



CENTER *for* ADVANCED
PUBLIC SAFETY

ADECA/LETS Office of Highway Safety

ANALYSIS OF DISTRACTED DRIVING IN ALABAMA 2012-2016 DATA

For more general information from NHTSA
and other sources, see:

<http://www.safehomealabama.gov/tag/distracted-driving/>

June 2017

THE UNIVERSITY OF
ALABAMA

Summary of Recommendations

- **Major PI&E Effort**
 - ✓ **Consequences of the current situation**
 - The mounting death and injury toll
 - Everyone thinks they are the exception
 - Focus of effort: *no exceptions – no use of cell phones by drivers*
 - Like smoking, it must become socially unacceptable
 - ✓ **Drivers need understanding of cognitive effects of *any and all* cell use**
 - Not just a matter of hands on/off the wheel or eye misdirection
 - Uses areas of the brain that are essential to safety
 - Especially true if any level of alcohol/drugs or emotional distress are involved
 - ✓ **Publicize changes in legal and IT countermeasures (see below)**
- **Major Enforcement Effort**
 - ✓ **Develop and apply better methods for cell phone use detection**
 - ✓ **Stronger penalties when detected**
 - ✓ **Training for better identification and recording**
- **Legal and IT Countermeasures**
 - ✓ **Legislation enabling checking for cell phone use for ALL crashes**
 - ✓ **Burden or proof shift to cell phone users**
 - ✓ **Per se assumption of responsibility**
 - ✓ **Get data from detection back into the crash records**

Outline of the Presentation

- **General Introduction**
 - ✓ NHTSA Distracted Driving 2015 Traffic Safety Facts
 - ✓ General national findings (FARS, etc.)
- **IMPACT Comparative Analyses**
 - ✓ Will consider only electronic device distractions
 - ✓ Distracted Driving by Electronic Devices (DDED)
 - ✓ Compare **DDED (red)** with **non-DDED (blue)**
 - ✓ Many results are unique to Alabama
 - ✓ Presented as Q & A

Summary of NHTSA DA 2015

- **DA = Distracted-Affected (NHTSA term)**
 - ✓ Causal driver identified as distracted
 - ✓ Essentially same as our Distracted Driving (DD)
- **2015 Statistics**
 - ✓ DA in 10% fatal, 15% injury and 14% overall crashes
 - ✓ 3,477 killed; 391,000 non-fatal injuries
 - ✓ 551 non-occupants (ped, bic, etc.) killed
- **Distracted by Cell Phone Use**
 - ✓ 476 fatalities 2015 nationally = 14% of all distractions
 - ✓ 16 DDED fatalities/year in Alabama

IMPACT Analyses

- From Data 2012 thru August 2016
- Compare and Contrast the Following:
 - ✓ Driving Distracted by Electronic Device (DDED)
 - ✓ Compared to: All Other Records (non-DDED)
- Subjects Covered:
 - ✓ Severity
 - ✓ Driver Behavior (including Impaired Driving)
 - ✓ Driver Demographics
 - ✓ Geographical Considerations
 - ✓ Time Factors
 - ✓ Crash Aspects
 - ✓ Vehicle Characteristics

Interpretation of IMPACT Results-1

- **Distracted Driving by Electronic Device**
 - ✓ DDED defined by C015, C020, C202
 - ✓ Attribute = cell phone or other electronic device
- **IMPACT Comparison Chart**
 - ✓ **Red=DDED; Blue=nonDDED**
 - ✓ Chart compares proportions
- **IMPACT Comparison Table**
 - ✓ “Subset” = DDED Frequency and PerCent
 - ✓ “Other” = nonDDED Frequency and Percent

Interpretation of IMPACT Results-2

- **Odds Ratio (OR) = DDED %/nonDDED %**
 - ✓ OR > 1 indicates over-representation for value
 - ✓ OR < 1 indicates under-representation for value
- **Max Gain**
 - ✓ F(both frequency and over-representation)
 - ✓ Equals crashes saved by forcing the OR to = 1.0
 - ✓ Generally, worst cases have the highest Max Gains

Value of Taking the Test

- **Two Step Process:**
- **1 – Think Through the Question**
 - ✓ Take your best guess
 - ✓ Consider the reason for the guess
- **2 – Evaluate the Correct Answer**
 - ✓ **Why did you get it right? Important:**
 - Just a lucky guess? or
 - Conclusion based on premises presented or known?
 - ✓ **Why did you get it wrong? Even more important.**

General Data Category

Crash Severity

QUESTION:

GENERAL CRASH SEVERITY

True or False:

DDDED crashes are generally less severe than non-DDDED crashes.

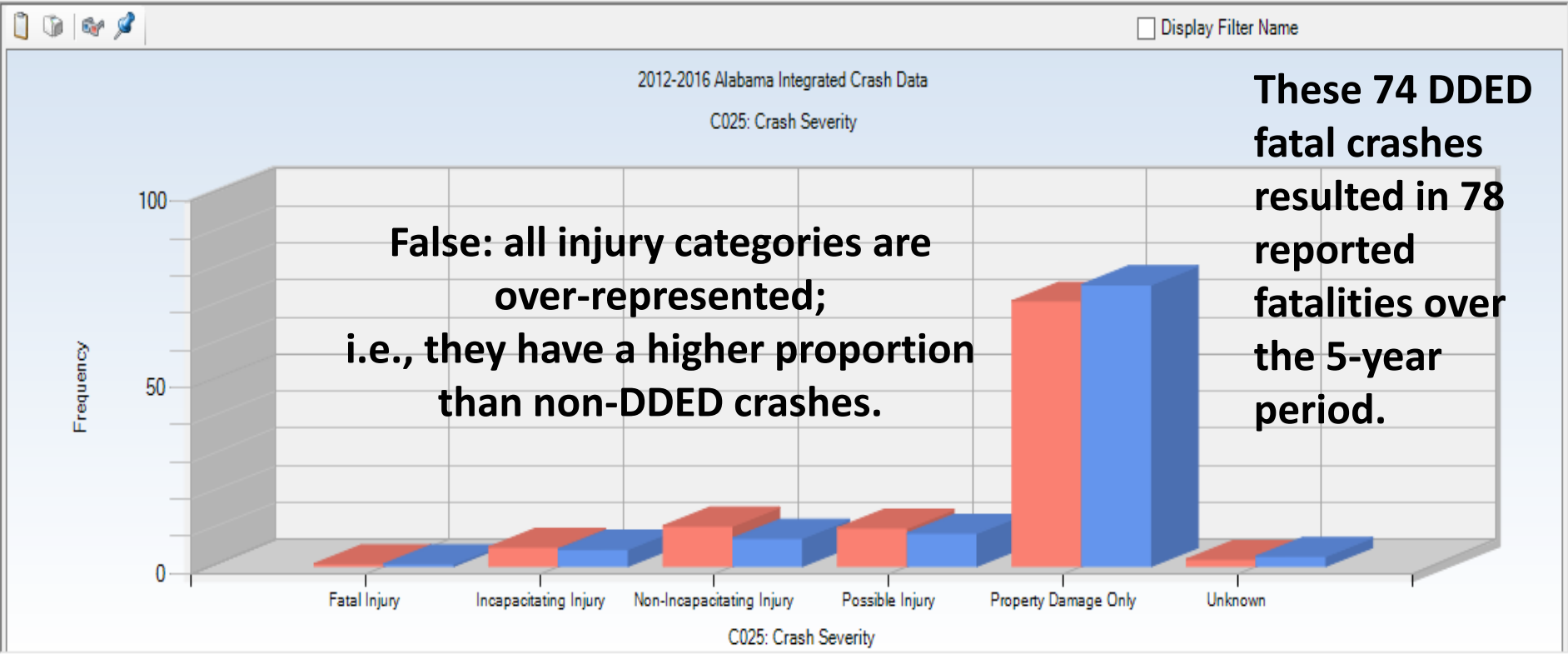
File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data DDED ElecDevice C15-20-202 1/ 1/2012 12/31/2016 Number Killed NC

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

C025: Crash Severity		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
	Fatal Injury	74	0.63	4030	0.59	1.067	4.668
	Incapacitating Injury	601	5.11	31362	4.59	1.114*	61.450
	Non-Incapacitating Injury	1271	10.82	51409	7.53	1.437*	386.563
	Possible Injury	1205	10.26	60576	8.87	1.156*	162.854
	Property Damage Only	8383	71.34	517458	75.76	0.942*	-519.317
	Unknown	216	1.84	18148	2.66	0.692*	-96.217

C020: E Distracted Driving Opinion
C021: Distance to Fixed Object
C022: E Type of Roadway Junction/Feat
C023: E Manner of Crash
C024: School Bus Related
C025: Crash Severity
C026: Intersection Related
C027: At Intersection
Sort by Sum of Max Gain



General Data Category

Driver Behavior

QUESTION:

VEHICLE MANEUVER

True or False:

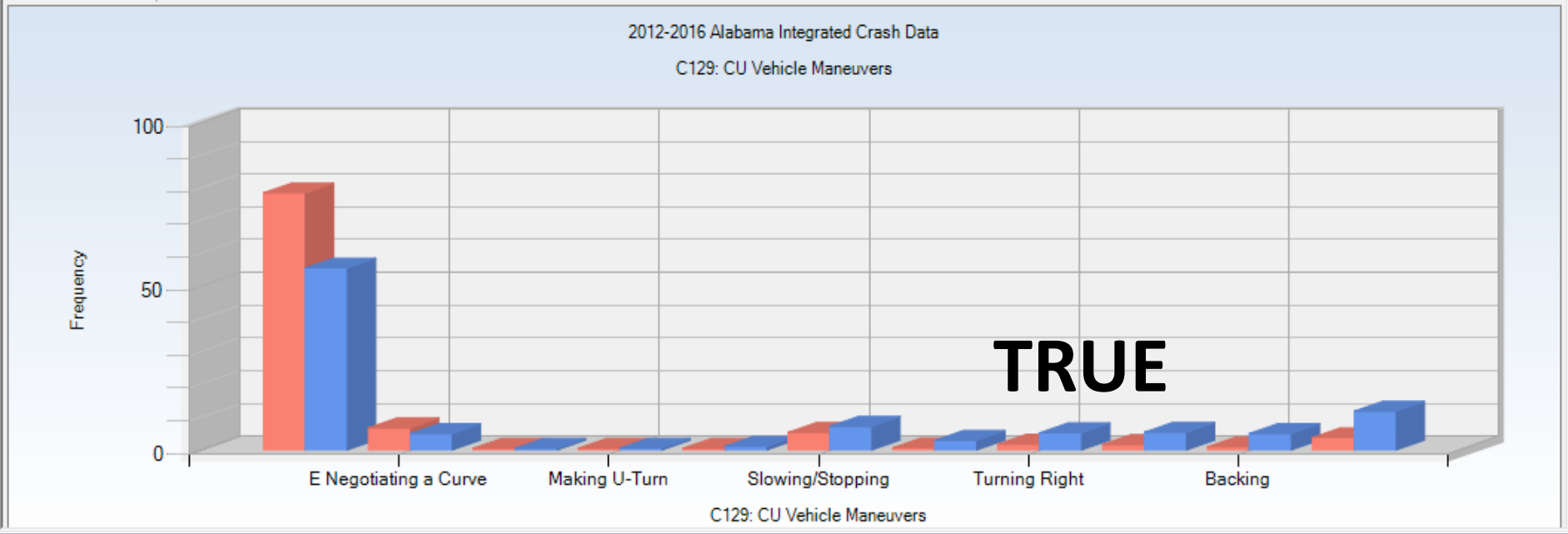
Other than for curves
DDED drivers tend to put their EDs aside
in more complex driving situations.

C129: CU Vehicle Maneuvers							
	Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
►	Movement Essentially Straight	9003	78.53	350469	55.59	1.413*	2630.210
	E Negotiating a Curve	769	6.71	31297	4.96	1.351*	199.908
	E Leaving Main Road	33	0.29	2357	0.37	0.770	-9.859
	Making U-Turn	28	0.24	3314	0.53	0.465*	-32.260
	E Overtaking/Passing	34	0.30	6896	1.09	0.271*	-91.394
	Slowing/Stopping	608	5.30	45250	7.18	0.739*	-214.808
	E Entering Main Road	73	0.64	18188	2.88	0.221*	-257.723
	Turning Right	195	1.70	32794	5.20	0.327*	-401.313
	E Changing Lanes	186	1.62	33911	5.38	0.302*	-430.624
	Backing	105	0.92	31468	4.99	0.184*	-467.202
	Turning Left	430	3.75	74514	11.82	0.317*	-924.933

C129: CU Vehicle Maneuvers

Items with less than 30 crashes were not considered

☐ Sort by Sum of Max Gain



QUESTION:

ESTIMATED SPEED AT IMPACT

True or False:

The proportion of DDED involvement
goes down as drivers
exceed the speed limit.

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
66 to 70 MPH	300	3.74	14712	3.84	0.974	-7.859
71 to 75 MPH	79	0.98	2827	0.74	1.335*	19.843
76 to 80 MPH	70	0.87	1714	0.45	1.952*	34.133
81 to 85 MPH	22	0.27	594	0.15	1.770*	9.570
86 to 90 MPH	9	0.11	436	0.11	0.986	-0.124
91 to 95 MPH	2	0.02	103	0.03	0.928	-0.155
96 to 100 MPH	2	0.02	351	0.09	0.272	-5.345

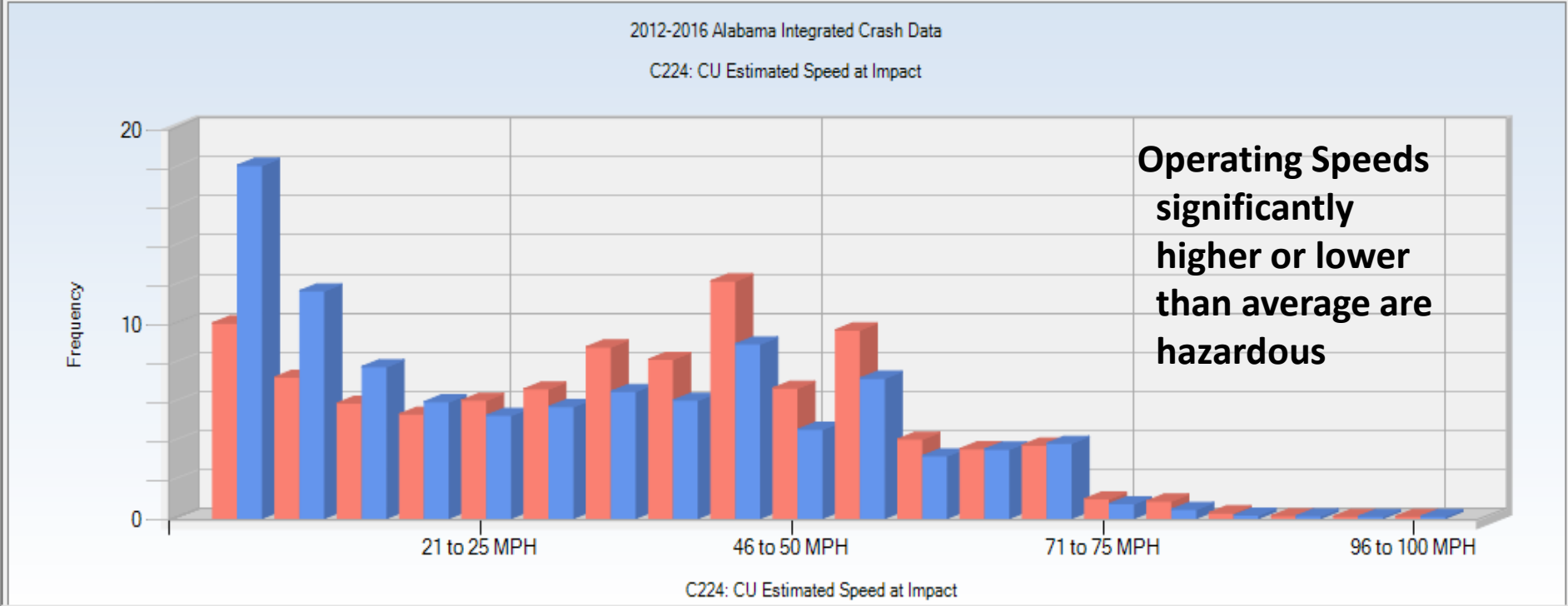
C224: CU Estimated Speed at Impact

FALSE

Potential Cause:

Relatively less pre-crash braking

☐ Sort by Sum of Max Gain



File Dashboard Filters Analysis Crosstab Locations Tools Window Help

2014-2016 Alabama Integrated Crash Data DisD Elec Dev Imp Spd by Spd Limit 1/ 1/2014 9/19/2016 N

Suppress Zero Values: Rows and Columns Select Cells: Column: CU Estimated Speed at Impact ; Row: CU Speed Limit

	36 to 40 MPH	41 to 45 MPH	46 to 50 MPH	51 to 55 MPH	56 to 60 MPH	61 to 65 MPH	66 to 70 MPH	71 to 75 MPH	TOTAL
40 MPH	95 32.09%	20 3.97%	13 4.96%	13 2.76%	5 2.94%	1 0.63%	2 1.32%	0 0.00%	149 7.22%
45 MPH	118 39.86%	360 71.43%	69 26.34%	72 15.29%	49 28.82%	20 12.66%	7 4.64%	0 0.00%	695 33.69%
50 MPH	35 11.82%	32 6.35%	59 22.52%	6 1.27%	5 2.94%	1 0.63%	4 2.65%	1 1.96%	143 6.93%
55 MPH	39 13.18%	81 16.07%	93 35.50%	354 75.16%	55 32.35%	41 25.95%	19 12.58%	10 19.61%	692 33.54%
60 MPH	2 0.68%	2 0.40%	3 1.15%	4 0.85%	18 10.59%	4 2.53%	1 0.66%	3 5.88%	37 1.79%
65 MPH	1 0.34%	4 0.79%	10 3.82%	15 3.18%	25 14.71%	70 44.30%	14 9.27%	8 15.69%	147 7.13%
70 MPH	6 2.03%	5 0.99%	15 5.73%	7 1.49%	13 7.65%	21 13.29%	104 68.87%	29 56.86%	200 9.69%
TOTAL	296 14.35%	504 24.43%	262 12.70%	471 22.83%	170 8.24%	158 7.66%	151 7.32%	51 2.47%	2063 100.00%

Impact Speeds are Highly Correlated to the Speed Limits

See red right on down the diagonal of approximately equal speeds

Potential reasons: (1) not higher because drivers are trying to go with the flow; (2) not lower because drivers caught unaware.

QUESTION:

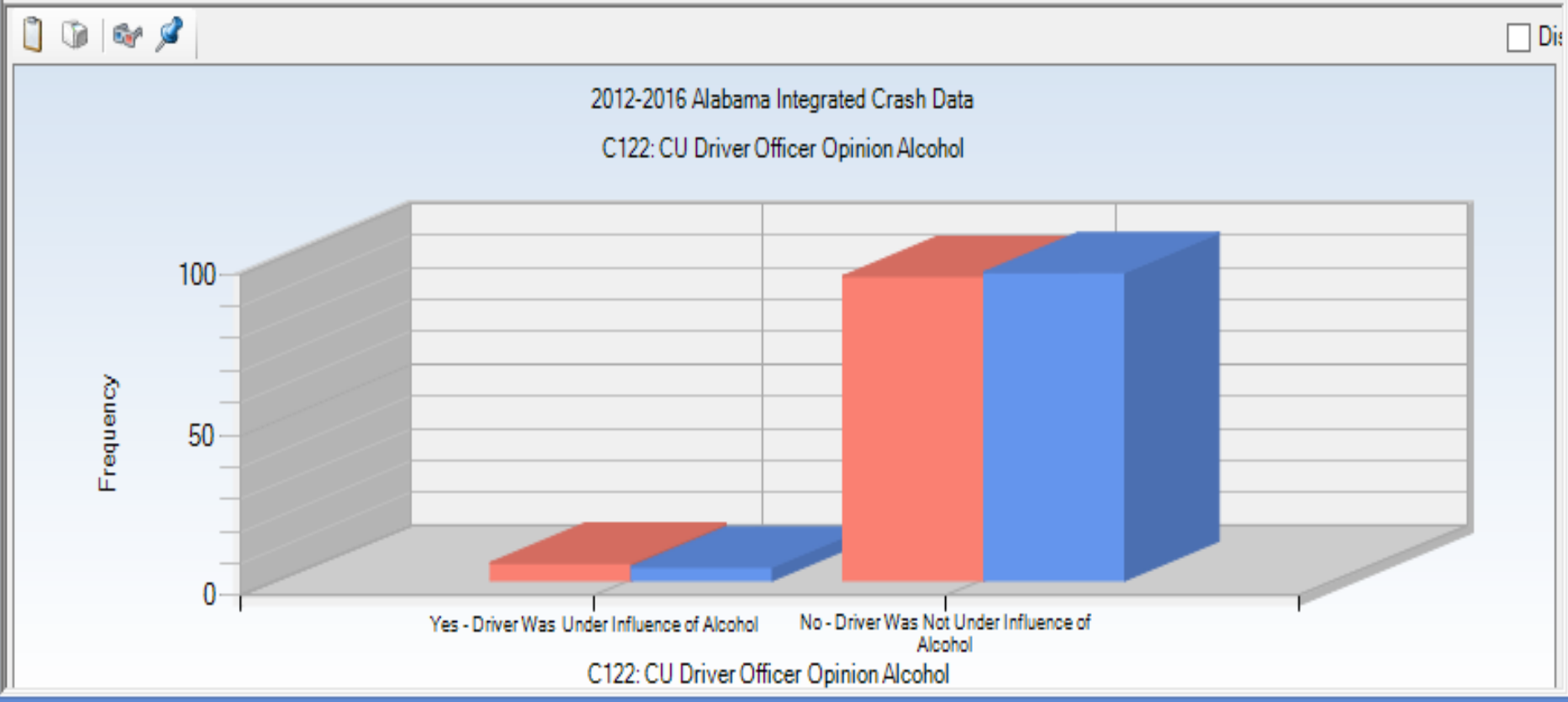
ALCOHOL INVOLVEMENT

True or False:

The proportion of DDED involvement
goes down as drivers
are under the influence of alcohol.

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

C122: CU Driver Officer Opinion Alcohol							C122: CU Driver Officer Opinion Alcohol	
	Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	
▶	Yes - Driver Was Under I...	606	5.42	24874	4.22	1.286*	134.627	False
	No - Driver Was Not Und...	10572	94.58	564981	95.78	0.987*	-134.627	
								<input type="checkbox"/> Sort by Sum of Max Gain



QUESTION:

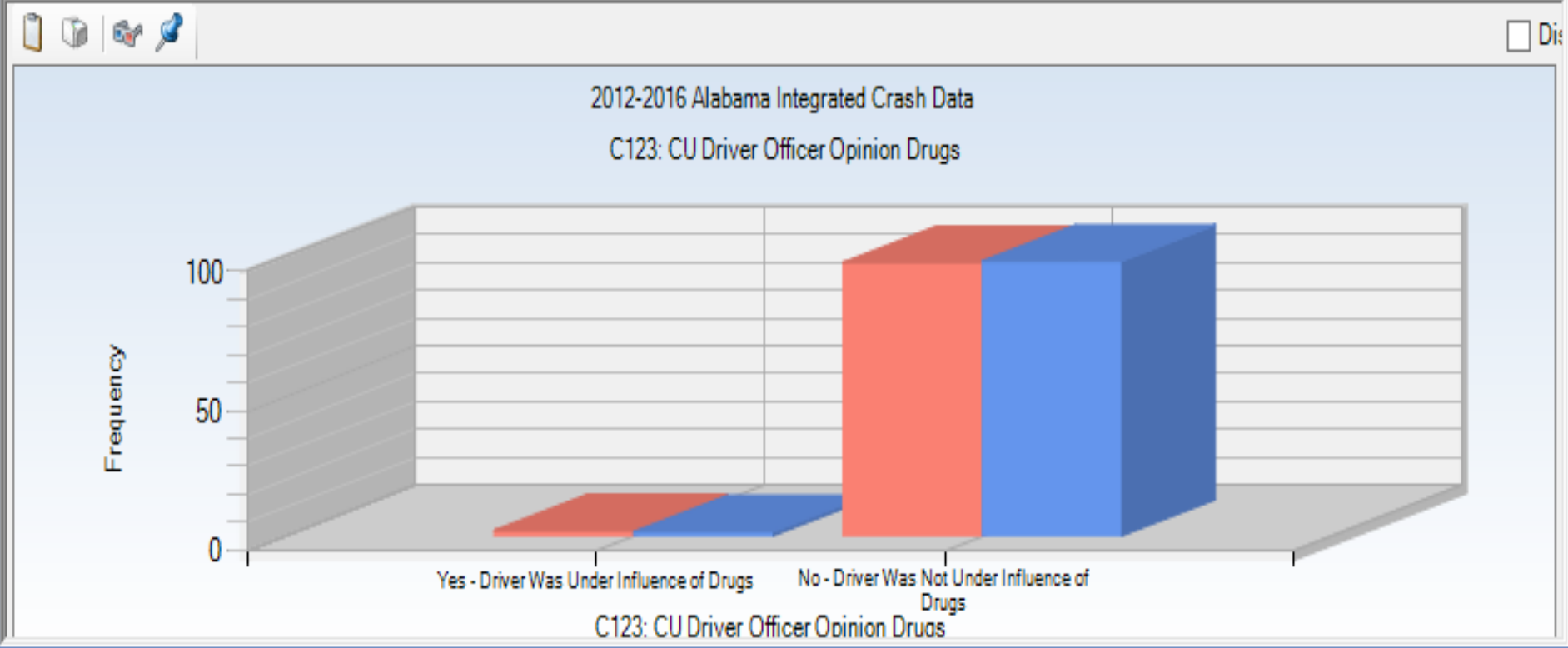
DRUG INVOLVEMENT

True or False:

The proportion of DDED involvement
goes down as drivers
are under the influence of drugs.

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

C123: CU Driver Officer Opinion Drugs							C123: CU Driver Officer Opinion Drugs	
	value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	
▶	Yes - Driver Was Under I...	199	1.81	7614	1.31	1.381*	54.943	False
	No - Driver Was Not Und...	10773	98.19	572302	98.69	0.995*	-54.943	
								<input type="checkbox"/> Sort by Sum of Max Gain



QUESTION:

DRIVER CONDITION

True or False:

While relatively few in number,
the proportion of DDED drivers who are
“Emotional (Distressed, Angry, Disturbed)”
is almost three times
that of non-DDED drivers.

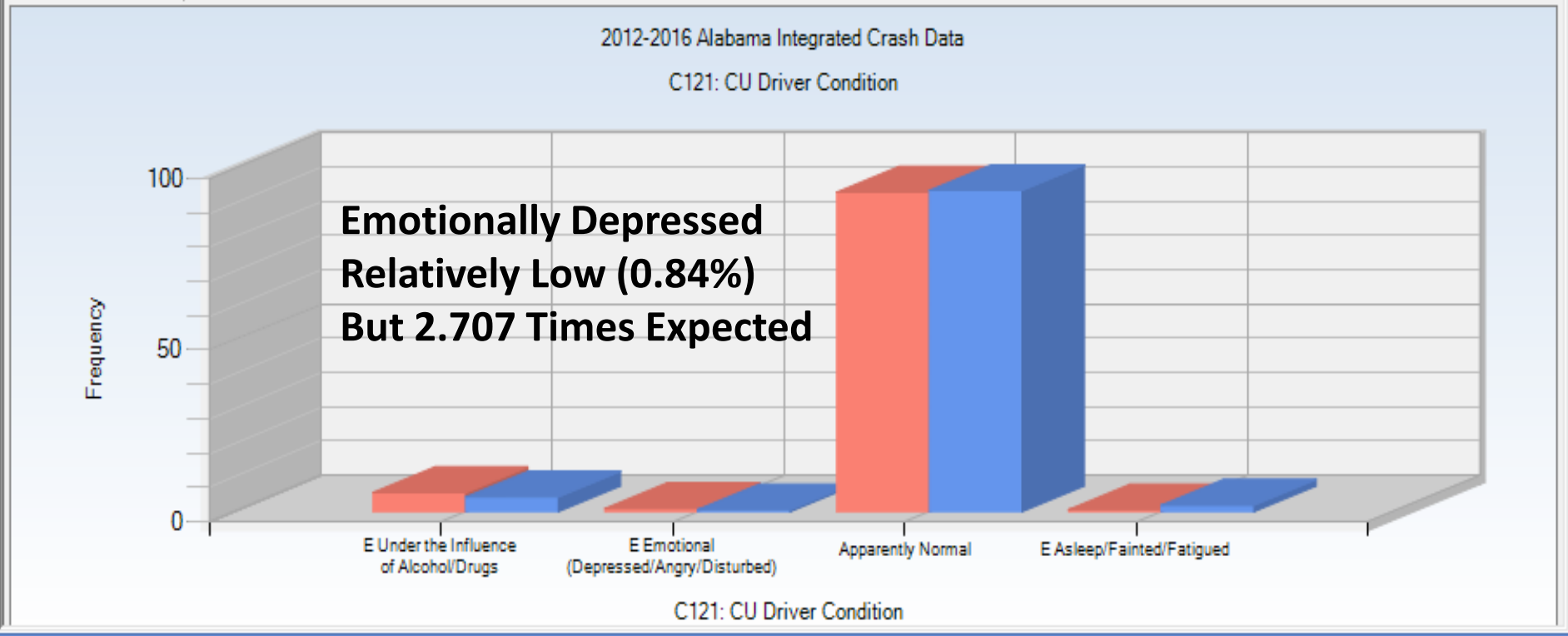
Order: Max Gain Descending ☒ Suppress Zero-Valued Rows Significance: Over Representation Threshold: 2.0

C121: CU Driver Condition		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
▶	E Under the Influence of Alcohol/Drugs	622	5.55	25052	4.25	1.307*	146.056
	E Emotional (Depressed/Angry/Disturbed)	94	0.84	1828	0.31	2.707*	59.271
	Apparently Normal	10434	93.07	552412	93.61	0.994	-60.861
	E Asleep/Fainted/Fatigued	61	0.54	10815	1.83	0.297*	-144.466

C121: CU Driver Condition

← **TRUE = 2.707**

☐ Sort by Sum of Max Gain



QUESTION:

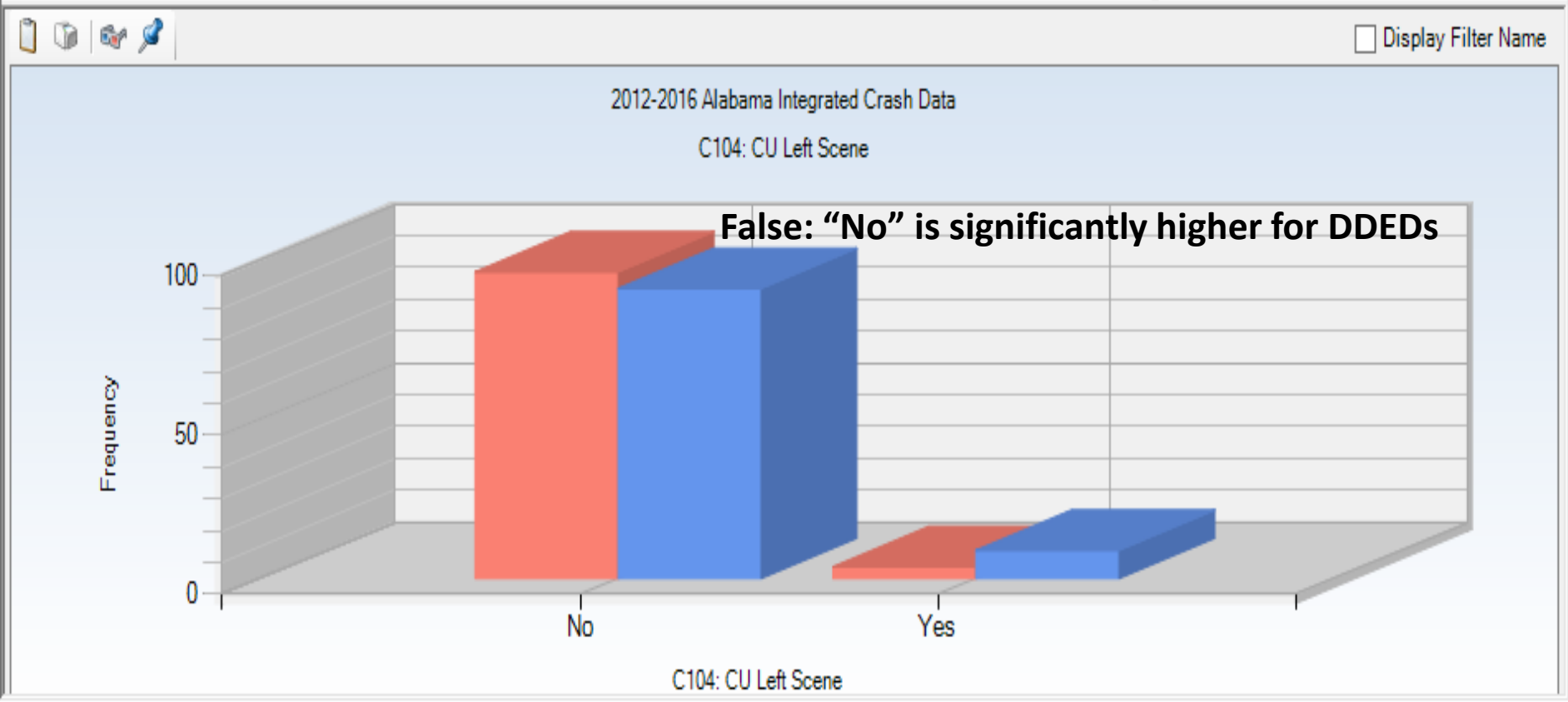
LEFT THE SCENE

True or False:

Causal drivers who are DDED
have a greater tendency to
leave the scene of the crash.

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

C104: CU Left Scene							C104: CU Left Scene	
	Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	
▶	No	11279	96.43	602725	91.18	1.057*	613.100	<input type="checkbox"/> Sort by Sum of Max Gain
	Yes	418	3.57	58267	8.82	0.405*	-613.100	



QUESTION:

WEATHER

True or False:

The data indicates that people tend to use their cell phones and text as much in rainy weather as in clear weather.

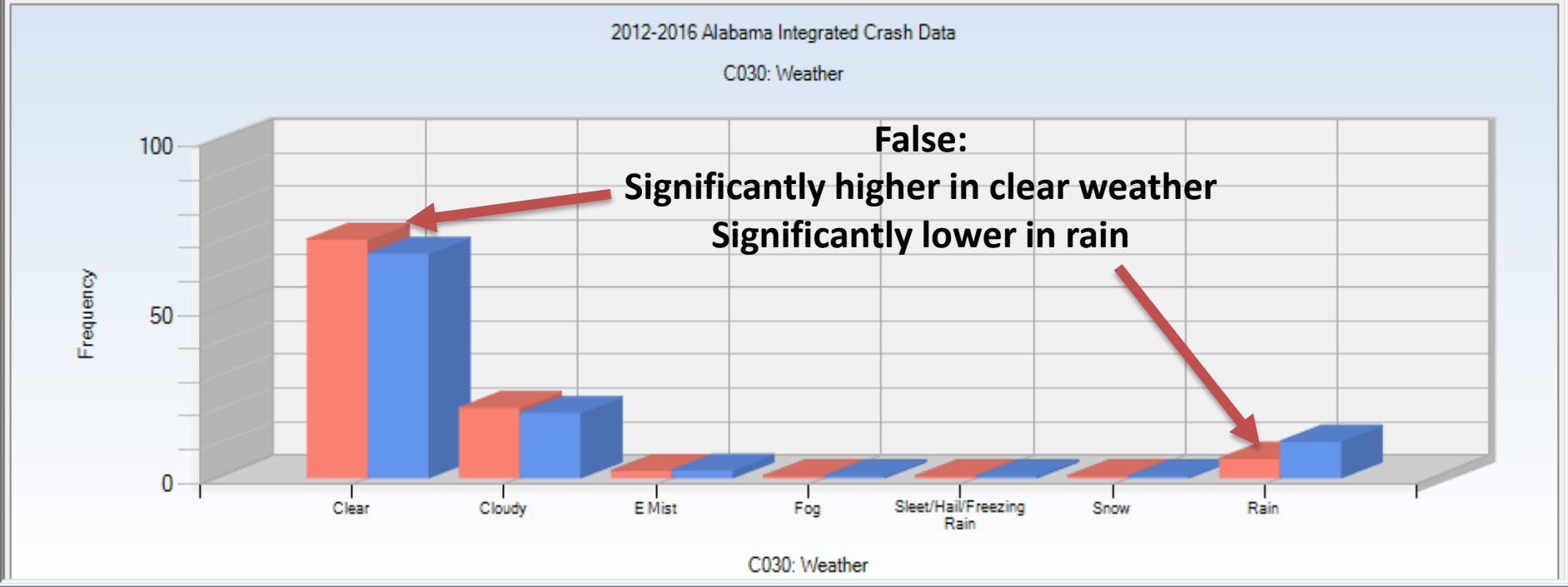
Order: Max Gain Descending ☒ Suppress Zero-Valued Rows Significance: Over Representation Threshold: 2.0

C030: Weather	Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
	Clear	8321	70.89	453842	66.66	1.063*	495.954
	Cloudy	2442	20.80	131543	19.32	1.077*	173.964
	E Mist	248	2.11	15370	2.26	0.936	-17.006
	Fog	42	0.36	3457	0.51	0.705	-17.605
	Sleet/Hail/Freezing Rain	3	0.03	1216	0.18	0.143	-17.966
	Snow	7	0.06	1491	0.22	0.272	-18.708
	Rain	675	5.75	73764	10.84	0.531*	-596.823

C030: Weather

Drivers Tend to Put Away Distractions in Situations Requiring Greater Attention

☐ Sort by Sum of Max Gain



General Data Category

Driver Demographics

QUESTION:

AGE OF CAUSAL DRIVERS

True or False:

Causal Drivers aged 18 and 19 are obviously
the worst DDED offenders
from a crash proportion point of view.

QUESTION:

AGE OF CAUSAL DRIVERS

True or False:

All causal drivers 43 and above
have less than expected DDED involvement
from a crash proportion point of view.

FileDashboardFiltersAnalysisImpactLocationsToolsWindowHelp

2012-2016 Alabama Integrated Crash DataDDED ElecDevice C15-20-2021/ 1/201212/31/2016Number Killed NC

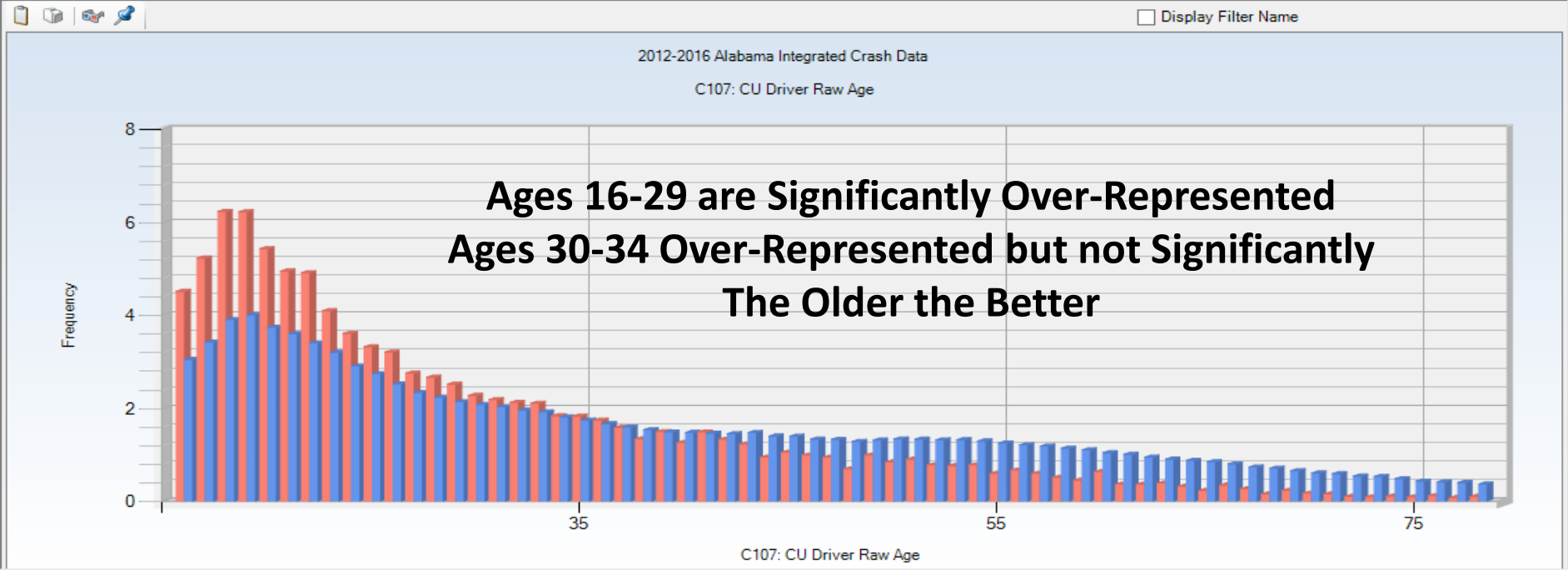
Order: Max GainDescending☒ Suppress Zero-Valued RowsSignificance: Over RepresentationThreshold: 2.0

C107: CU Driver Raw Age						
	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
16	517	4.51	18071	3.04	1.482*	168.072
17	599	5.23	20307	3.42	1.528*	206.898
18	714	6.23	23163	3.90	1.596*	266.752
19	713	6.22	23760	4.00	1.554*	254.225
20	622	5.43	22185	3.74	1.452*	193.636
21	567	4.95	21358	3.60	1.375*	154.604
22	563	4.91	20169	3.40	1.446*	173.562
23	469	4.09	18981	3.20	1.280*	102.501
24	413	3.60	17239	2.90	1.241*	80.137
25	380	3.31	16249	2.74	1.211*	66.252
26	367	3.20	14943	2.52	1.272*	78.470
27	315	2.75	13851	2.33	1.178*	47.555
28	305	2.66	13231	2.23	1.194*	49.526
29	288	2.51	12670	2.13	1.177*	43.358
30	260	2.27	12318	2.07	1.093	22.155

C107: CU Driver Raw Age

TRUE

☐ Sort by Sum of Max Gain



QUESTION:

DDDED CAUSAL DRIVER GENDER

True or False:

From a relative proportion point of view
female drivers have a larger problem
with DDED than do male drivers.

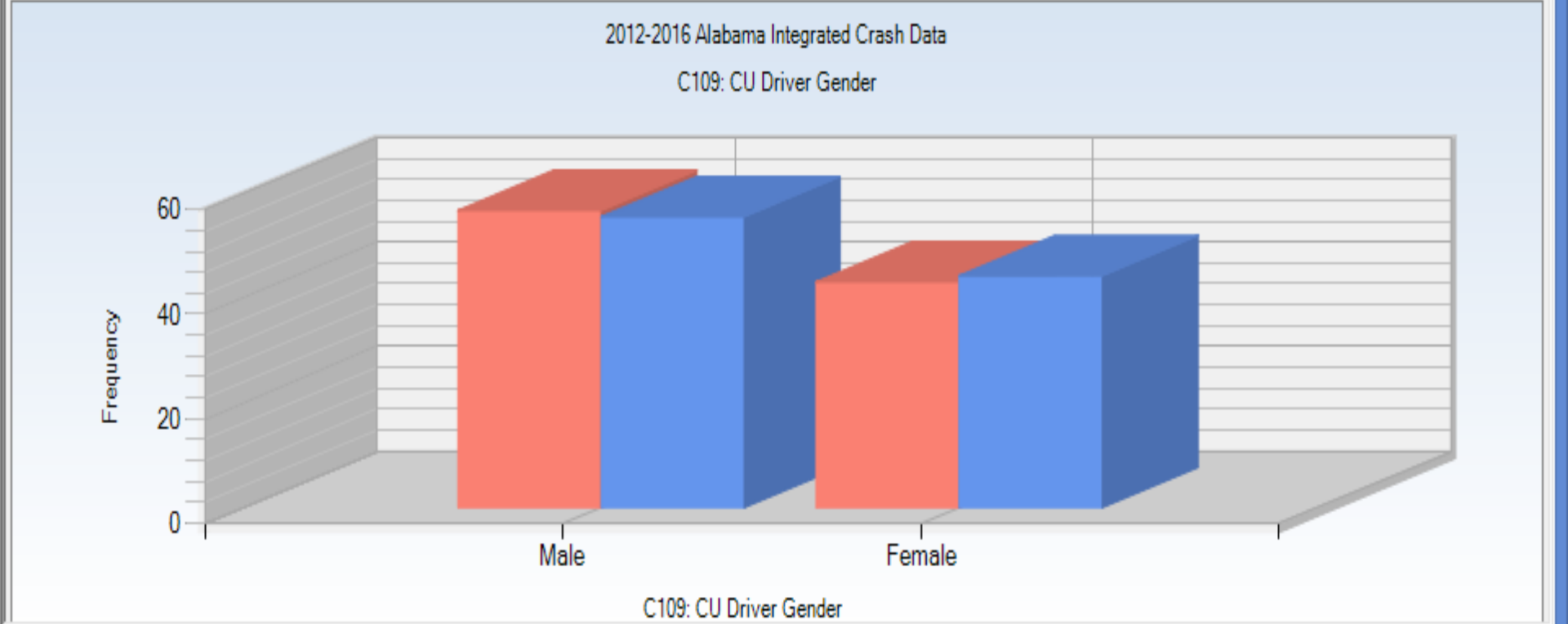
Order: Max Gain Descending ☒ Suppress Zero-Valued Rows Significance: Over Representation Threshold: 2.0

C109: CU Driver Gender		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Male		6574	56.84	344076	55.64	1.022*	138.690
Female		4992	43.16	274322	44.36	0.973*	-138.690

C109: CU Driver Gender

FALSE

☐ Sort by Sum of Max Gain



QUESTION:

DISTANCE FROM HOME

True or False:

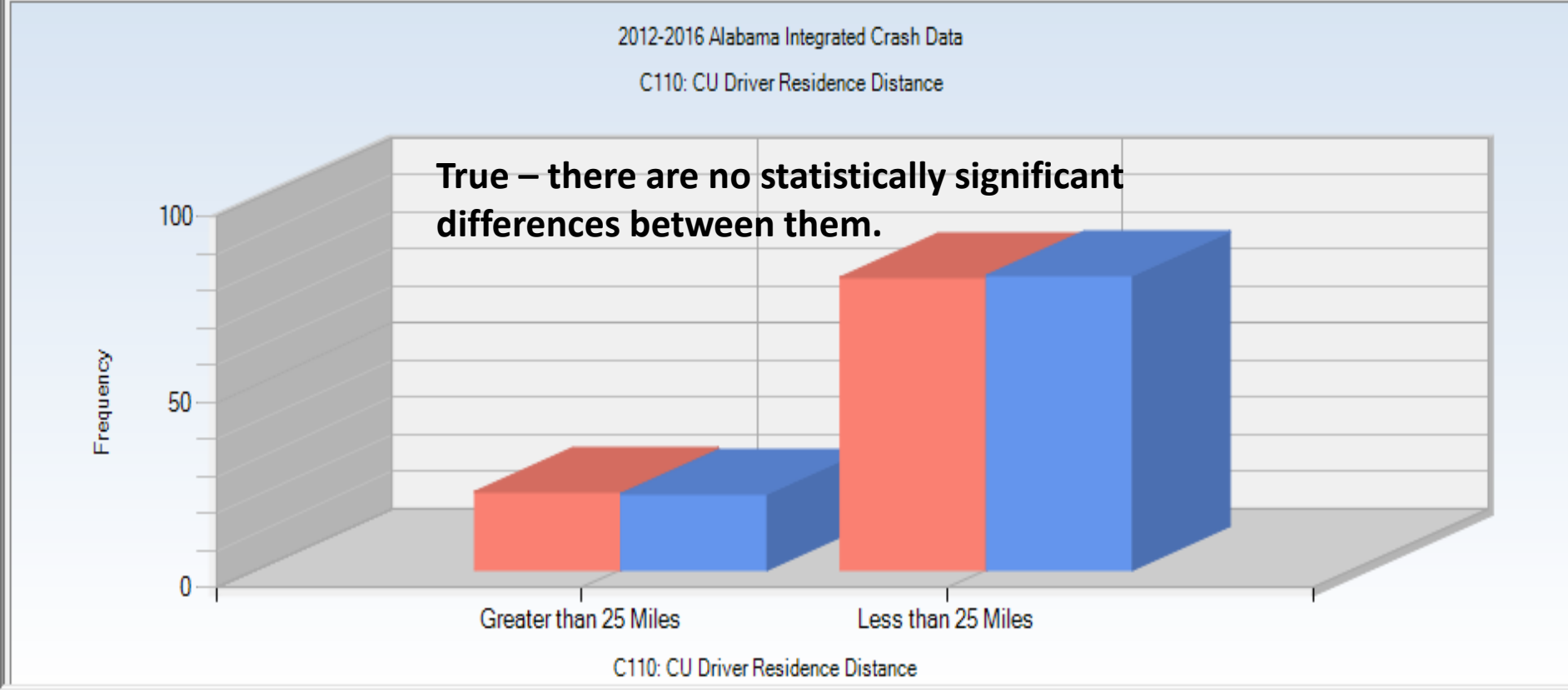
Those further away from home have relatively the same problem with DDED as those closer to home.

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

C110: CU Driver Residence Distance	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
Greater than 25 Miles	2399	21.09	124190	20.57	1.026	59.696
Less than 25 Miles	8976	78.91	479691	79.43	0.993	-59.696

C110: CU Driver Residence Distance

☐ Sort by Sum of Max Gain



General Data Category

Geographical Characteristics

QUESTION:

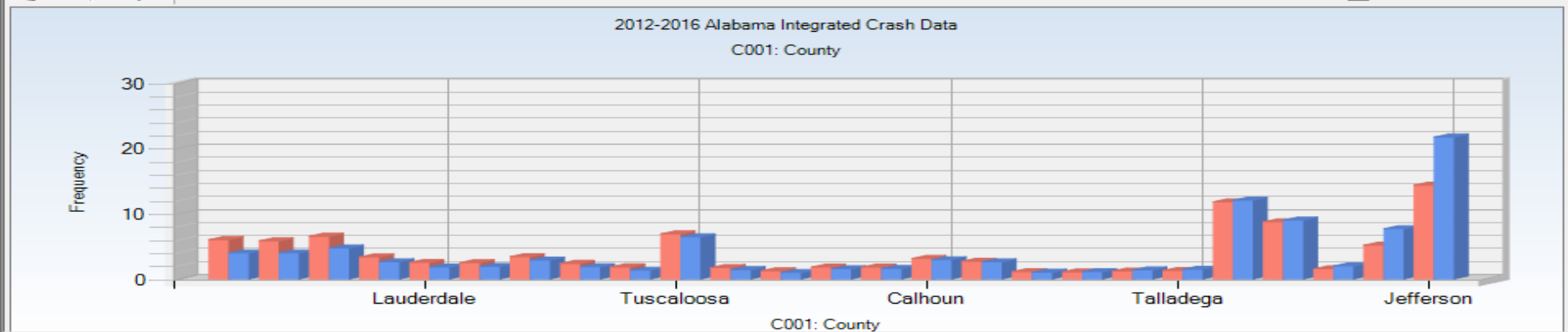
COUNTIES

True or False:

The most under-represented areas
for DDED caused crashes
tend to be those counties that
include our largest cities.

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
Baldwin	600	6.02	23409	3.98	1.514*	203.660
Lee	580	5.82	23459	3.99	1.460*	182.813
Shelby	652	6.54	27777	4.72	1.386*	181.705
Morgan	334	3.35	15385	2.61	1.282*	73.515
Lauderdale	252	2.53	10749	1.83	1.385*	70.008
Marshall	248	2.49	11294	1.92	1.297*	56.780
Houston	340	3.41	16919	2.88	1.187*	53.543
Cullman	236	2.37	10844	1.84	1.285*	52.399
Walker	183	1.84	7874	1.34	1.373*	49.685
Tuscaloosa	687	6.90	37925	6.44	1.070	44.888
Limestone	174	1.75	8225	1.40	1.249*	34.742
Coffee	123	1.23	5701	0.97	1.274*	26.476
St Clair	179	1.80	9034	1.54	1.170	26.045
Elmore	179	1.80	9284	1.58	1.139	21.812
Calhoun	311	3.12	17242	2.93	1.065	19.074
Etowah	270	2.71	15322	2.60	1.041	10.582
Dekalb	110	1.10	5994	1.02	1.084	8.515
Autauga	108	1.08	6534	1.11	0.976	-2.628
Colbert	121	1.21	8069	1.37	0.886	-15.617
Talladega	128	1.28	8690	1.48	0.870	-19.131
Mobile	1177	11.81	70984	12.06	0.979	-24.837
Madison	871	8.74	52989	9.00	0.971	-26.162
Russell	153	1.54	11696	1.99	0.773*	-45.026
Montgomery	515	5.17	45229	7.69	0.673*	-250.776
Jefferson	1432	14.37	127816	21.72	0.662*	-732.065

☐ Sort by Sum of Max Gain☐ Display Filter Name

QUESTION:

RURAL/URBAN

True or False:

DDDED caused crashes are over-represented
in urban areas.

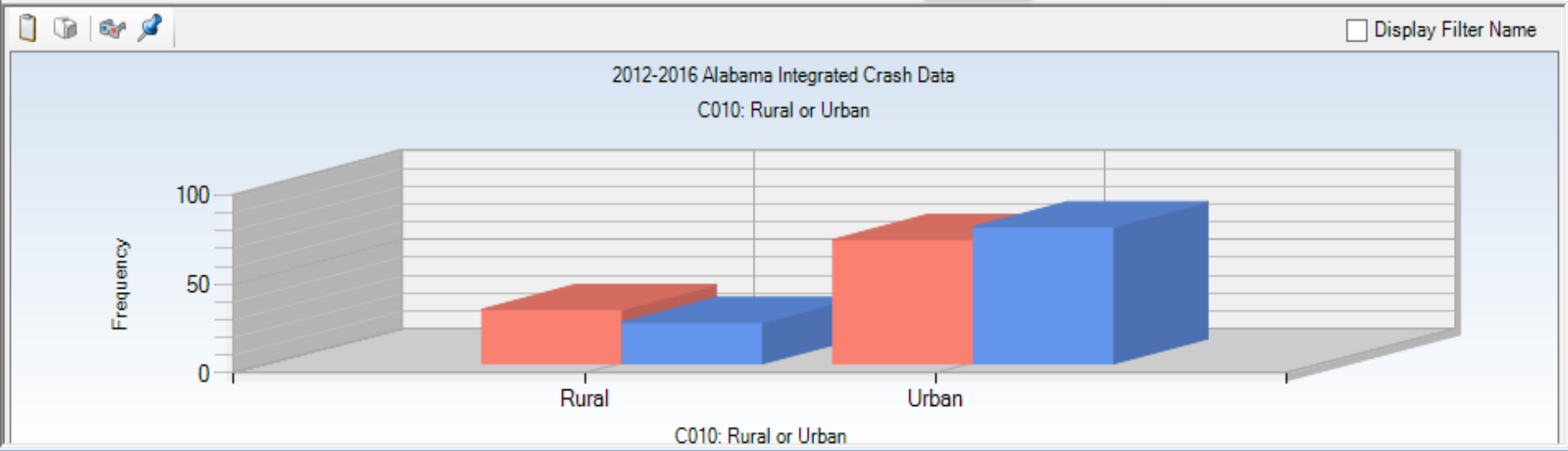
File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data DDED ElecDevice C15-20-202 1/ 1/2012 12/31/2016

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

C010: Rural or Urban		Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
	Rural	3571	30.39	157843	23.11	1.315*	855.478
	Urban	8179	69.61	525140	76.89	0.905*	-855.478

C008: Time of Day
C009: Data Source
C010: Rural or Urban
C011: Highway Classifications
☐ Sort by Sum of Max Gain



The significant (31.8% higher than expected) rural DDED crash frequency indicates that the higher speeds on rural roadways are less forgiving than is DDED in urban areas.

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

File Dashboard Filters Analysis Crosstab Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data DDED ElecDevice C15-20-202

Suppress Zero Values: None Select Cells: Column: Crash Severity ; Row: Rural or Urban

	Fatal Injury	Incapacitating Injury	Non-Incapacitating Inju	Possible Injury	Property Damage Only	Unknown	TOTAL
Rural	48 64.86%	386 64.23%	596 46.89%	241 20.00%	2292 27.34%	8 3.70%	3571 30.39%
Urban	26 35.14%	215 35.77%	675 53.11%	964 80.00%	6091 72.66%	208 96.30%	8179 69.61%
TOTAL	74 0.63%	601 5.11%	1271 10.82%	1205 10.26%	8383 71.34%	216 1.84%	11750 100.00%

Probability of a DDED Crash being Fatal:

- Rural = $48/3571 = 1.34\% = 1$ in 74
- Urban = $26/8179 = 0.32\% = 1$ in 315
- Crash being fatal in rural area is over four times more likely
- increased probabilities also with the higher injury severities

QUESTION:

LOCALE

True or False:

Of all of the locale types, drivers seem to put their electronic devices aside most in Business/Shopping areas.

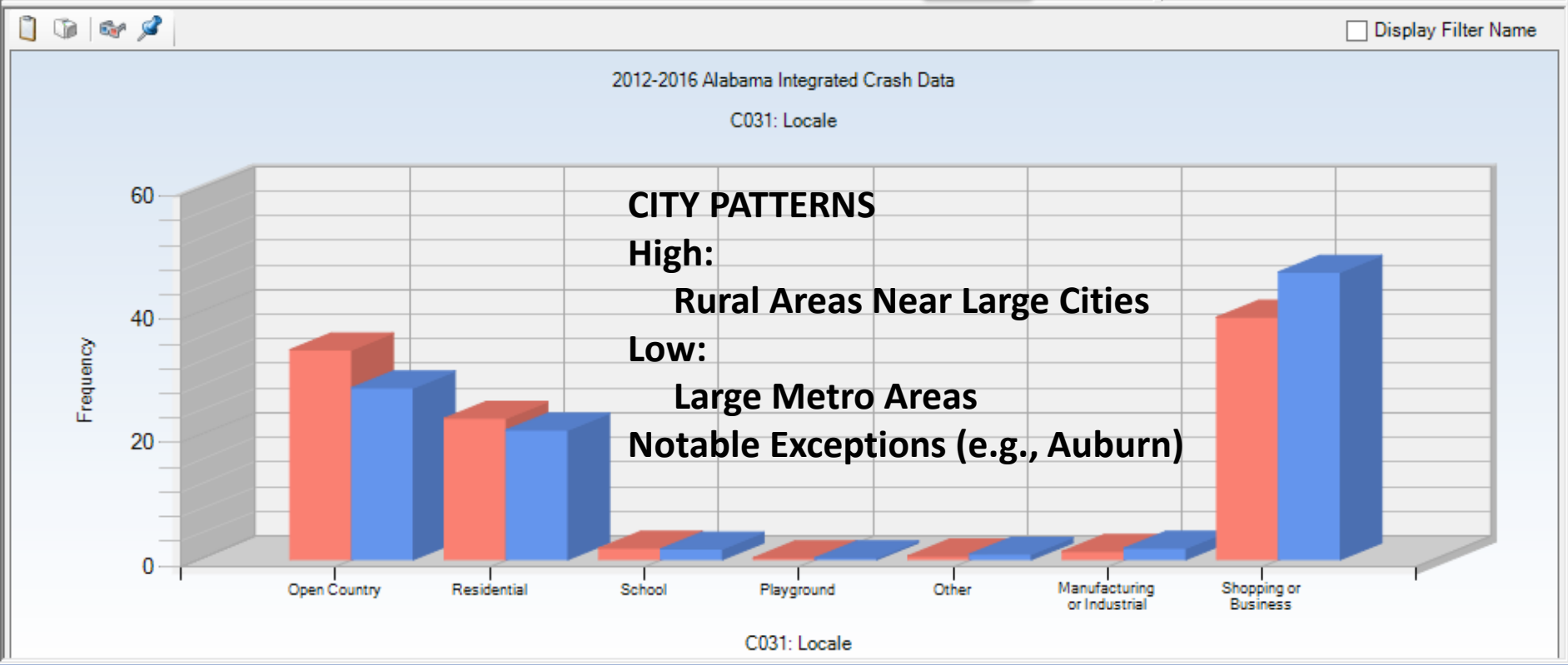
File Dashboard Filters Analysis Impact Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data DDED ElecDevice C15-20-202 1/ 1/2012 12/31/2016

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

C031: Locale	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	C030: Weather
Open Country	4001	34.05	189890	27.86	1.222*	727.284	C031: Locale
Residential	2691	22.90	143277	21.02	1.089*	220.895	C032: E Police Present at Time of Crash
School	214	1.82	11695	1.72	1.061	12.377	C033: Police Notification Delay
Playground	5	0.04	262	0.04	1.107	0.483	C034: Police Arrival Delay
Other	66	0.56	5910	0.87	0.648*	-35.889	C035: EMS Arrival Delay
Manufacturing or Industrial	152	1.29	12401	1.82	0.711*	-61.794	C036: Adjusted EMS Arrival Delay
Shopping or Business	4621	39.33	318117	46.68	0.843*	-863.357	C037: Non-Vehicular Property Damage

C040: Agency ORI
C042: Highway Patrol Troops
☐ Sort by Sum of Max Gain



QUESTION:

ROADWAY CLASSIFICATIONS

True or False:

Interstate highways had more
DDED-caused crashes than county roads.

File Dashboard Filters Analysis Impact Locations Tools Window Help

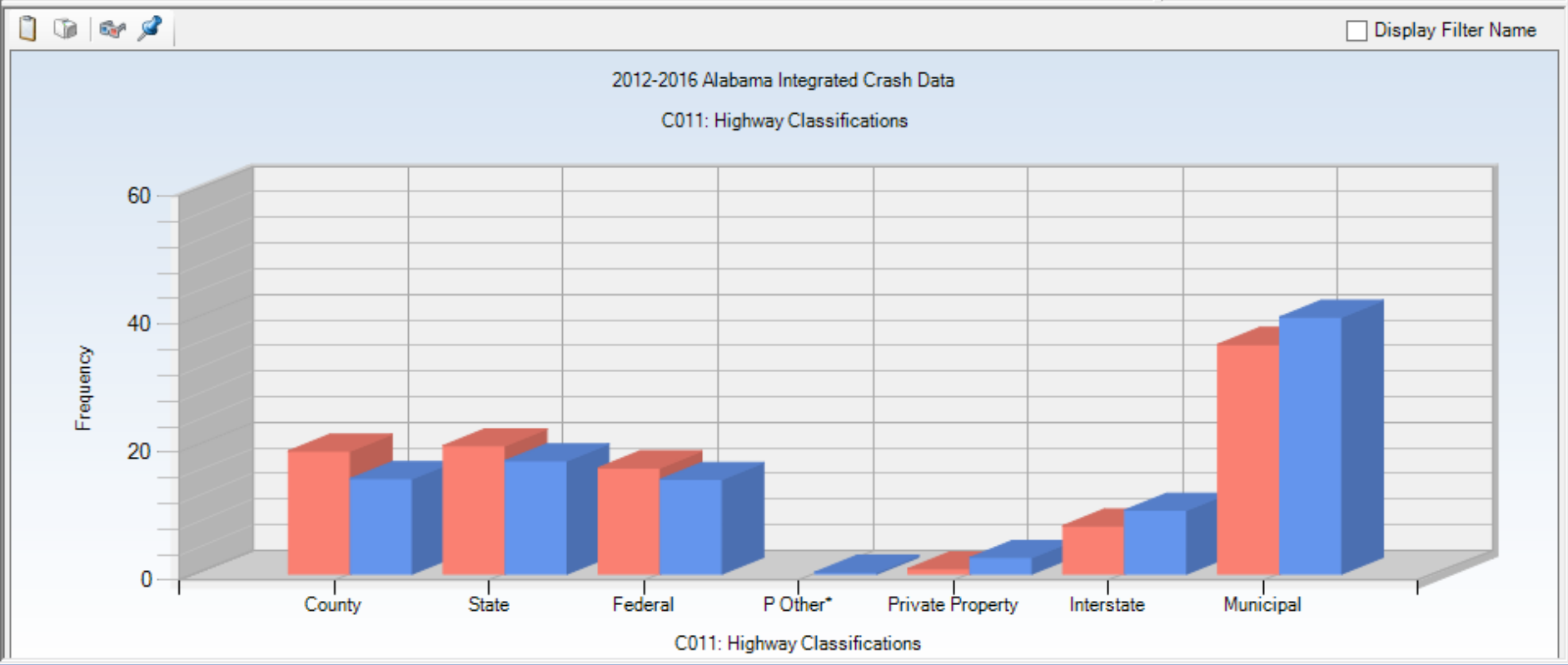
2012-2016 Alabama Integrated Crash Data DDED ElecDevice C15-20-202 1/ 1/2012 12/31/2016

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

C011: Highway Classifications							
Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	
County	2256	19.20	101625	14.88	1.290*	507.649	
State	2355	20.04	120927	17.71	1.132*	274.579	
Federal	1948	16.58	100868	14.77	1.123*	212.673	
P Other*	0	0.00	21	0.00	0.000	0.000	
Private Property	94	0.80	17384	2.55	0.314*	-205.073	
Interstate	883	7.51	68031	9.96	0.754*	-287.401	
Municipal	4214	35.86	274127	40.14	0.894*	-502.065	

C008: Time of Day
C009: Data Source
C010: Rural or Urban
C011: Highway Classifications
C012: Controlled Access
C013: E Highway Side
C015: Primary Contributing Circumstance
C016: Primary Contributing Unit Number
C017: First Harmful Event
C018: Location First Harmful Event Relative to Highway

☐ Sort by Sum of Max Gain



Roadway Classifications

- Roadway classifications are consistent
 - With Urban-Rural and Locale results
 - Exception of under-represented Interstates
- All other rural roads are over-represented
- County roads greatest odds ratio/MaxGain
- State & Federal comparable w/ each other
- C412: two-lane significantly over-represented
 - 3698 crashes = over 52% of the crashes
 - Validates county road over-representation
- All other lane numbers were under-represented
- Second most frequent was 4-lane

General Data Category

Time Factors

QUESTION:

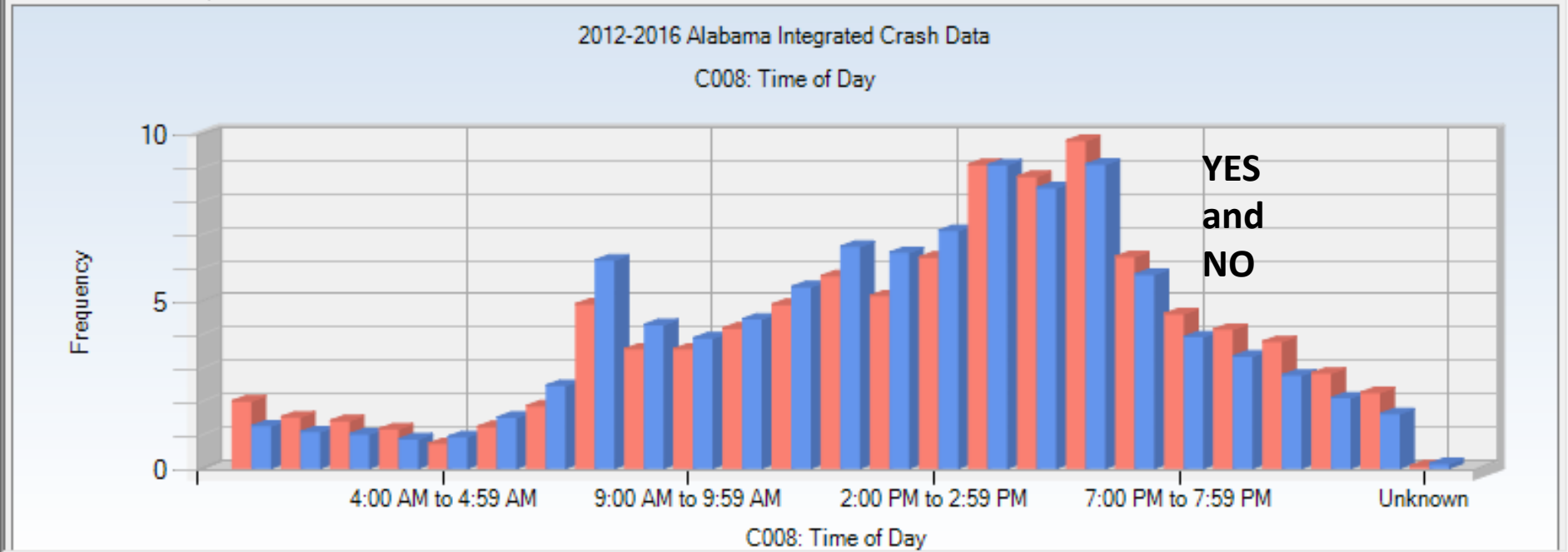
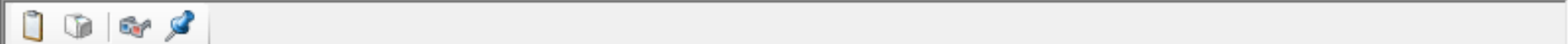
TIME OF CRASH

True or False:

Compared proportionally to non-DDED,
rush hours appear to be the worst times
for DDED-caused crashes

C008: Time of Day							
Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	
12:00 Midnight to 12:59 AM	236	2.01	8629	1.26	1.590*	87.547	
1:00 AM to 1:59 AM	180	1.53	7424	1.09	1.409*	52.278	
2:00 AM to 2:59 AM	167	1.42	6969	1.02	1.393*	47.106	
3:00 AM to 3:59 AM	138	1.17	5974	0.87	1.343*	35.224	
4:00 AM to 4:59 AM	86	0.73	6435	0.94	0.777*	-24.707	
5:00 AM to 5:59 AM	146	1.24	10379	1.52	0.818*	-32.560	

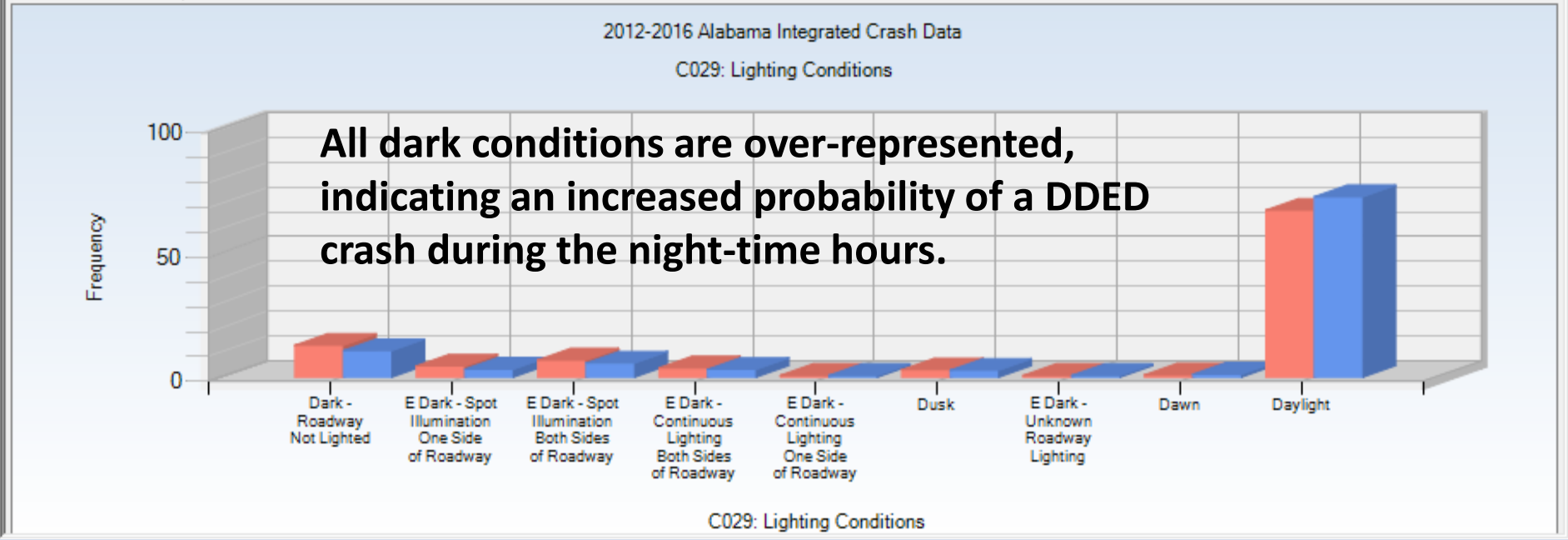
- C005: Day of Month
 - C006: Day of the Week
 - C007: Week of the Year
 - C008: Time of Day
 - C009: Data Source
 - C010: Rural or Urban
 - C011: Highway Classifications
 - C012: Controlled Access
- ☐ Sort by Sum of Max Gain



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

C029: Lighting Conditions							
	Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
▶	Dark - Roadway Not Lighted	1502	12.82	72322	10.69	1.200*	249.952
	E Dark - Spot Illumination On...	524	4.47	21541	3.18	1.405*	151.079
	E Dark - Spot Illumination Bo...	805	6.87	38282	5.66	1.215*	142.257
	E Dark - Continuous Lighting...	435	3.71	20979	3.10	1.198*	71.809
	E Dark - Continuous Lighting...	86	0.73	3341	0.49	1.487*	28.160
	Dusk	344	2.94	18673	2.76	1.064	20.731
	E Dark - Unknown Roadway...	40	0.34	2056	0.30	1.124	4.406
	Dawn	105	0.90	7959	1.18	0.762*	-32.787
	Daylight	7871	67.20	491367	72.63	0.925*	-635.608

☐ Sort by Sum of Max Gain



QUESTION:

DAY OF THE WEEK

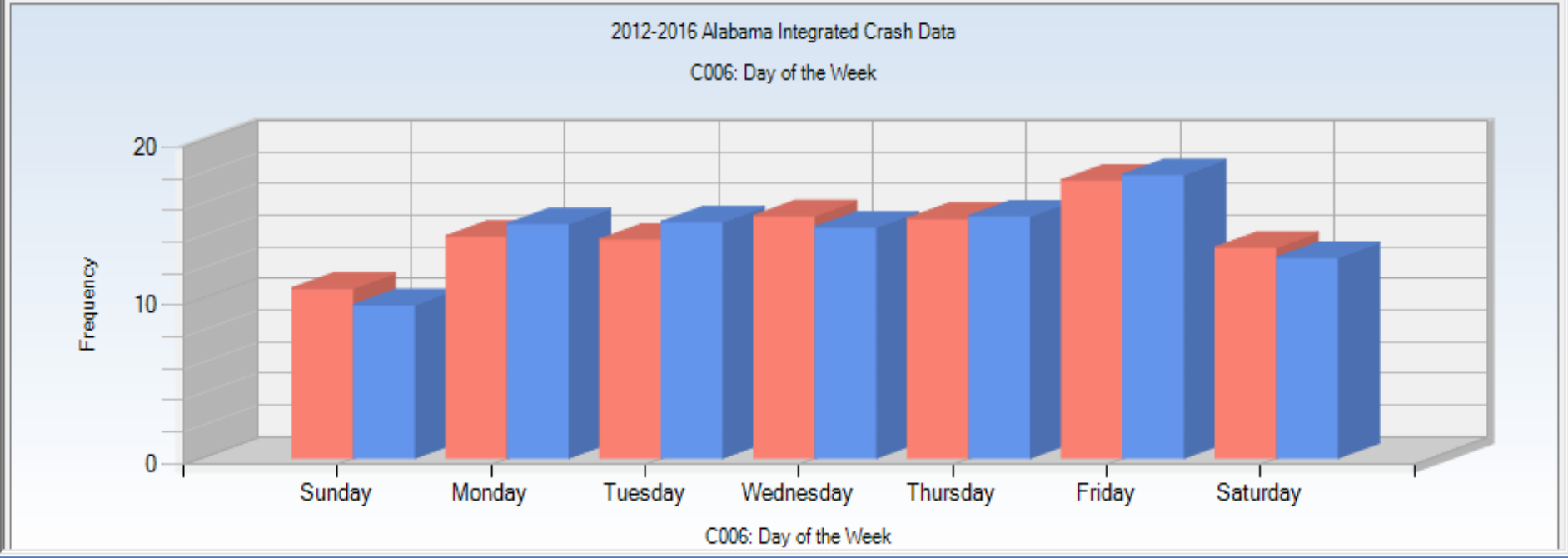
True or False:

The only day that has a statistically significant greater proportion of DDED caused crashes is Sunday

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	1262	10.74	66212	9.69	1.108*	122.893
	Monday	1649	14.03	101225	14.82	0.947*	-92.469
	Tuesday	1626	13.84	102027	14.94	0.926*	-129.267
	Wednesday	1801	15.33	99775	14.61	1.049	84.477
	Thursday	1781	15.16	104581	15.31	0.990	-18.205
	Friday	2065	17.57	122485	17.93	0.980	-42.225
	Saturday	1566	13.33	86678	12.69	1.050	74.797

- C005: Day of Month
- C006: Day of the Week
- C007: Week of the Year
- C008: Time of Day
- C009: Data Source
- C010: Rural or Urban
- C011: Highway Classifications
- C012: Controlled Access
- C013: E Highway Side
- C015: Primary Contributing Circumstances
- ☐ Sort by Sum of Max Gain



QUESTION:

TIME-OF-DAY BY DAY-OF-THE-WEEK

True or False:

The time-of-day by day-of-the-week
distribution for DDED crashes is
almost identical to that of DUI crashes

File Dashboard Filters Analysis Crosstab Locations Tools Window Help

2012-2016 Alabama Integrated Crash Data DDED ElecDevice C15-20-202 1/ 1/2012 12/31/2016

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

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	TOTAL
12:00 Midnight to 12:59 AM	63 4.99%	23 1.52%	22 1.41%	23 1.21%	18 0.90%	39 2.01%	50 3.19%	236 2.01%
1:00 AM to 1:59 AM	52 4.12%	9 0.55%	12 0.74%	15 0.83%	18 1.01%	23 1.11%	51 3.26%	180 1.53%
2:00 AM to 2:59 AM	57 4.52%	14 0.85%	10 0.56%	10 0.56%	27 1.31%	27 1.31%	40 2.55%	167 1.42%
3:00 AM to 3:59 AM	46 3.65%	9 0.55%	9 0.56%	10 0.56%	11 0.56%	18 0.87%	35 2.23%	138 1.17%
4:00 AM to 4:59 AM	23 1.82%	5 0.30%	11 0.74%	11 0.56%	8 0.62%	8 0.39%	17 1.09%	86 0.73%
5:00 AM to 5:59 AM	21 1.66%	17 1.03%	17 1.05%	25 1.39%	20 1.12%	22 1.07%	24 1.53%	146 1.24%
6:00 AM to 6:59 AM	19 1.51%	38 2.30%	37 2.28%	36 2.00%	39 2.19%	28 1.36%	22 1.40%	219 1.86%
7:00 AM to 7:59 AM	13 1.03%	94 5.70%	113 6.95%	110 6.11%	120 6.74%	98 4.75%	29 1.85%	577 4.91%
8:00 AM to 8:59 AM	30 2.38%	69 4.18%	66 4.06%	73 4.05%	73 4.10%	66 3.20%	42 2.68%	419 3.57%
9:00 AM to 9:59 AM	29 2.30%	58 3.52%	72 4.43%	58 3.22%	66 3.71%	71 3.44%	65 4.15%	419 3.57%
10:00 AM to 10:59 AM	52 4.12%	86 5.22%	58 3.57%	85 4.72%	69 3.87%	71 3.44%	71 4.53%	492 4.19%
11:00 AM to 11:59 AM	42 3.33%	94 5.70%	89 5.47%	76 4.22%	89 5.00%	106 5.13%	80 5.11%	576 4.90%
12:00 Noon to 12:59 PM	87 6.89%	105 6.37%	84 5.17%	90 5.00%	94 5.28%	116 5.62%	100 6.39%	676 5.75%
1:00 PM to 1:59 PM	79 6.26%	97 5.88%	73 4.49%	80 4.44%	88 4.94%	108 5.23%	81 5.17%	606 5.16%
2:00 PM to 2:59 PM	72 5.71%	89 5.40%	103 6.33%	123 6.83%	108 6.06%	132 6.39%	115 7.34%	742 6.31%
3:00 PM to 3:59 PM	86 6.81%	169 10.25%	158 9.72%	171 9.49%	174 9.77%	212 10.27%	98 6.26%	1068 9.09%
4:00 PM to 4:59 PM	81 6.42%	145 8.79%	140 8.61%	175 9.72%	160 8.98%	215 10.41%	110 7.02%	1026 8.73%
5:00 PM to 5:59 PM	91 7.21%	165 10.01%	212 13.04%	200 11.10%	205 11.51%	189 9.15%	90 5.75%	1152 9.80%
6:00 PM to 6:59 PM	85 6.74%	95 5.76%	106 6.52%	129 7.16%	119 6.68%	133 6.44%	77 4.92%	744 6.33%
7:00 PM to 7:59 PM	76 6.02%	79 4.79%	59 3.63%	83 4.61%	78 4.38%	100 4.84%	68 4.34%	543 4.62%
8:00 PM to 8:59 PM	57 4.52%	68 4.12%	47 2.89%	82 4.55%	62 3.48%	89 4.31%	83 5.30%	488 4.15%
9:00 PM to 9:59 PM	37 2.93%	64 3.88%	67 4.12%	73 4.05%	60 3.37%	66 3.20%	78 4.98%	445 3.79%
10:00 PM to 10:59 PM	40 3.17%	34 2.06%	39 2.40%	36 2.00%	54 3.03%	67 3.24%	64 4.09%	334 2.84%
11:00 PM to 11:59 PM	23 1.82%	20 1.21%	22 1.35%	28 1.55%	35 1.97%	65 3.15%	73 4.66%	266 2.26%
Unknown	1 0.08%	1 0.06%	0 0.00%	0 0.00%	0 0.00%	0 0.00%	3 0.19%	5 0.04%
TOTAL	1262 10.74%	1649 14.03%	1626 13.84%	1801 15.33%	1781 15.16%	2065 17.57%	1566 13.33%	11750 100.00%

Time-of-Day & Day-of-the-Week
both suggest a correlation
with Impaired Driving

General Data Category

Crash Characteristics

QUESTION:

MANNER OF CRASH

True or False:

The majority of DDED caused crashes
were rear-end collisions.

FileDashboardFiltersAnalysisImpactLocationsToolsWindowHelp

2012-2016 Alabama Integrated Crash DataDDED ElecDevice C15-20-2021/ 1/201212/31/2016Number Killed NC

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

C023: E Manner of Crash						
	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
▶ Rear End (front to rear)	6037	51.38	236714	34.66	1.482*	1964.586
Single Vehicle Crash (all types)	3157	26.87	138611	20.29	1.324*	772.344
Head-On (front to front only)	282	2.40	13050	1.91	1.256*	57.489
Sideswipe - Opposite Direction	198	1.69	11050	1.62	1.042	7.896
Record from Paper System	0	0.00	27259	3.99	0.000	0.000
Non-Collision	41	0.35	4717	0.69	0.505*	-40.151
Causal Veh Backing: Rear to Rear	10	0.09	3517	0.51	0.165	-50.506
Unknown	3	0.03	3467	0.51	0.050	-56.646
Angle Oncoming (frontal)	195	1.66	14694	2.15	0.771*	-57.795
Angle (front to side) Opposite Direction	173	1.47	19133	2.80	0.526*	-156.163
Other	101	0.86	15015	2.20	0.391*	-157.317
Angle (front to side) Same Direction	136	1.16	17262	2.53	0.458*	-160.974
Causal Veh Backing: Rear to Side	31	0.26	12070	1.77	0.149*	-176.652
Sideswipe - Same Direction	446	3.80	52321	7.66	0.495*	-454.127
Side Impact (90 degrees)	548	4.66	59848	8.76	0.532*	-481.622
Side Impact (angled)	392	3.34	54255	7.94	0.420*	-541.400

C012: Controlled Access

C013: E Highway Side

C015: Primary Contributing Circumstance

C016: Primary Contributing Unit Number

C017: First Harmful Event

C018: Location First Harmful Event Relative to

C019: E Most Harmful Event

C020: E Distracted Driving Opinion

C021: Distance to Fixed Object

C022: E Type of Roadway Junction/Feature

C023: E Manner of Crash

C024: School Bus Related

C025: Crash Severity

C026: Intersection Related

C027: At Intersection

C028: Mileposted Route

C029: Lighting Conditions

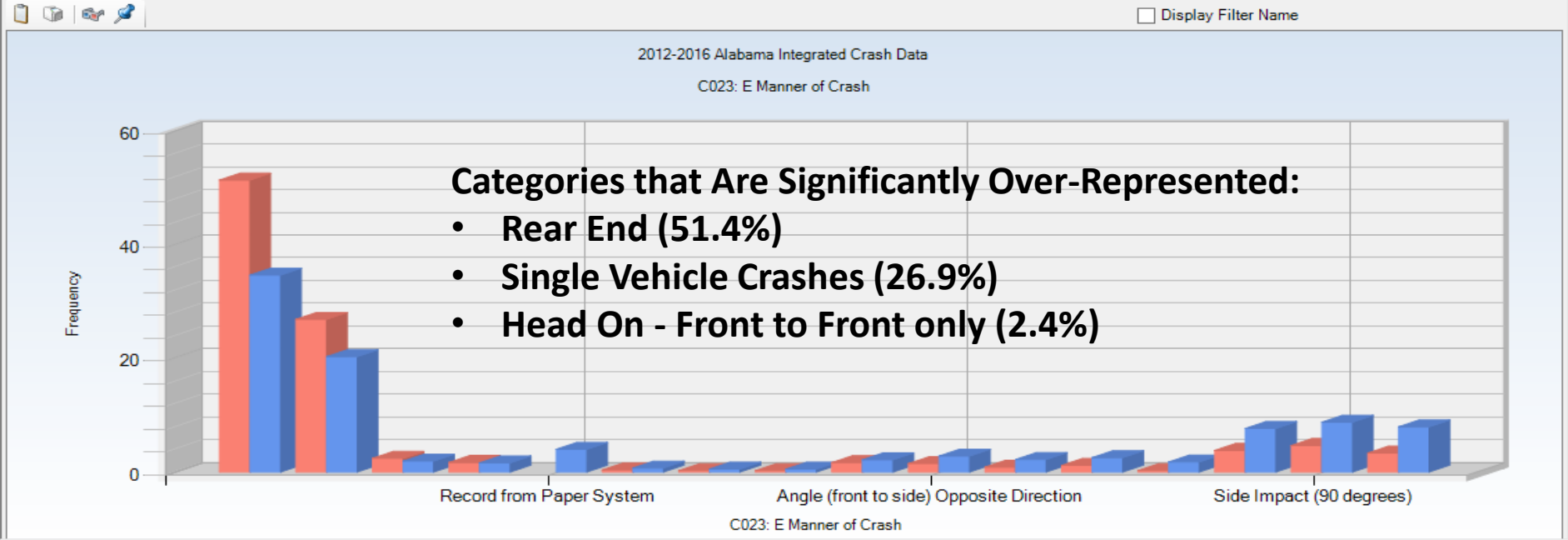
C030: Weather

C031: Locale

C032: E Police Present at Time of Crash

C033: Police Notification Delay

☐ Sort by Sum of Max Gain



QUESTION:

FIRST HARMFUL EVENT

True or False:

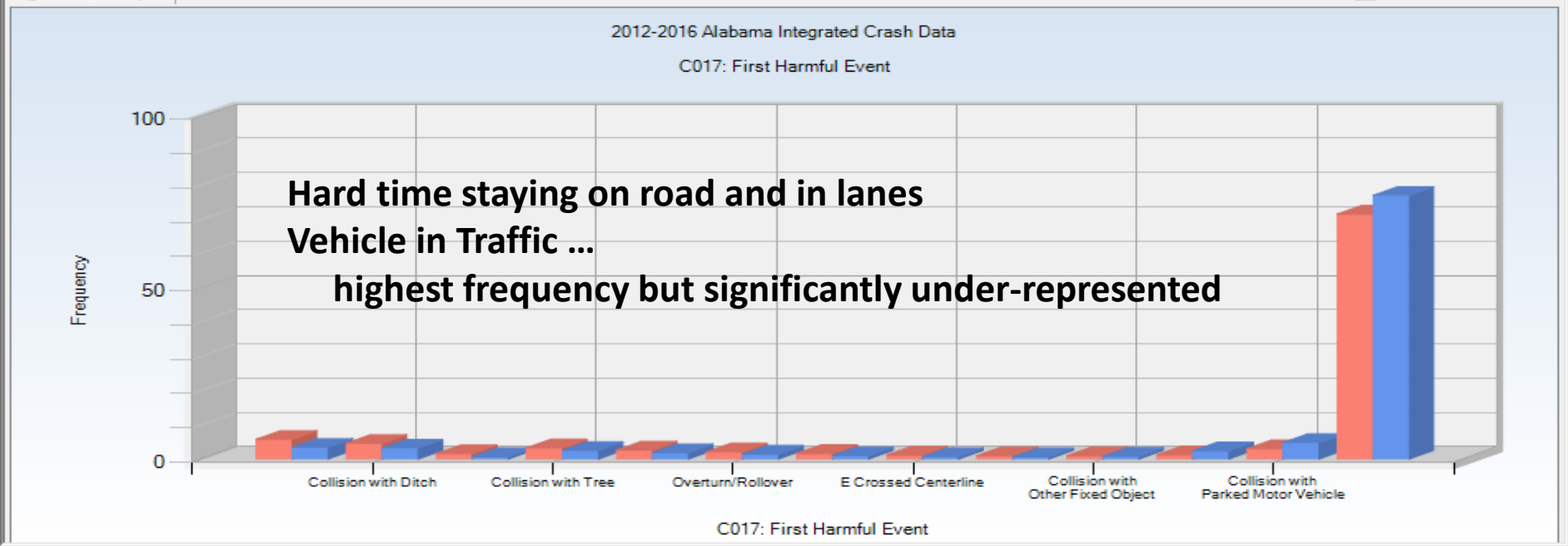
Close to 30% of
DDED caused crashes
involve only a single vehicle

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

C017: First Harmful Event							
	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain	
E Ran Off Road Right	621	5.74	20685	3.39	1.693*	254.159	
Collision with Ditch	494	4.57	19538	3.20	1.426*	147.501	
Collision with Mailbox	167	1.54	3839	0.63	2.453*	98.917	
Collision with Tree	350	3.24	15170	2.49	1.301*	80.965	
E Ran Off Road Left	278	2.57	11122	1.82	1.409*	80.755	
Overtum/Rollover	225	2.08	8442	1.38	1.503*	75.284	
Collision with Utility Pole	172	1.59	5902	0.97	1.643*	67.330	
E Crossed Centerline	123	1.14	4137	0.68	1.676*	49.632	
E Collision with Embankment	102	0.94	3754	0.62	1.532*	35.424	
Collision with Other Fixed Object	102	0.94	4704	0.77	1.223	18.576	
E Collision with Vehicle in (or fr...	131	1.21	14586	2.39	0.506*	-127.677	
Collision with Parked Motor Ve...	326	3.01	29115	4.77	0.631*	-190.344	
Collision with Vehicle in Traffic	7728	71.43	469055	76.89	0.929*	-590.522	

☐ Sort by Sum of Max Gain

☐ Display Filter Name



QUESTION:

NUMBER OF VEHICLES INVOLVED

True or False:

Crashes that are over-represented
in DDED caused crashes:

Single Vehicle

Three-vehicle crashes

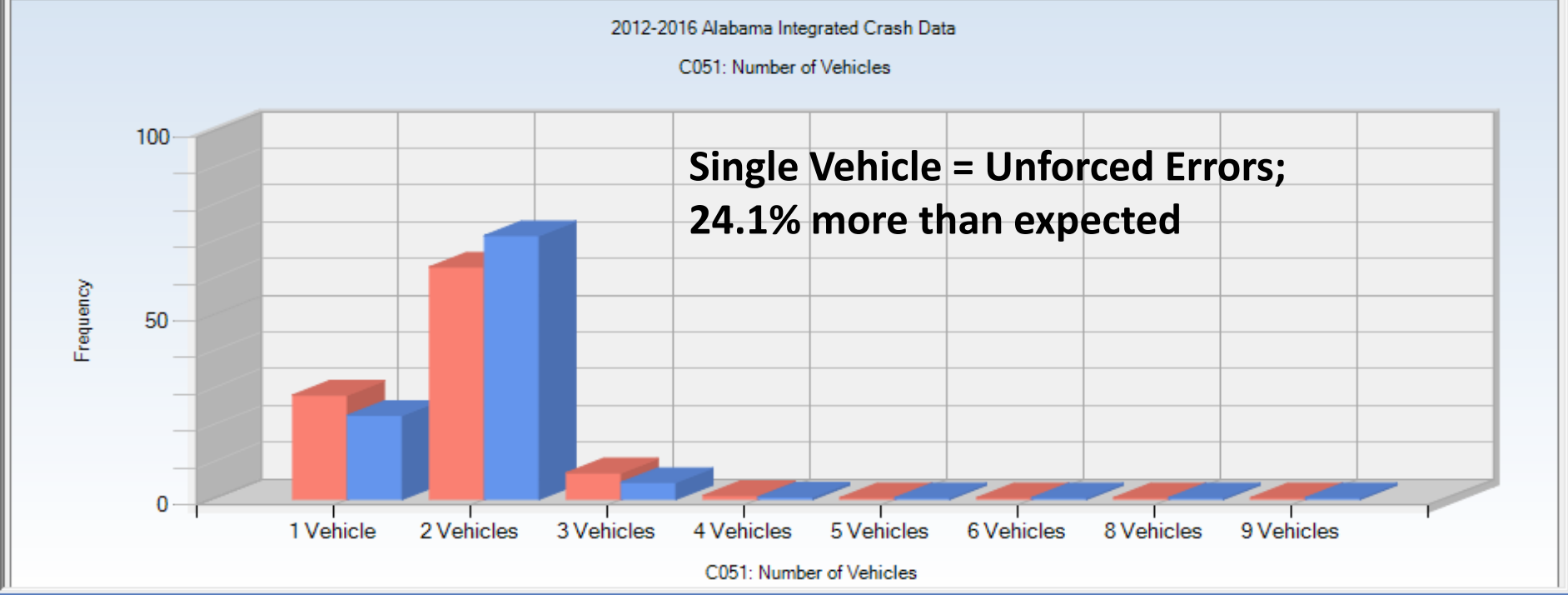
Four-vehicle crashes

Order: Natural Order Ascending ☒ 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	3334	28.37	156097	22.86	1.241*	648.516
2 Vehicles	7429	63.23	489983	71.74	0.881*	-1000.639
3 Vehicles	849	7.23	31659	4.64	1.559*	304.340
4 Vehicles	123	1.05	4348	0.64	1.644*	48.197
5 Vehicles	12	0.10	664	0.10	1.050	0.577
6 Vehicles	1	0.01	155	0.02	0.375	-1.667
8 Vehicles	1	0.01	17	0.00	3.419	0.708
9 Vehicles	1	0.01	4	0.00	14.532	0.931

- C046: ALDOT Region
 - C047: ADECAHHSO Region
 - C048: Regional Planning Organization
 - C049: Has Coordinate
 - C050: E MapClick Used
 - C051: Number of Vehicles**
 - C052: Number of Drivers Recorded
 - C053: Number of Persons Recorded
 - C054: Number of Motorists Recorded
 - C055: Number of Non-Motorists Record
 - C056: Number of Pedestrians
- ☐ Sort by Sum of Max Gain

☐ Display Filter Name



General Data Category

Vehicle Characteristics

QUESTION:

VEHICLE AGE

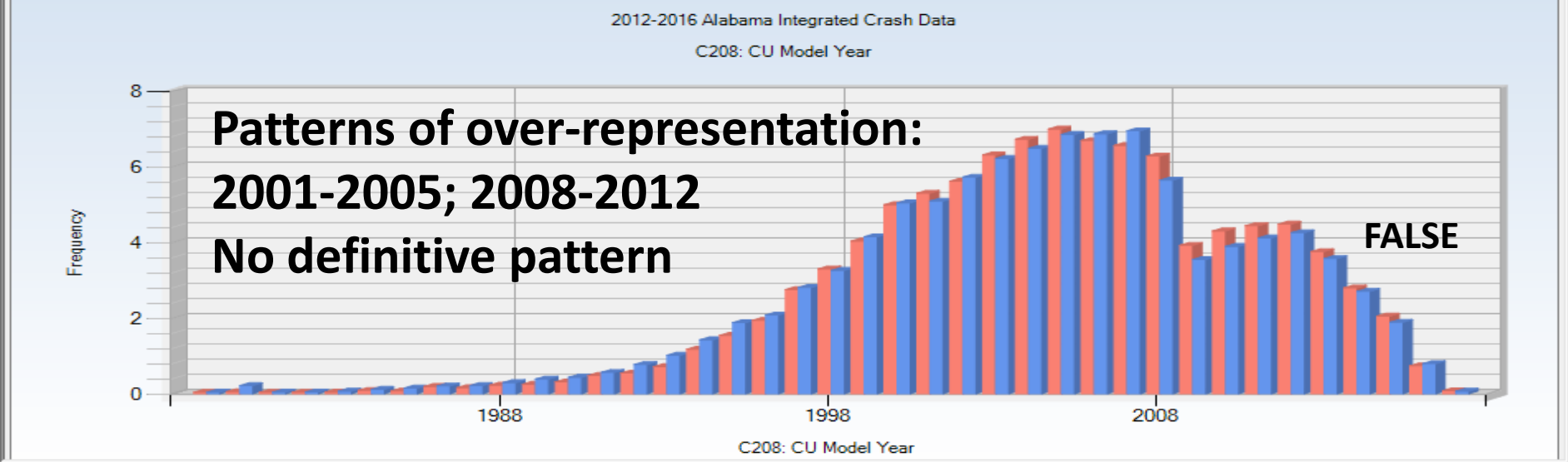
True or False:

DDDED caused crashes tend to
Involve the newest vehicles.

C208: CU Model Year	Value	Subset Frequency	Subset Percent	Other Frequency	Other Percent	Odds Ratio	Max Gain
2001		612	5.30	31654	5.09	1.041	23.931
2002		649	5.62	35586	5.72	0.982	-12.118
2003		729	6.31	38675	6.22	1.015	10.495
2004		777	6.73	40332	6.49	1.037	27.711
2005		808	7.00	42622	6.86	1.020	16.167
2006		773	6.69	42718	6.87	0.974	-20.616
2007		758	6.56	43213	6.95	0.944	-44.812
2008		726	6.29	35104	5.65	1.113*	73.837
2009		453	3.92	22065	3.55	1.105	43.076
2010		497	4.30	24220	3.90	1.105	47.040
2011		513	4.44	25627	4.12	1.078	36.901
2012		518	4.48	26465	4.26	1.054	26.333
2013		434	3.76	22222	3.57	1.051	21.159
2014		323	2.80	16819	2.71	1.034	10.536
2015		237	2.05	11740	1.89	1.087	18.894
2016		85	0.74	4947	0.80	0.925	-6.906
2017		9	0.08	410	0.07	1.182	1.383

C208: CU Model Year

☐ Sort by Sum of Max Gain



QUESTION:

CAUSAL UNIT TYPE

True or False:

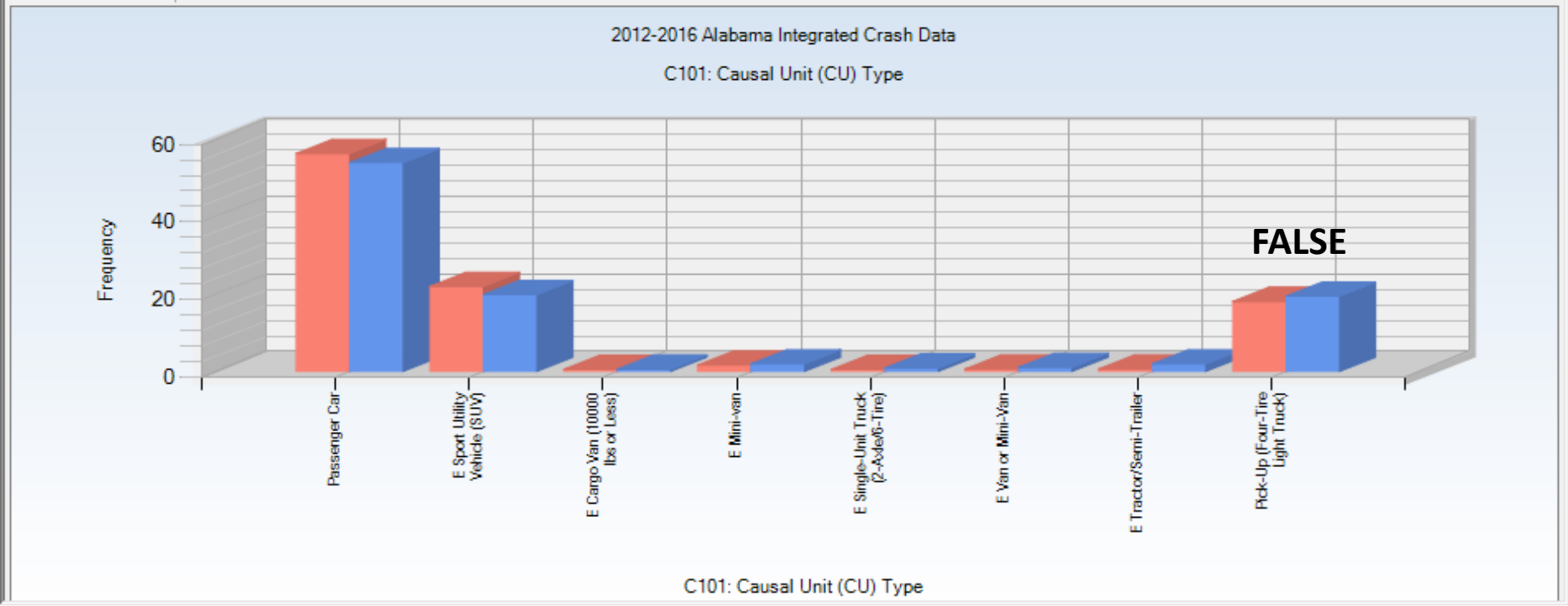
Pickup trucks have some of the highest over-representation metrics.

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
Passenger Car	6505	56.27	342431	53.88	1.044*	275.680
E Sport Utility Vehicle (SUV)	2536	21.94	126062	19.84	1.106*	242.748
E Cargo Van (10000 lbs or Less)	58	0.50	3432	0.54	0.929	-4.433
E Mini-van	183	1.58	12171	1.92	0.827*	-38.408
E Single-Unit Truck (2-Axle/6-Tire)	55	0.48	5329	0.84	0.567*	-41.942
E Van or Mini-Van	67	0.58	6554	1.03	0.562*	-52.227
E Tractor/Semi-Trailer	70	0.61	12208	1.92	0.315*	-152.081
Pick-Up (Four-Tire Light Truck)	2087	18.05	123421	19.42	0.930*	-158.208

C101: Causal Unit (CU) Type

☐ Sort by Sum of Max Gain



Vehicle Type Analyses



CENTER for ADVANCED
PUBLIC SAFETY

- **Causal Vehicle Type = Passenger Cars & SUVs**
- **Effect of Recession on Age of Fleet**
 - ✓ Effect of the recession in 2009 is quite clear
 - ✓ Both in the DDED crashes & other crashes (blue bars)
 - ✓ Only year showing a statistically significance is 2009
- **Collective Patterns**
 - ✓ 1998 through 2004, and
 - ✓ 2008 through 2011
 - ✓ DDED is not over-represented very old or very new
 - ✓ Probable cause ...
 - Many of the older vehicle owners do not have smart phones
 - Many new vehicles have installed countermeasures

Summary of Recommendations

- **Major PI&E Effort**
 - ✓ **Consequences of the current situation**
 - The mounting death and injury toll
 - Everyone thinks they are the exception
 - Focus of effort: *no exceptions – no use of cell phones by drivers*
 - Like smoking, it must become socially unacceptable
 - ✓ **Drivers need understanding of cognitive effects of *any and all* cell use**
 - Not just a matter of hands on/off the wheel or eye misdirection
 - Uses areas of the brain that are essential to safety
 - Especially true if any level of alcohol/drugs or emotional distress are involved
 - ✓ **Publicize changes in legal and IT countermeasures (see below)**
- **Major Enforcement Effort**
 - ✓ **Develop and apply better methods for cell phone use detection**
 - ✓ **Stronger penalties when detected**
 - ✓ **Training for better identification and recording**
- **Legal and IT Countermeasures**
 - ✓ **Legislation enabling checking for cell phone use for ALL crashes**
 - ✓ **Burden or proof shift to cell phone users**
 - ✓ **Per se assumption of responsibility**
 - ✓ **Get data from detection back into the crash records**



CENTER *for* ADVANCED
PUBLIC SAFETY

THANK YOU

Q&A SESSION

David B. Brown,
brown@cs.ua.edu

Rhonda Stricklin
rstricklin@cs.ua.edu

Center for Advanced Public Safety
Tuscaloosa, AL | (866) 349-2273
caps.ua.edu

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