352

- 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

Fatal vs Non-Fatal CY2016

2012-2016 Alabama Integrated Crash Data
C010: Rural or Urban

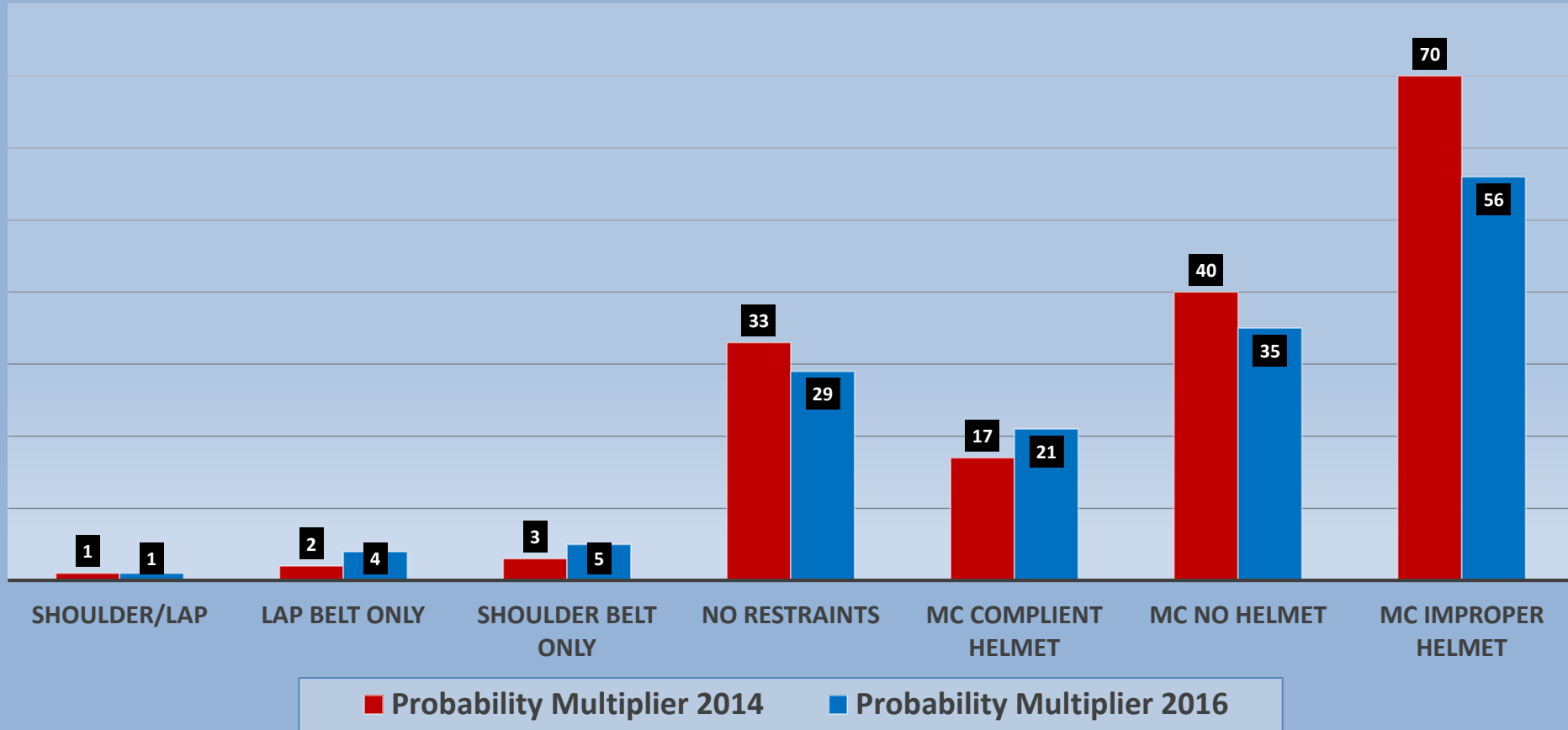


Restraints and Helmets

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
- **Seatbelt Use: Non-Fatal 97%; Fatal 48%**
- **Changes in 2017**
 - ✓ No major change in general seatbelt use
 - ✓ Slight non-significant increase in fatal crash non-use

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.

FileDashboardFiltersAnalysisImpactLocationsToolsWindowHelp

2012-2016 Alabama Integrated Crash DataFatal Crashes1/ 1/201212/31/2016

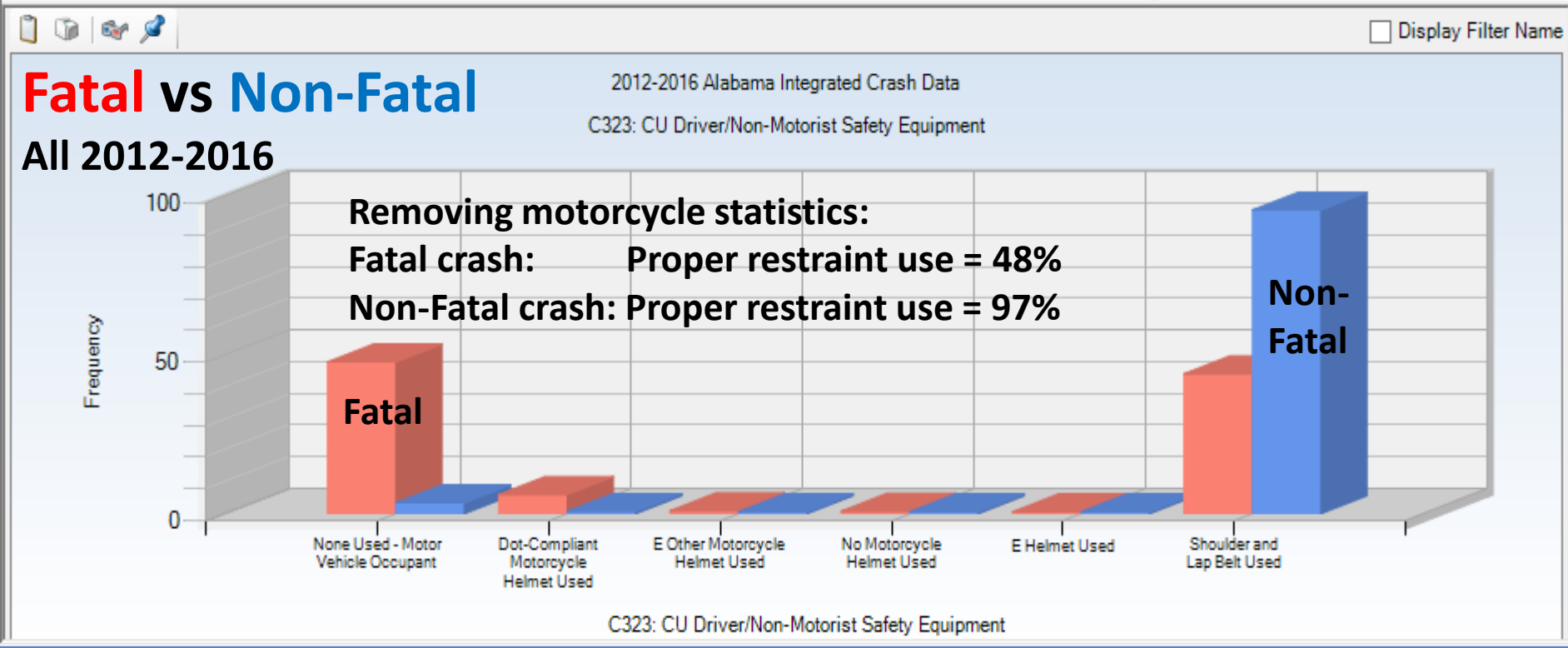
Order: Max GainDescending☒ Suppress Zero-Valued RowsSignificance: Over RepresentationThreshold: 2.0

C323: CU Driver/Non-Motorist Safety Equipment							
	Value	Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
	None Used - Motor Vehicle O...	Fatal 1637	47.81	Non 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



Pedestrian Behavior

- Increased Ped Fatal in 2014-2016: 97 to 120
- Reduced Ped Fatal 2016-2017: 89 to 79
- Prorated to a year: 120 to 107 = 13 (-11.2%)
- Over-Rep Ped Acts, Fatal Crashes ('16, '17):
 - ✓ Improper crossing (26, 20)
 - ✓ In roadway (13, 13)
 - ✓ Not visible (4, 7)
- Fatal Ped has 3 Times Expected Walking UI (2016-7)

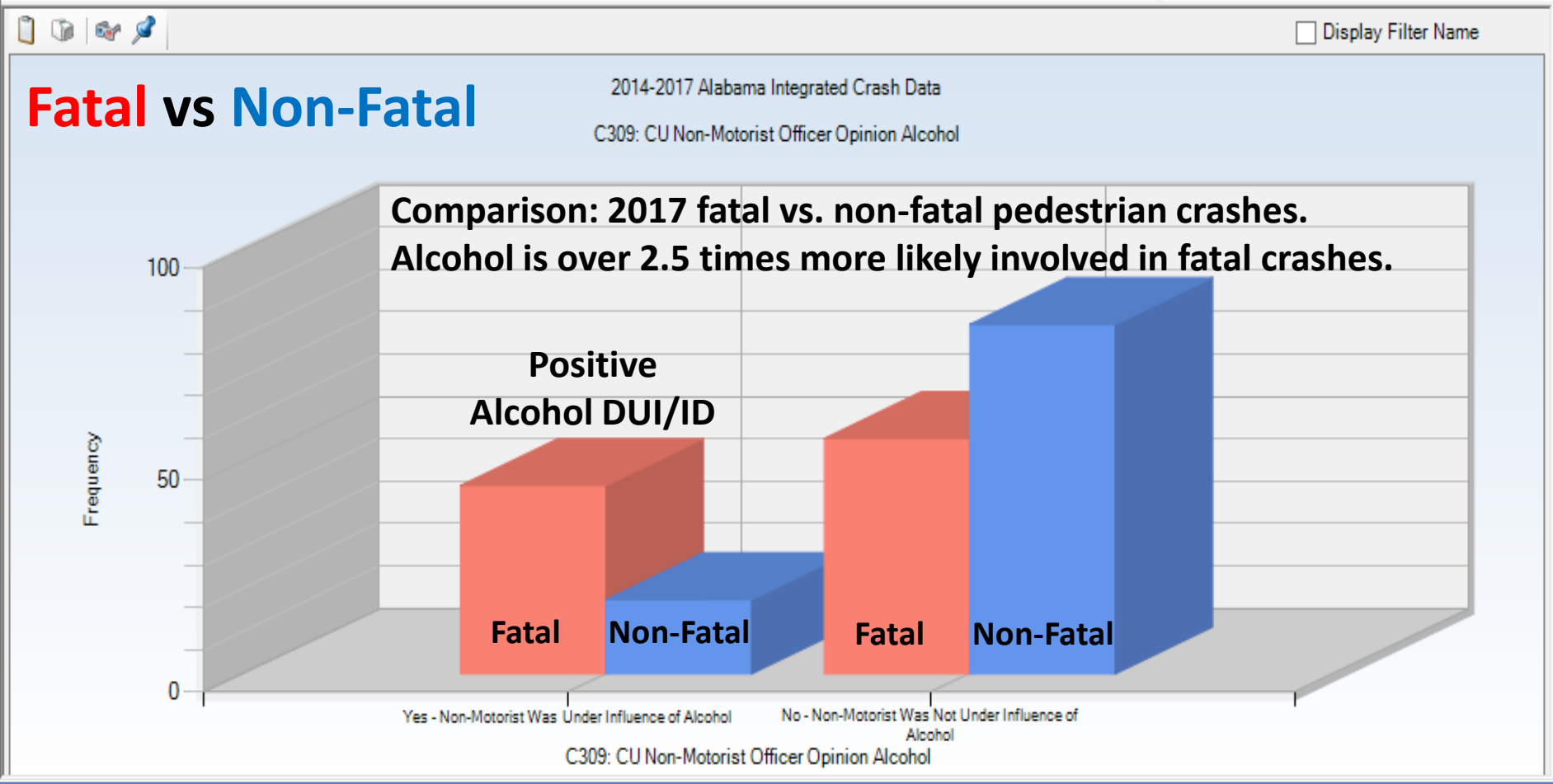
File Dashboard Filters Analysis Impact Locations Tools Window Help

2014-2017 Alabama Integrated Crash Data2017 First 9 Months And Fatal Crashes1/ 1/201410/16/2017

Order: Max GainDescending☒ Suppress Zero-Valued RowsSignificance: Over RepresentationThreshold: 2.0

C309: CU Non-Motorist Officer Opinion Alcohol		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Yes - Non-Motorist Was Under I...	Fatal	16	44.44	Non 45	17.51	2.538	9.696
No - Non-Motorist Was Not Und...		20	55.56	212	82.49	0.673*	-9.696

☐ Sort by Sum of Max Gain



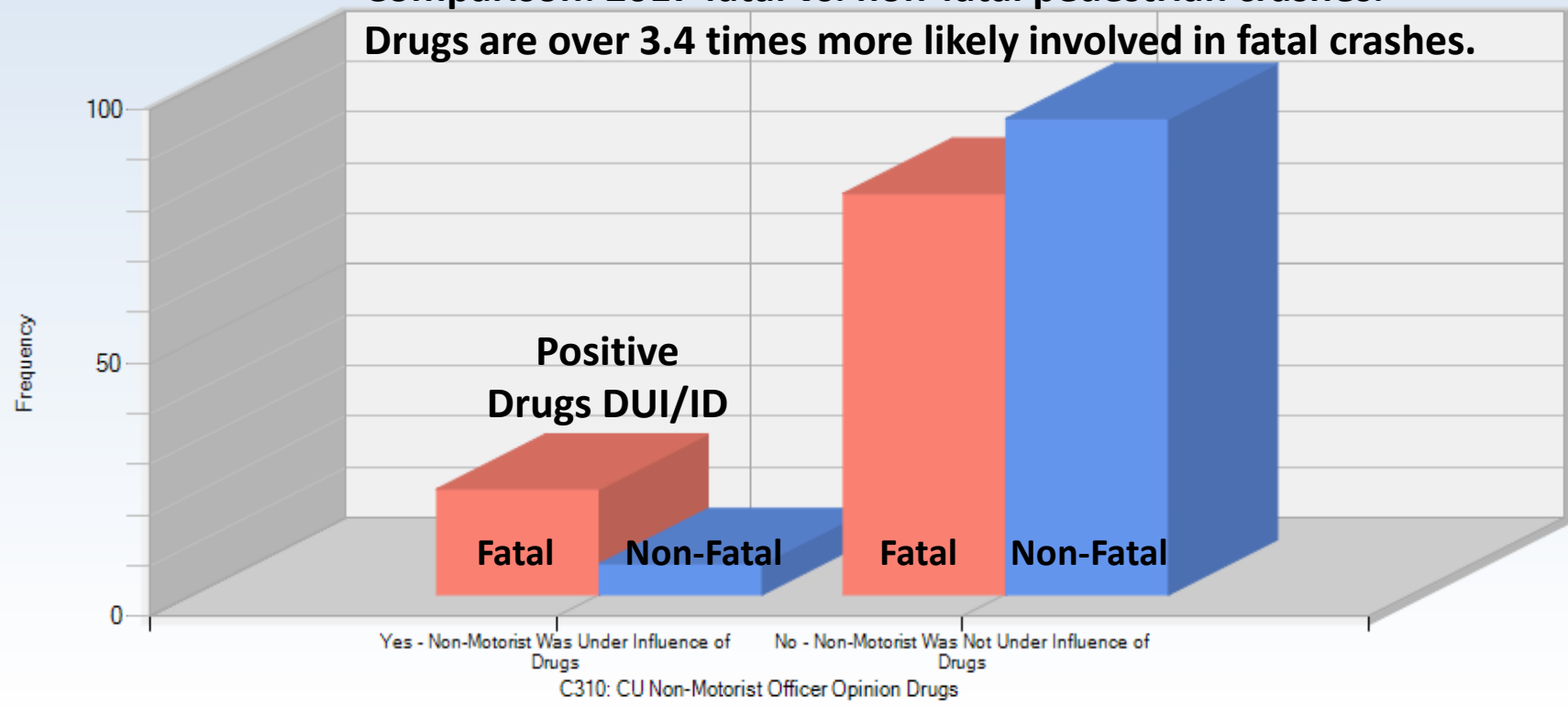
Order: Max Gain Descending ☒ Suppress Zero-Valued Rows Significance: Over Representation Threshold: 2.0

C310: CU Non-Motorist Officer Opinion Drugs							
Value		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Yes - Non-Motorist Was Under Influence ...	Fatal	5	20.83	Non 14	6.09	3.423	3.539
No - Non-Motorist Was Not Under Influen...		19	79.17	216	93.91	0.843	-3.539

☐ Sort by Sum of Max Gain

Fatal vs Non-Fatal

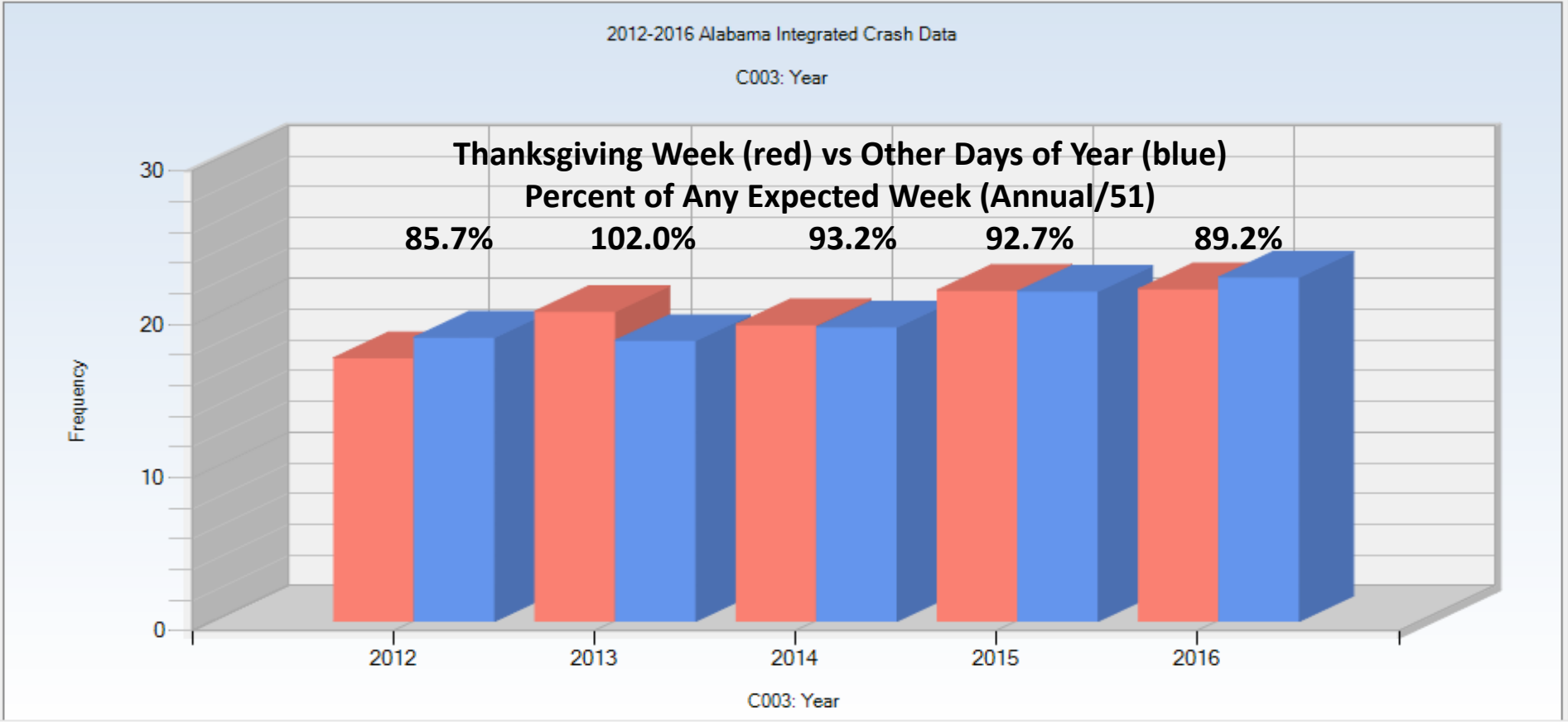
2014-2017 Alabama Integrated Crash Data
C310: CU Non-Motorist Officer Opinion Drugs
Comparison: 2017 fatal vs. non-fatal pedestrian crashes.
Drugs are over 3.4 times more likely involved in fatal crashes.



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

C003: Year	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
2012	2124	17.18	126388	18.52	0.927*	-166.242
2013	2500	20.22	124984	18.32	1.104*	235.200
2014	2392	19.34	130941	19.19	1.008	19.255
2015	2669	21.59	146884	21.53	1.003	7.356
2016	2680	21.67	153171	22.45	0.966	-95.569

- C226: CU Vehicle Damage
 - C112: CU Driver First License Class
 - C052: Number of Drivers Recorded
 - C003: Year**
 - C113: CU Driver Second License Class
 - C326: CU Driver/Non-Motorist Gender
 - C324: CU Driver Airbag Status
- ☒ Sort by Sum of Max Gain



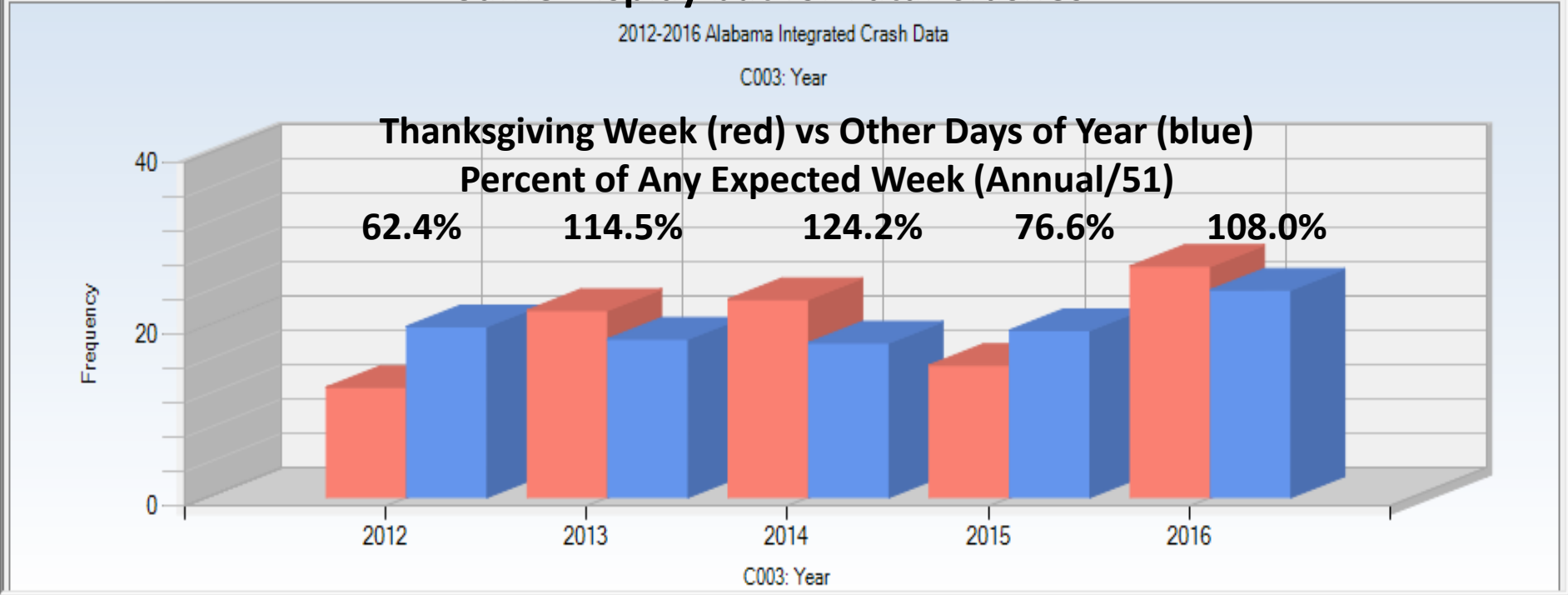
Order: Max Gain Descending ☐ Suppress Zero-Valued Rows Significance: Over Representation Threshold: 2.0

C003: Year	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
2012	10	12.82	817	19.91	0.644	-5.528
2013	17	21.79	757	18.45	1.182	2.613
2014	18	23.08	739	18.01	1.282	3.955
2015	12	15.38	799	19.47	0.790	-3.186
2016	21	26.92	992	24.17	1.114	2.146

C003: Year

☐ Sort by Sum of Max Gain

Same Display but for Fatal Crashes ☐ Display Filter Name



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	1472	11.90	66002	9.67	1.231*	275.996
Monday	2181	17.64	100693	14.76	1.195*	356.370
Tuesday	2420	19.57	101233	14.84	1.319*	585.585
Wednesday	2167	17.53	99409	14.57	1.203*	365.637
Thursday	1050	8.49	105312	15.43	0.550*	-858.329
Friday	1592	12.88	122958	18.02	0.715*	-636.088
Saturday	1483	11.99	86761	12.71	0.943*	-89.172

- C007: Week of the Year
 - C004: Month
 - C005: Day of Month
 - C029: Lighting Conditions
 - C030: Weather
 - C006: Day of the Week
 - C403: CU Roadway Condition
 - C008: Time of Day
 - C002: City
 - C583: V2 Roadway Condition
- ☒ Sort by Sum of Max Gain

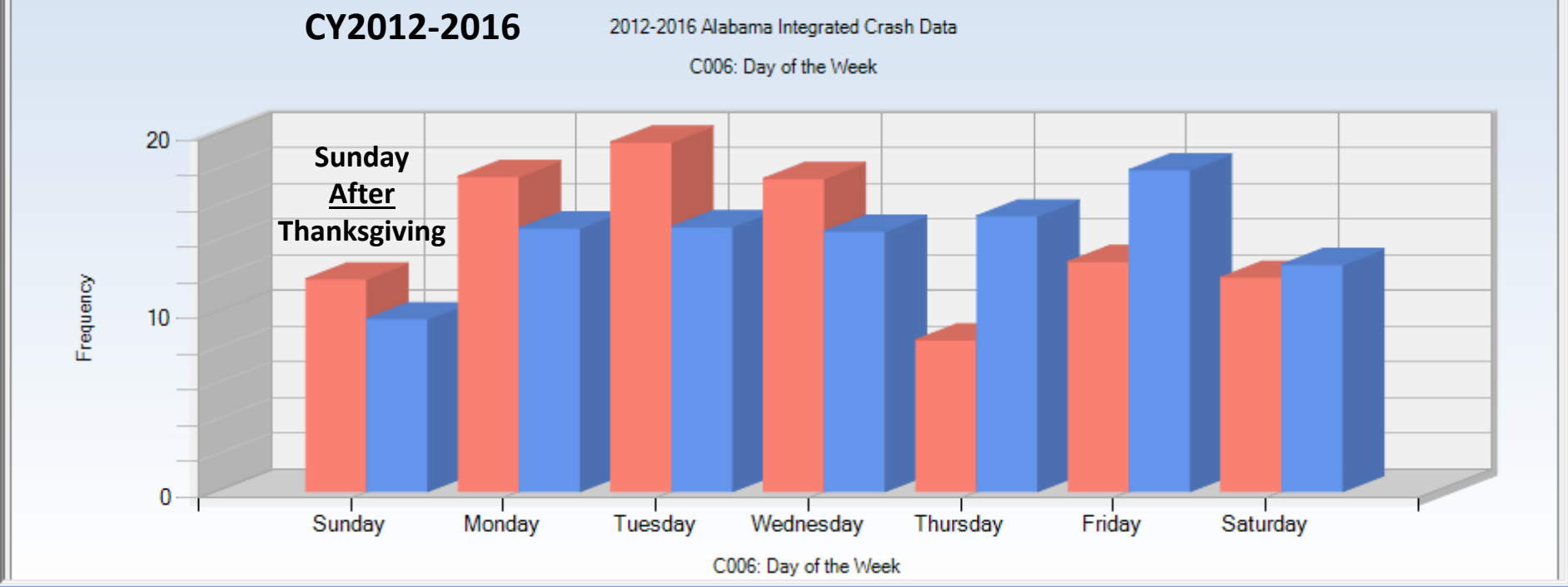
Thanksgiving Week (red) vs Other Days of Year (blue)

CY2012-2016

2012-2016 Alabama Integrated Crash Data

C006: Day of the Week

☐ Display Filter Name



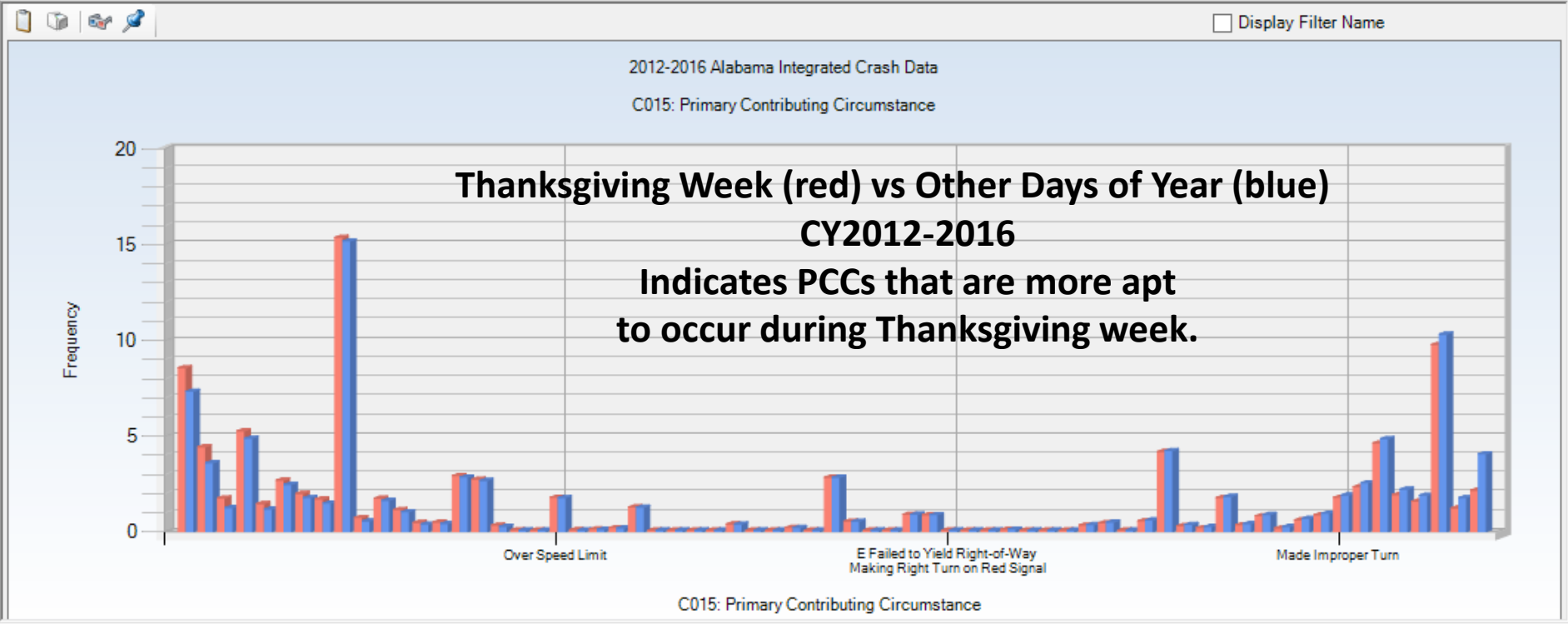
File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data Thanksgiving Wk 12 Or 13 Or 14 Or 15 Or 16 1/ 1/2012 12/31/2016 Nun

Order: Max Gain 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
Unseen Object/Person/Vehicle	Value	966	8.55	45942	7.32	1.168*	139.062
DUI		500	4.43	22542	3.59	1.232*	94.253
E Swerved to Avoid Animal		198	1.75	7849	1.25	1.401*	56.721
Improper Lane Change/Use		594	5.26	30559	4.87	1.080	43.950
E Crossed Centerline		165	1.46	7393	1.18	1.240*	31.929
E Ran off Road		303	2.68	15439	2.46	1.090	25.104
E Fatigued/Asleep		225	1.99	11136	1.77	1.123	24.556
E Aggressive Operation		192	1.70	9326	1.49	1.144	24.136
Followed too Close		1734	15.35	95155	15.17	1.012	21.247
Vision Obstructed		83	0.73	3468	0.55	1.330*	20.577

C015: Primary Contributing Circumstance
Sort by Sum of Max Gain



	Fatal Injury	Incapacitating Injury	Non-Incapacitating Inju	Possible Injury	Property Damage Only	Unknown	TOTAL
Brakes	9 13.24%	172 25.44%	409 31.95%	636 51.96%	4353 42.16%	185 52.86%	5764 41.40%
Steering	1 1.47%	49 7.25%	107 8.36%	97 7.92%	689 6.67%	35 10.00%	978 7.02%
E Tire Blowout/Separatio	24 35.29%	175 25.89%	349 27.27%	194 15.85%	2244 21.73%	48 13.71%	3034 21.79%
E Improper Tread Depth	28 41.18%	175 25.89%	202 15.78%	144 11.76%	997 9.66%	15 4.29%	1561 11.21%
Wheels	2 2.94%	19 2.81%	63 4.92%	51 4.17%	599 5.80%	23 6.57%	757 5.44%
E Wipers	0 0.00%	2 0.30%	4 0.31%	8 0.65%	33 0.32%	3 0.86%	50 0.36%
Windows/Windshi eld	1 1.47%	7 1.04%	15 1.17%	9 0.74%	109 1.06%	6 1.71%	147 1.06%
E Mirrors	0 0.00%	0 0.00%	3 0.23%	4 0.33%	48 0.46%	1 0.29%	56 0.40%
Trailer Hitch/Coupling	1 1.47%	7 1.04%	13 1.02%	12 0.98%	230 2.23%	1 0.29%	264 1.90%
Power Train	0 0.00%	13 1.92%	33 2.58%	26 2.12%	425 4.12%	5 1.43%	502 3.61%
Fuel System	1 1.47%	4 0.59%	9 0.70%	2 0.16%	109 1.06%	4 1.14%	129 0.93%
Exhaust	0 0.00%	0 0.00%	0 0.00%	0 0.00%	5 0.05%	0 0.00%	5 0.04%
E Headlights	0 0.00%	12 1.78%	12 0.94%	11 0.90%	58 0.56%	5 1.43%	98 0.70%
E Tail Lights	1 1.47%	16 2.37%	22 1.72%	8 0.65%	78 0.76%	4 1.14%	129 0.93%
Turn Signal	0 0.00%	1 0.15%	8 0.63%	1 0.08%	41 0.40%	2 0.57%	53 0.38%
Suspension	0 0.00%	2 0.30%	16 1.25%	9 0.74%	122 1.18%	4 1.14%	153 1.10%
E Cruise Control	0 0.00%	3 0.44%	2 0.16%	0 0.00%	8 0.08%	2 0.57%	15 0.11%
E Body/Doors	0 0.00%	3 0.44%	9 0.70%	5 0.41%	56 0.54%	7 2.00%	80 0.57%
P Tires*	0 0.00%	15 2.22%	4 0.31%	7 0.57%	100 0.97%	0 0.00%	126 0.90%
P Lights*	0 0.00%	1 0.15%	0 0.00%	0 0.00%	6 0.06%	0 0.00%	7 0.05%
P Restraint System	0 0.00%	0 0.00%	0 0.00%	0 0.00%	3 0.03%	0 0.00%	3 0.02%
P Cargo	0 0.00%	0 0.00%	0 0.00%	0 0.00%	12 0.12%	0 0.00%	12 0.09%
TOTAL	68 0.49%	676 4.86%	1280 9.19%	1224 8.79%	10325 74.16%	350 2.51%	13923 100.00%

Tire defects account for 76.5% of all veh-defect caused fatal crashes



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THANK YOU

Q&A SESSION

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Recommended Countermeasures

Countermeasure Development - 1

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

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



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