

ISDS 4180
Vehicle Crashes in Louisiana Report
(Fall 2016)



11/29/16

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INTRODUCTION

Based on data collected from the crash teaching medium database, this report will summarize, illustrate and present charts and tables, as well as report on insights gathered from the analysis of vehicle crash data in the state of Louisiana. This report will also include map views and geographical attributes. Throughout the analysis, a number of main measures will be used frequently to answer the main questions. Examples of which include the number of incidents, fatalities, percentage of fatal crashes, etc. Other measures such as dollar amounts and vehicle type descriptions will be avoided. Instead, the report will focus on the occupants and drivers involved in the crash, the severity of crashes, how to avoid fatalities and any conditions that may influence these incidents.

The main thesis in this report will be based on location and conditions. It will be answering the question of: where do most vehicle crashes and fatalities occur throughout Louisiana, and how do internal conditions, such as substance use, and external conditions, such as road type and time of day, affect the severity of the crashes in their respective regions. Comprehensively, there are a total of 64 parishes in the state of Louisiana and are grouped into five regions: North Louisiana, Central Louisiana, Acadiana, Florida Parishes and Greater New Orleans. These regions hold 22, 9, 19, 7, 7 parishes, respectively. In many of the charts and tables that follow, data on specific conditions on these parishes will be grouped into two segments: "Top 10" and "Bottom 10". This is to effectively contrast differences between the parishes with the most frequent incidents and the parishes with the least frequent number of incidents/records. For example, alcohol-use related accidents by parish will group the Top 10 parishes that have the most number of alcohol-related accidents, and vise-versa. Furthermore, this report will explain how conditions such as road type, highway type, substance involved, age, weather, safety systems and time of day could affect the number of crashes and the number of fatalities involved in each region/parish.

At the end of the report there will be a summary, conclusions and recommendations to avoid fatalities throughout the five regions of the state of Louisiana.

ANALYSIS

The starting focus will be crashes by regions. Which region has the largest population of drivers and occupants involved in crashes? Which region has the most crashes and fatalities? The data will be represented as a symbol map in **Figure 1**. This symbol map represents the average population of drivers and occupants involved in crashes in the state of Louisiana broken down by regions, which are North Louisiana, Central Louisiana, Acadiana, Florida Parishes, and Greater New Orleans. The Florida parishes have the largest average population involving more drivers and occupants than any other region, with 336,780. The Greater New Orleans region has seven parishes (tied for last), but accounts for a population of 303,683 involving drivers and occupants.

Figure 1: Average Population by Region

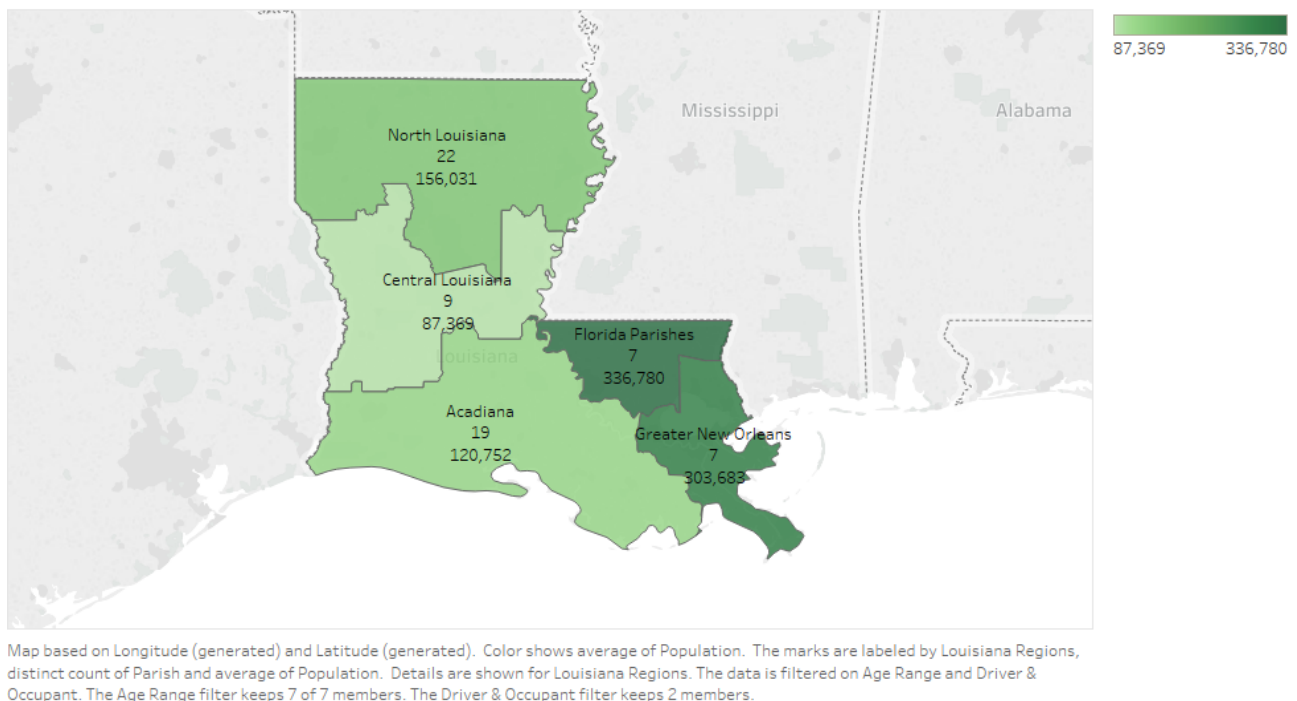
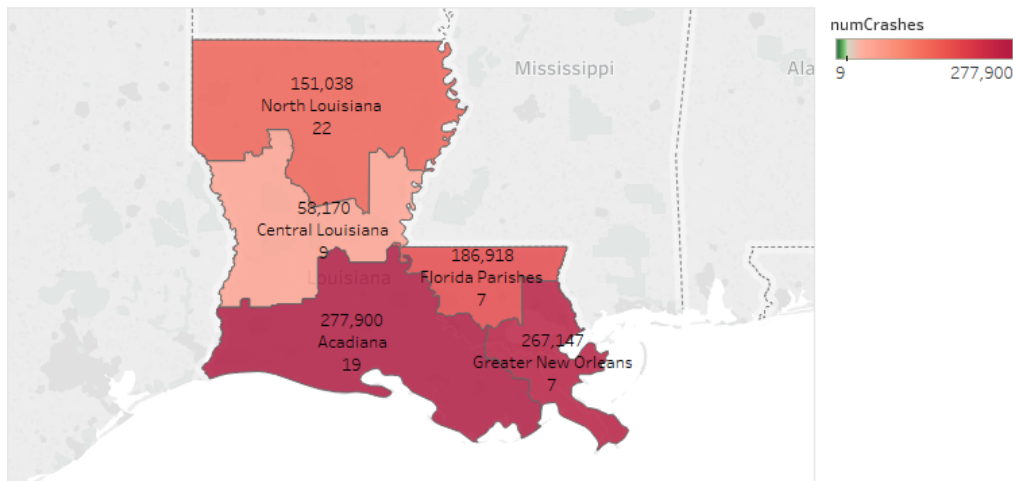


Figure 2 covers crashes by region. The darker the shade of the region the more aggregate number of crashes there are in that region. Per the data below, the region known as Acadiana is the home to 19 parishes and has 277,900 crashes, which is the largest amount of crashes out of all regions. The Greater New Orleans ties last for number of parishes, seven, within that region, but accounts for 267,147 crashes, which is the second highest, in crashes, out of all regions. The Florida Parishes have a high amount of aggregate crashes with 186,918 even though they only have 7 parishes within that region, as well.

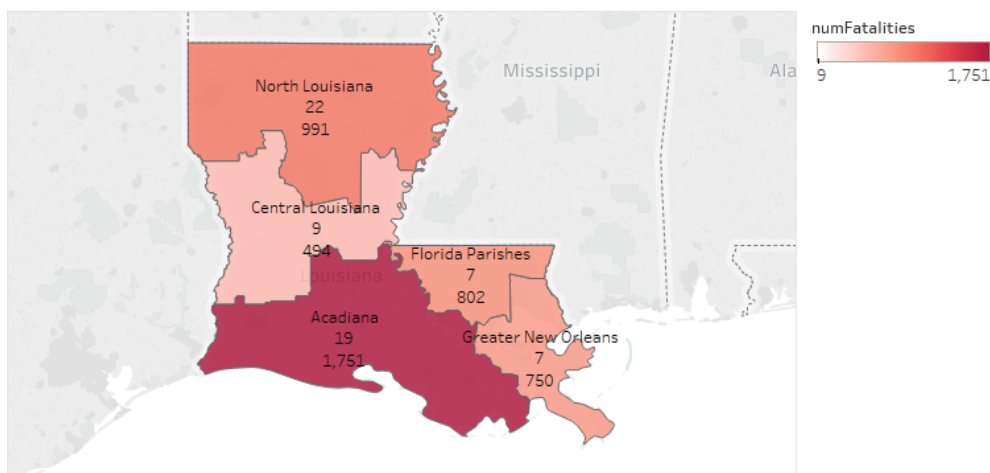
Figure 2: Crashes by Region



Map based on Longitude (generated) and Latitude (generated). Color shows numCrashes. The marks are labeled by numCrashes, Louisiana Regions and distinct count of Parish. Details are shown for Louisiana Regions. The data is filtered on Person Type and Age Range. The Person Type filter keeps Driver and Occupant. The Age Range filter keeps 7 of 7 members.

Figure 3, a symbol map, shows the amount of fatalities within all regions in the state of Louisiana. Acadiana also leads in fatalities with an aggregate number of 1,751 out of all regions while the region known as North Louisiana has 991 fatalities, the second highest number of fatalities, within a region of 22 parishes, which is the largest amount of parishes in a region. More analysis must be done to decipher the meaning of this data. From the analysis so far, the Acadiana region leads in car crash population, crashes in general, and car crash related fatalities.

Figure 3: Fatalities by Region



Map based on Longitude (generated) and Latitude (generated). Color shows numFatalities. The marks are labeled by Louisiana Regions, distinct count of Parish and numFatalities. Details are shown for Louisiana Regions. The data is filtered on Person Type and Age Range. The Person Type filter keeps Driver and Occupant. The Age Range filter keeps 7 of 7 members.

The second focus will be about validating the parishes within the five regions in terms of crashes and fatalities. Which parishes have the most amount of crashes and fatalities? Which parishes have the least amount of crashes and fatalities?

Figure 4 shows the top ten parishes that had the most crashes in the state as well as the percentages of crashes with the parish's population. Per the data, East Baton Rouge Parish, which is in the Florida Parishes region, has the most aggregate number of crashes out of every parish within the state of Louisiana with 114,594. 30% of the parishes from the top 10 come from the Greater New Orleans region (237,077) and accounts for 25% of all crashes in the state, and 38% of crashes in the top 10 parishes. Jefferson (ranked 2) and Orleans Parish (ranked 3) account for a total of 165,906 crashes, equating to 55 percent of all crashes within that region. In terms of volume East Baton Rouge still has the most crashes and has the represent the largest amount based fatalities within the parish's population with 26.67%.

Figure 4: Crashes by Parish- Top 10

Parish	Louisiana Regions	numCrashes
East Baton Rouge	Florida Parishes	114,594 26.67%
Jefferson	Greater New Orleans	92,041 24.75%
Orleans	Greater New Orleans	73,865 21.88%
Lafayette	Acadiana	56,778 32.66%
Caddo	North Louisiana	53,288 21.07%
Calcasieu	Acadiana	39,878 21.44%
St. Tammany	Greater New Orleans	34,325 15.16%
Rapides	Central Louisiana	25,279 19.15%
Ouachita	North Louisiana	25,266 16.77%
Tangipahoa	Florida Parishes	21,680 18.81%

NumCrashes and %crashes of Population broken down by Parish and Louisiana Regions. Color shows numCrashes. The marks are labeled by numCrashes and %crashes of Population. The data is filtered on Top10ParishesbyCrash, Driver & Occupant, Gender, Weather Description and Age Range. The Top10ParishesbyCrash filter keeps 10 members. The Driver & Occupant filter keeps 2 members. The Gender filter keeps Female, Male and NOT REPORTED. The Weather Description filter keeps 11 of 11 members. The Age Range filter keeps Adult and Senior. The view is filtered on Action (Louisiana Regions) and Parish. The Action (Louisiana Regions) filter keeps 5 members. The Parish filter keeps 64 of 64 members.

Figure 5 shows the bottom ten parishes that had the most crashes in the state as well as the crash population percentage. The figure also shows the percentage of fatal crashes as well. Per the data, Tensas, located in the North Louisiana region, has the least amount of crashes in the state of Louisiana with 136. The color and shade represents how many crashes have happened in that parish, ranging from dark green (least) to dark red (most). There are seven parishes from North Louisiana that are listed in the bottom ten parishes for most crashes, which accounts for 38% of the parishes within that region. Tensas parish has the lowest amount of crashes.

Figure 5: Crashes by Parish - Bottom 10

Parish	Louisiana Regions	numCrashes
West Feliciana	Florida Parishes	673 4.41%
West Carroll	North Louisiana	409 3.55%
Tensas	North Louisiana	136 2.38%
Red River	North Louisiana	503 5.53%
Jackson	North Louisiana	534 3.52%
Franklin	North Louisiana	312 1.54%
East Feliciana	Florida Parishes	517 2.49%
East Carroll	North Louisiana	377 4.62%
Catahoula	Central Louisiana	645 6.19%
Caldwell	North Louisiana	503 4.86%

NumCrashes and %crashes of Population broken down by Parish and Louisiana Regions. Color shows numCrashes. The marks are labeled by numCrashes and %crashes of Population. The data is filtered on Driver & Occupant, Gender, Weather Description and Age Range. The Driver & Occupant filter keeps 2 members. The Gender filter keeps Female, Male and NOT REPORTED. The Weather Description filter keeps 11 of 11 members. The Age Range filter keeps Adult and Senior. The view is filtered on Bottom10ParishesbyCrash, which keeps 10 members.

In **Figure 6**, in terms of fatalities, East Baton Rouge parish leads all parishes for most fatalities with 269 and represents .06% of fatalities based on the population that were involved in crashes. Of the top 10 parishes for fatalities, those belonging to the Greater New Orleans region (3 of 7) accounts for 74% of their fatalities, while those belonging to the Acadiana region (2 of 19) accounts for 23.4% of their fatalities. St. Tammany, a parish that ranked seventh for most crashes, is ranked second for most fatalities, with 242, out of all parishes. An interesting note is that St. Tammany ranks third for most crashes in the Greater New Orleans region (seventh overall), but ranks second for most fatalities (second overall).

Figure 6: Fatalities by Parish - Top 10

Parish	Louisiana Regions	
Tangipahoa	Florida Parishes	208 0.18%
Calcasieu	Acadiana	231 0.12%
St. Tammany	Greater New Orleans	242 0.11%
Lafayette	Acadiana	179 0.10%
Rapides	Central Louisiana	127 0.10%
Caddo	North Louisiana	217 0.09%
Ouachita	North Louisiana	108 0.07%
East Baton Rouge	Florida Parishes	269 0.06%
Orleans	Greater New Orleans	153 0.05%
Jefferson	Greater New Orleans	158 0.04%

NumFatalities and %fatalities of Population broken down by Parish and Louisiana Regions. Color shows numFatalities. The marks are labeled by numFatalities and %fatalities of Population. The data is filtered on top10parishesbyfatalities, Driver & Occupant, Gender, Weather Description and Age Range. The top10parishesbyfatalities filter keeps 10 members. The Driver & Occupant filter keeps 2 members. The Gender filter keeps Female and Male. The Weather Description filter excludes NOT REPORTED, OTHER and UNKNOWN. The Age Range filter keeps Adult, Senior, Underage, Young Adult and Youth.

Figure 7 shows the bottom ten parishes that had the most fatalities in the state of Louisiana. Per the data, Tensas Parish, located in North Louisiana, has the least number of fatalities with 2. There are seven parishes from North Louisiana that are listed in the bottom ten parishes for most fatalities by crashes, which accounts for 38% of the parishes within that region.

Figure 7: Fatalities by Parish - Bottom 10

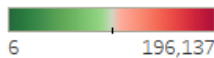
Parish	Louisiana Regions	
Cameron	Acadiana	21 0.28%
Catahoula	Central Louisiana	27 0.26%
Caldwell	North Louisiana	16 0.15%
Claiborne	North Louisiana	24 0.15%
East Carroll	North Louisiana	11 0.13%
Jackson	North Louisiana	20 0.13%
West Carroll	North Louisiana	15 0.13%
West Feliciana	Florida Parishes	15 0.10%
LaSalle	North Louisiana	21 0.08%
Tensas	North Louisiana	2 0.03%

NumFatalities and %fatalities of Population broken down by Parish and Louisiana Regions. Color shows numFatalities. The marks are labeled by numFatalities and %fatalities of Population. The data is filtered on Driver & Occupant, Gender, Weather Description and Age Range. The Driver & Occupant filter keeps 2 members. The Gender filter keeps Female and Male. The Weather Description filter excludes NOT REPORTED, OTHER and UNKNOWN. The Age Range filter keeps Adult, Senior, Underage, Young Adult and Youth. The view is filtered on bottom10parishesbyfatalities, which keeps 10 members.

The third focus will be weather analysis and its effect, if any, on the crashes and fatalities based on regions and parishes. Based on the weather, where do most crashes occur? Where do most fatalities occur based on weather?

Figure 8 shows that most crashes throughout all five regions happen when the weather is clear, since every region leads in that category, which indicates that less driving occurs in adverse conditions. The Greater New Orleans parishes have the most crashes when the weather is clear with a total of 196,137. The Acadiana parishes lead the way in crashes when the weather (55,107) is cloudy, when it is raining (28,433), and when it is foggy (3,461). North Louisiana leads all regions in crashes when it is snowing (249) and when there is sleet/hail (144). This would make sense since the northern region of Louisiana would experience more bad weather related to lower temperatures. By the looks of the data, there seems to be a substantial drop off in terms of crashes by weather conditions after the top 3 conditions: clear, cloudy, and rain. Acadiana has a large number of crashes that happen in foggy weather, which could be due to the region being near the gulf.

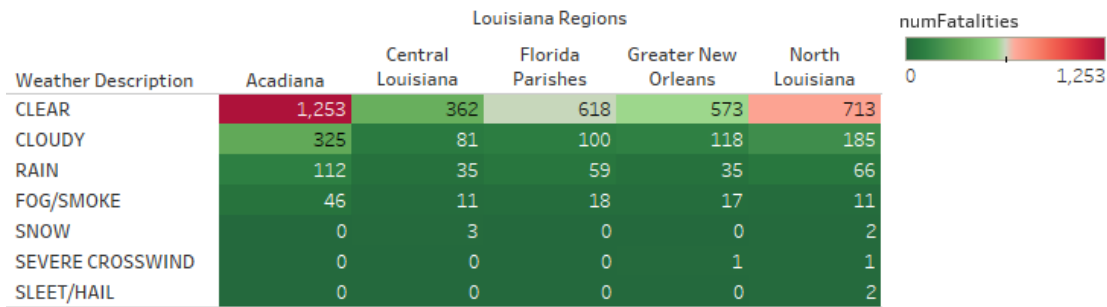
Figure 8: Crashes by Weather

Weather Description	Louisiana Regions					numCrashes
	Acadiana	Central Louisiana	Florida Parishes	Greater New Orleans	North Louisiana	
CLEAR	188,896	39,781	133,366	196,137	102,270	
CLOUDY	55,107	11,197	31,181	41,808	29,623	
RAIN	28,433	6,309	20,330	24,654	17,004	
FOG/SMOKE	3,461	473	1,199	1,431	721	
SNOW	108	86	116	66	249	
SLEET/HAIL	85	71	78	63	285	
OTHER	172	40	63	134	144	
SEVERE CROSSWIND	110	19	31	55	69	
BLOWING SAND, SOIL, DIRT, SN..	28	6	15	17	15	

NumCrashes broken down by Louisiana Regions vs. Weather Description. Color shows numCrashes. The marks are labeled by numCrashes.

Figure 8.1 shows that most crashes that resulted in fatalities throughout all five regions happen when the weather is clear since every region leads in that category as well. Again, this doesn't imply that clear weather is the most dangerous, but that fewer drivers are on the road during adverse weather conditions. The Acadiana parishes have the most crashes that result into fatalities when the weather is clear (1,253), when it is cloudy (325), when it is raining (112), and when it is foggy (46). There is a substantial drop off after the weather condition known as clear. Like crashes, Acadiana has the most fatalities when there are foggy weather conditions, which could conclude that it fogs frequently in the southwest part of the state, which is near the gulf, more than any other area. While the Greater New Orleans parishes are also on the gulf, the parishes with the highest population are in larger cities, which would have a warmer relative temperature, thereby accounting for the differences in fog between the two gulf regions.

Figure 8.1: Fatalities by Weather

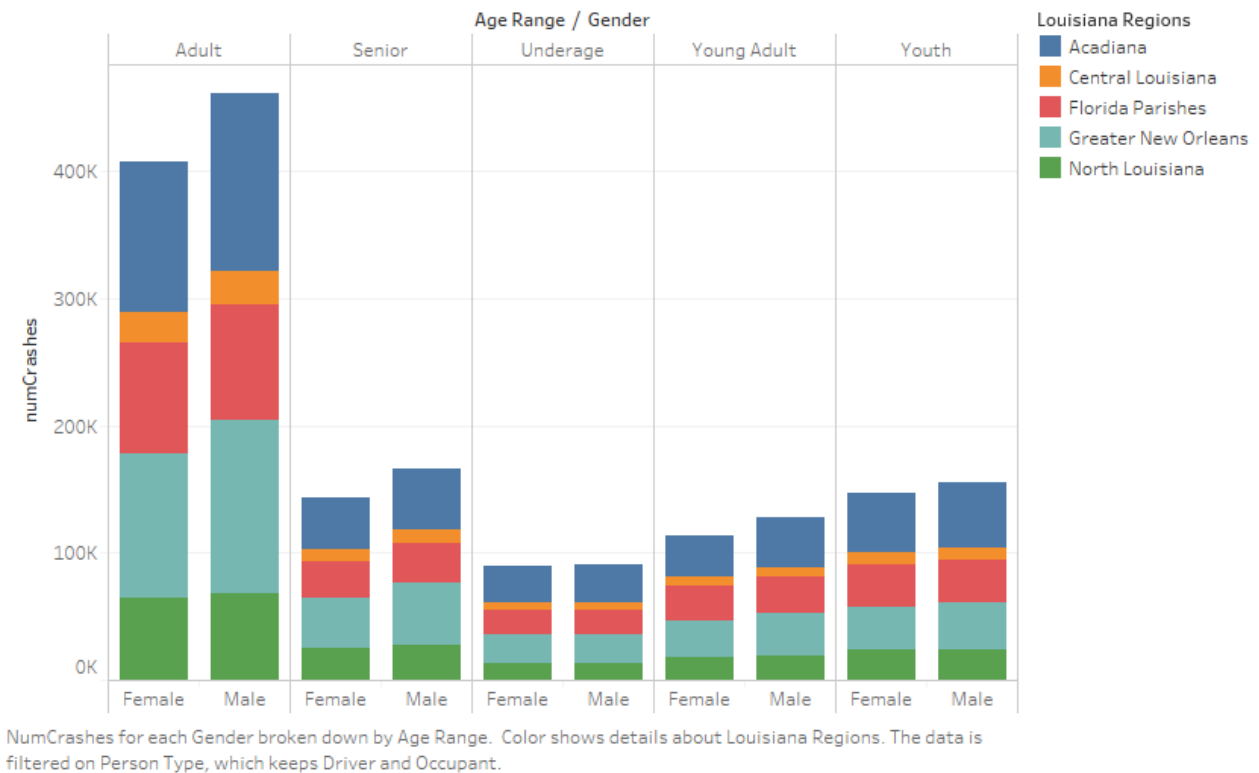


NumFatalities broken down by Louisiana Regions vs. Weather Description. Color shows numFatalities. The marks are labeled by numFatalities. The data is filtered on Driver & Occupant, which keeps 2 members.

The next focus will be crashes and fatalities by age range and gender. Which age range was involved in the most crashes and fatalities? Which age range was involved in the most crashes and fatalities where alcohol and or drugs were involved? Which age range, based on region, had the most crashes and fatalities? Were alcohol and or drugs involved? How did the other age ranges and sexes compare?

In **Figure 9**, crashes are broken down by age and sex based on region. The person type used for filtering is driver and occupant. Acadiana leads all regions for most amount of adult males (139,035) and adult females (117,215) who have been involved in crashes. The Greater New Orleans parishes come in second with the most adult males (136,573) and adult females (113,531) who have been involved in crashes compared to the other regions. The Greater New Orleans parishes lead all regions for most amount of senior males (48,664) and senior females (39,839) who have been involved in crashes. The Acadiana parishes come in second with the senior males and senior females who have been involved in crashes. The Acadiana parishes also lead all regions for underage males and females, young adult males and females, and youth males and females while the Greater New Orleans parishes come in second for all the categories listed. This could conclude that the majority of adults who get into crashes are located in south Louisiana, home of the Acadiana, Greater New Orleans parishes and Florida Parishes, when compared to North and Central Louisiana. It is also worth mentioning that the combined population of the south Louisiana regions is three times that of the combined population of the north Louisiana regions.

Figure 9: Crashes by Age and Sex



underage: 1-14, youth: 15-20, young adult: 21-24, adult: 25-54, senior: 55-95+

In **Figure 9.1**, fatalities are broken down by age and sex based on region. The person type used for filtering is also driver and occupant. Acadiana leads all males and females in every age group category for fatalities. It was already noted earlier that Acadian had more fatalities than any other region. North Louisiana comes in second for adult males and females who are in the adult, senior and youth age ranges. Out of all regions combined, adult males get into more crashes compared to any other age range for both males and females.

Figure 9.1: Fatalities by Age and Sex

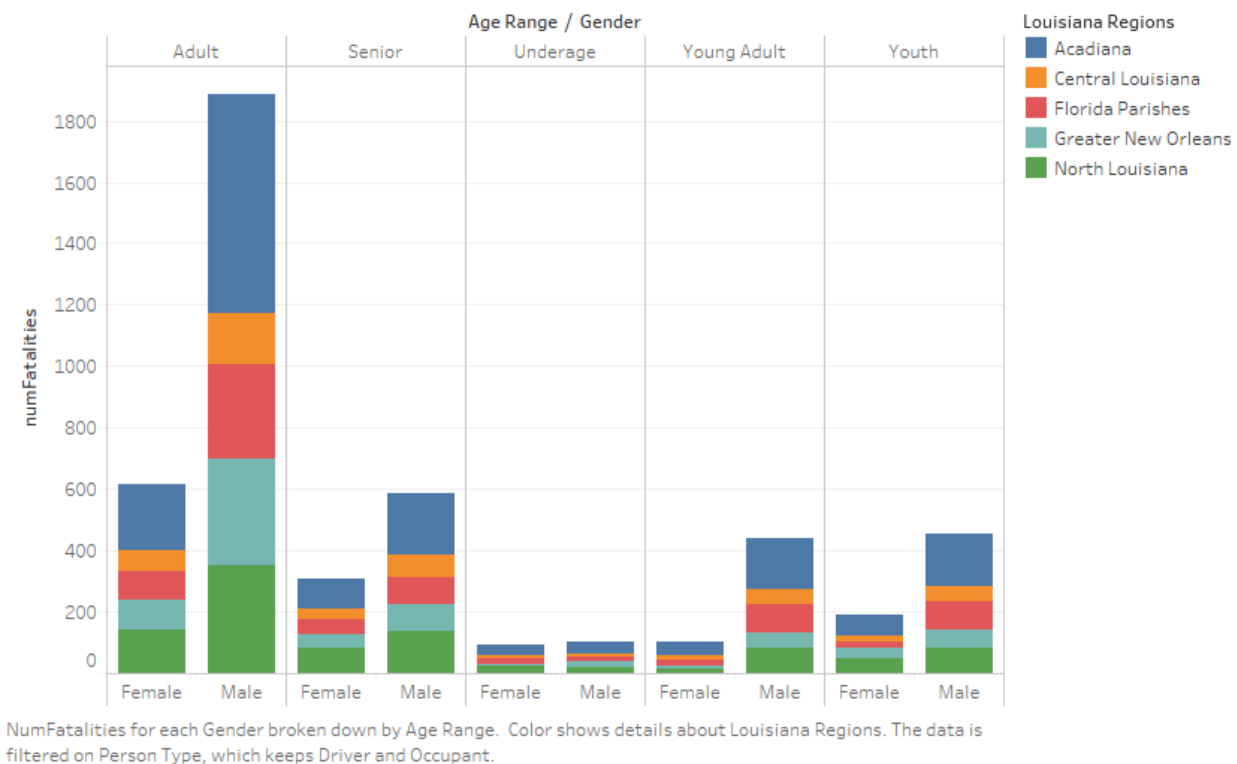
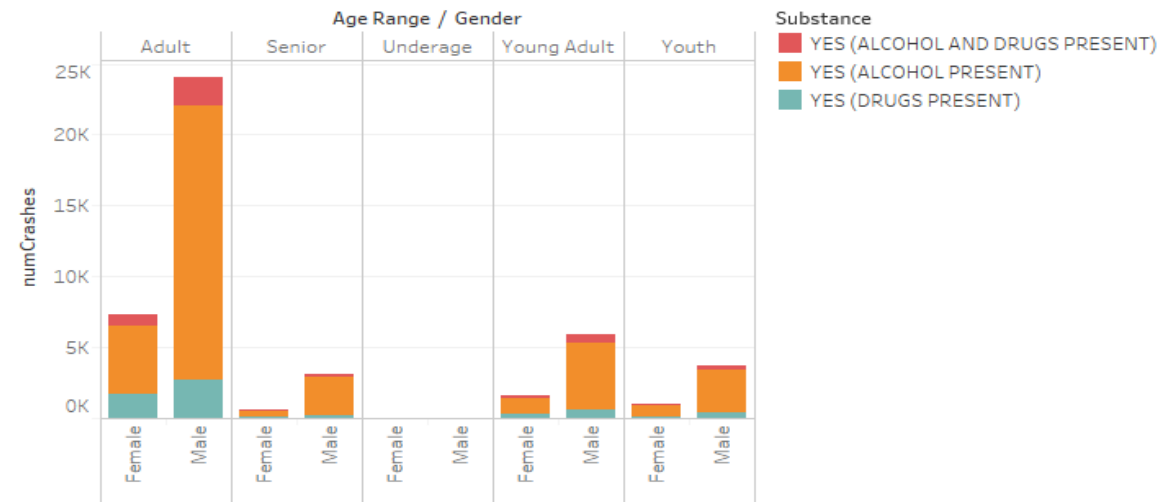


Figure 9.2 shows crashes involving alcohol and drugs, by age and sex, with the person type filtered as driver and occupant. According to the data, Acadiana has the highest rate of crashes where alcohol was present among adults. Adult males have crashed more than any other age range of males and or females when there was alcohol involved with 19,339. This is not only consistent with data showing that adult males are the highest category to be involved in a crash, but show that this category is highest for having alcohol involved in a crash as well. 39% of adult males (7,604) who crashed with alcohol present are from the Acadiana parishes, which is the largest percentage compared to all regions. Acadiana also leads all regions with adult females who were involved in a crash where alcohol was present with 1,712, which is 36% of the total crashes involving adult females.

The Greater New Orleans parishes follow in second place for the most male (4,125 and 21% of total) and female adults (1,070 and 22% of the total) who were involved in a crash where alcohol was present. Noted once again, the two southern regions, Acadiana and Greater New Orleans are combined for 60% of all adult males who crashed where there was alcohol present and 58% of all females who crashed where alcohol was involved. Another interesting note is that Acadian leads all regions in the state with the most young adult and youth drivers and occupants, male and female, with alcohol present in crashes while the parishes in Greater New Orleans comes in second for the same categories. In terms of drugs present in crashes, Acadiana also leads all

regions in that criteria for adult male and female drivers. Adult males and female drivers and occupants also lead where both alcohol and drugs are present compared to the other regions.

Figure 9.2: Crashes w/ Alc&Drugs by age & sex



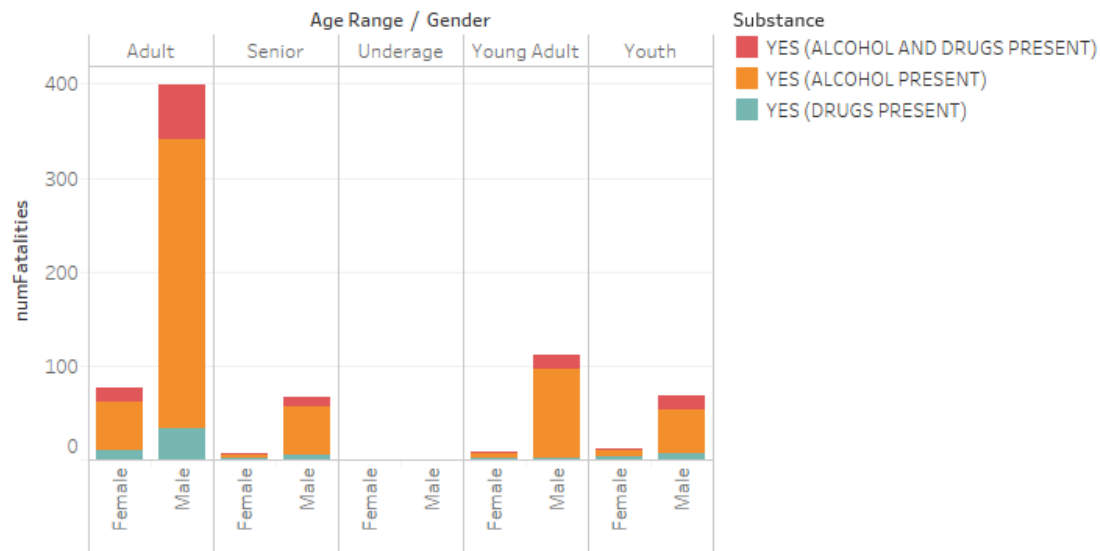
NumCrashes for each Gender broken down by Age Range. Color shows details about Substance. The data is filtered on Louisiana Regions and Person Type. The Louisiana Regions filter keeps 6 of 6 members. The Person Type filter keeps Driver. The view is filtered on Substance, Gender and Age Range. The Substance filter keeps YES (ALCOHOL AND DRUGS PRESENT), YES (ALCOHOL PRESENT) and YES (DRUGS PRESENT). The Gender filter keeps Female and Male. The Age Range filter keeps Adult, Senior, Underage, Young Adult and Youth.

Figure 9.3 shows fatalities involving alcohol and drugs by age and sex with the person type filtered as driver and occupant. Per the data, adult males have more fatalities than any other age range of males and or females when there's alcohol present, with 308. 37% of adult males (113) that have resulted in fatalities with alcohol present are from the Acadiana parishes, which is the largest percentage compared to all regions. Acadian also leads all regions in crashes, with adult females, resulting in fatalities while alcohol was present with 52, which is 40% of total fatalities involving adult females.

The North Louisiana parishes lead in second place with the most adult males (55 and 17.8% of total), while the Greater New Orleans parishes came in third with most adult males (54 and 17.5% of total) that have resulted in fatalities when alcohol was present. The two southern regions, Acadiana and Greater New Orleans, are combined for 54.8% of all adult males that have resulted in fatalities.

Another interesting note is that Acadian leads all regions in the state with the most young adult and youth drivers and occupants who are male with alcohol present resulting in a fatality. In terms of drugs present in crashes with fatalities, Acadiana also leads all regions in that criteria for adult male and female drivers. Adult male and female drivers, and occupants, in Acadiana also lead where both alcohol and drugs are present compared to the other regions.

Figure 9.3: Fatalities w/ Alc&Drugs by age & sex



NumFatalities for each Gender broken down by Age Range. Color shows details about Substance. The data is filtered on Louisiana Regions and Person Type. The Louisiana Regions filter keeps 6 of 6 members. The Person Type filter keeps Driver and Occupant. The view is filtered on Substance, Gender and Age Range. The Substance filter keeps YES (ALCOHOL AND DRUGS PRESENT), YES (ALCOHOL PRESENT) and YES (DRUGS PRESENT). The Gender filter keeps Female and Male. The Age Range filter keeps Adult, Senior, Underage, Young Adult and Youth.

Next, we will look at street/road type by parish crashes. How many crashes occur in each parish by road type? Which highway incurs the most crashes? How many of these crashes cause fatalities?

Figure 10: Crashes and Fatalities by Road Type

Louisiana Regions	Road Type			
	ONE-WAY ROAD OR STR..	TWO-WAY PHYSICAL BA..	TWO-WAY PHYSICAL SE..	TWO-WAY UNDIVIDED R..
Acadiana	20,949	6,491	47,465	200,684
Central Louisiana	5,183	478	10,690	41,323
Florida Parishes	12,885	6,889	47,336	117,684
Greater New Orleans	41,206	21,028	111,026	88,728
North Louisiana	12,728	3,712	31,457	100,986

NumCrashes broken down by Road Type vs. Louisiana Regions. Color shows numCrashes. The marks are labeled by numCrashes. The view is filtered on Louisiana Regions and Road Type. The Louisiana Regions filter keeps Acadiana, Central Louisiana, Florida Parishes, Greater New Orleans and North Louisiana. The Road Type filter keeps ONE-WAY ROAD OR STREET, TWO-WAY PHYSICAL BARRIER, TWO-WAY PHYSICAL SEPARATION and TWO-WAY UNDIVIDED ROAD OR STREET.

In **Figure 10**, it is clear that Acadiana is once again the region with the most number of crashes, including a total of 200,684 crashes occurring on a two-way undivided road or street. The main road types where most of the accidents occur are two-way undivided roads and two-way physical separation. In most parishes, crashes occur on two-way undivided road types. However, Greater New Orleans parishes had more crashes occur in two-way physical separations. With 111,026 recorded incidents, compared to 88,728 crashes on two-way undivided roads. This could be related to the fact that Greater New Orleans parishes have different geographical landscapes that forces them to build different types of roads. In fact, this region has indeed many crashes related to special roads, construction sites and toll roads, as we will see with further analysis.

Figure 11: Crashes and Fatalities for each Region by Highway Type

Highway Type		Acadiana	North Louisiana	Louisiana Regions Greater New Orleans	Florida Parishes	Central Louisiana
STATE ROAD	numCrashes	131,220	46,620	43,211	68,104	22,540
	numFatalities	1,079	446	254	461	309
US HIGHWAY	numCrashes	38,552	34,328	46,273	29,872	17,734
	numFatalities	287	223	189	106	120
INTERSTATE	numCrashes	22,418	17,059	32,076	25,384	2,003
	numFatalities	300	196	223	147	33
PARISH ROAD	numCrashes	24,927	11,891	60,957	16,898	5,463
	numFatalities	227	125	123	104	63
CITY/LOCAL ROADS AND ST..	numCrashes	59,681	40,193	79,959	45,995	10,235
	numFatalities	80	86	118	82	18
TOLL ROAD	numCrashes	8	17	826	6	3
	numFatalities	0	0	5	0	0

NumCrashes and numFatalities broken down by Louisiana Regions vs. Highway Type. Color shows numFatalities. The marks are labeled by numCrashes and numFatalities. The view is filtered on Louisiana Regions and Highway Type. The Louisiana Regions filter keeps Acadiana, Central Louisiana, Florida Parishes, Greater New Orleans and North Louisiana. The Highway Type filter keeps 6 of 7 members.

Figure 11 shows the number of crashes and fatalities for each region by highway type. The table starts with the highway type that has the highest number of fatalities first and descending. The darker the color, the higher the number of fatalities. By looking at the table, it can be easily seen that city roads and parish roads are safer than interstate highways, in terms of fatalities. When comparing crashes, it is interesting to note that, with the exception of Greater New Orleans

parishes, State Roads experience the highest number of crash occurrences across all parishes, followed by city and local streets, and then US highways. Interstates ranks 5th in number of crashes, but 3rd in number of fatal crashes. City and local roads rank 2nd in number of crashes, but 5th in number of fatal crashes. This concludes the fact that city street accidents occur more frequently, but are less fatal. Whereas, interstate road highway accidents happen less frequently, but at faster speeds, therefore a greater chance of a fatal crash occurring compared to city roads. Furthermore, Greater New Orleans parishes have an unusually high number of Toll Road accidents (avg. 100x more) compared to other parishes and regions.

The next focus will be looking at how the number of crashes and fatalities increase with the type of protection system used (proper vs. improper), as well as which are the safest regions and parishes to drive in. Also, the assumption is made that for a protection system to be considered to be used properly it would fall under one of the following categories: shoulder and lap belt used, helmet used, child safety seat properly used. All other categories are considered improper use of protection systems.

Figure 12.1: Improper Use of Protection Systems (Top 10 in Crashes)

Parish	Louisiana Regions	Protection System				Grand Total	numCrashes 162 9,996
		SHOULDER BELT ONLY USED	NONE USED - VEHICLE OCCUPANT	LAP BELT ONLY USED	CHILD SAFETY SEAT IMPROPERLY USED		
Orleans	Greater New Orleans	9,996	4,023	1,997	518	15,637	
East Baton Rouge	Florida Parishes	3,507	4,995	2,192	718	10,910	
Jefferson	Greater New Orleans	2,127	3,914	1,990	507	8,162	
Caddo	North Louisiana	2,609	2,034	780	287	5,500	
Lafayette	Acadiana	1,071	2,468	1,090	473	4,880	
Calcasieu	Acadiana	625	2,249	821	248	3,779	
Ouachita	North Louisiana	927	1,826	744	246	3,520	
St. Tammany	Greater New Orleans	483	2,075	881	214	3,493	
Rapides	Central Louisiana	676	1,830	533	162	3,055	
Tangipahoa	Florida Parishes	498	1,797	727	190	3,008	
Grand Total		22,519	27,211	11,755	3,563	61,944	

NumCrashes broken down by Protection System vs. Parish and Louisiana Regions. Color shows numCrashes. The marks are labeled by numCrashes. The data is filtered on Top10ParishesbyCrash and Driver & Occupant. The Top10ParishesbyCrash filter keeps 10 members. The Driver & Occupant filter keeps 2 members. The view is filtered on ProtectionSystem-improper, which keeps 4 members.

In **Figure 12.1**, it can be said that this includes the list of the parishes with drivers most willing to endanger themselves. The table above shows how many vehicle occupants did not use properly the protection systems at the time of the crash. These indicators are displayed by number of crashes, not fatalities. The colors contrast how many did not properly use safety systems, with the red color showing the most. It can be immediately noticed that, in the Greater

New Orleans region, the Orleans parish had almost 10,000 cases of crashes where the shoulder belt only was used (no lap belt). Throughout all the parishes, a moderate-high number of crashes, 44% of total crashes happened when no protection system was used by the occupants. This means that, if you usually ride with someone that does not wear protection equipment, chances are there will be a car crash, according to the numbers. In other words, occupants who do not use any protection systems are more likely to crash (27,211 recorded) than occupants who use at least a shoulder belt (22,519 recorded) or any more form of safety. While the proper or improper use of a protection system cannot directly cause a person to crash, it could be argued that drivers ignorant to the effects of protection systems are more likely to be involved in a crash.

Figure 12.2: Improper Use of Protection Systems (Bottom 10 in Crashes)

Parish	Louisiana Regions	Protection System				Grand Total
		NONE USED - VEHICLE OC..	SHOULDER BELT ONLY U..	LAP BELT ONLY USED	CHILD SAFETY SEAT IMPRO..	
Catahoula	Central Louisiana	223	7	33	6	257
Caldwell	North Louisiana	119	19	28	8	161
Red River	North Louisiana	128		21	1	143
Franklin	North Louisiana	114		14	5	128
East Feliciana	Florida Parishes	77	35	17	2	126
West Feliciana	Florida Parishes	83	23	17	5	123
Jackson	North Louisiana	90	8	19	1	113
West Carroll	North Louisiana	85	4	17	6	108
East Carroll	North Louisiana	58	22	10	2	85
Tensas	North Louisiana	42	1	5		47
Grand Total		1,019	119	181	36	1,291

NumCrashes broken down by Protection System vs. Parish and Louisiana Regions. Color shows numCrashes. The marks are labeled by numCrashes. The data is filtered on Driver & Occupant, which keeps 2 members. The view is filtered on Protection System and Bottom10ParishesbyCrash. The Protection System filter keeps CHILD SAFETY SEAT IMPROPERLY USED, LAP BELT ONLY USED, NONE USED - VEHICLE OCCUPANT and SHOULDER BELT ONLY USED. The Bottom10ParishesbyCrash filter keeps 10 members.

Figure 12.2, these are the parishes with the least number of crashes as per improper use of protection systems. It is interesting to note that the majority of these parishes are located in North Louisiana. Therefore, North Louisiana is the region with the least number of crashes even though protection systems might be improperly used. Again, the most common form of protection system that is not used is “none at all”, with 1,019 incidents recorded in total. Tensas, North Louisiana, is the parish with the least number of crashes in this case. On the other hand,

Catahoula in Central Louisiana has 223 recorded crashes, which is more than five times more than Tensas.

Figures 12.3 and 12.4 show the top 10 and bottom 10 parishes, respectively, in fatalities when improperly using protection systems. Here we see that East Baton Rouge parish has the most fatalities (135) when not using any protection systems, followed closely by St. Tammany (131). Catahoula (20) tops the lower 10 parishes, followed by a tie (18) between East Feliciana and Franklin. When reviewing 12.3 it is obvious, and expected, that the most fatalities occur when no protection system is used and cut dramatically even when seat belts are only improperly worn.

Figure 12.3: Improper Use of Protection Systems (Top 10 in Fatalities)

Parish	Louisiana Regions	Protection System				Grand Total
		SHOULDER BELT ONLY USED	NONE USED - VEHICLE OCCUPANT	LAP BELT ONLY USED	CHILD SAFETY SEAT IMPROPERLY USED	
Tangipahoa	Florida Parishes	0	118	1	1	120
Calcasieu	Acadiana	3	116	2	3	124
St. Tammany	Greater New Orleans	0	131	1	1	133
Rapides	Central Louisiana	0	76	0	0	76
Lafayette	Acadiana	2	90	0	0	92
Ouachita	North Louisiana	0	57	2	1	60
Caddo	North Louisiana	3	89	0	3	95
East Baton Rouge	Florida Parishes	4	135	2	0	141
Jefferson	Greater New Orleans	1	82	0	0	83
Orleans	Greater New Orleans	3	69	0	0	72
Grand Total		16	963	8	9	996

Figure 12.4: Improper Use of Protection Systems (Bottom 10 in Fatalities)

Parish	Louisiana Regions	Protection System				Grand Total
		NONE USED - VEHICLE OCCUPANT	SHOULDER BELT ONLY USED	LAP BELT ONLY USED	CHILD SAFETY SEAT IMPROPERLY USED	
Catahoula	Central Louisiana	20	0	0	0	20
East Feliciana	Florida Parishes	18	1	0	0	19
Franklin	North Louisiana	18		0	0	18
Red River	North Louisiana	15		0	0	15
West Carroll	North Louisiana	13	0	0	0	13
Jackson	North Louisiana	12	0	0	0	12
Caldwell	North Louisiana	10	0	0	1	11
East Carroll	North Louisiana	9	0	0	0	9
West Feliciana	Florida Parishes	7	0	0	0	7
Tensas	North Louisiana	2	0	0		2
Grand Total		124	1	0	1	126

Figure 13.1: Proper Use of Protection Systems (Top 10 in Fatal)

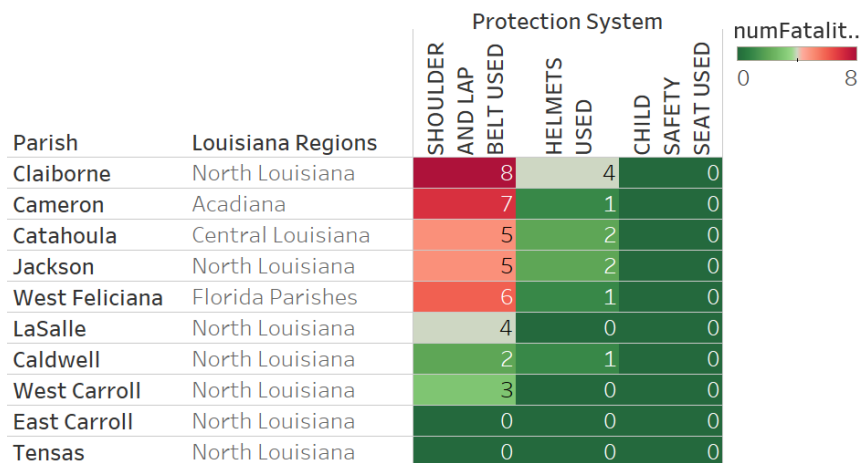
Parish	Louisiana Regions	Protection System			Grand Total
		SHOULDER AND LAP BELT USED	HELMETS USED	CHILD SAFETY SEAT USED	
East Baton Rouge	Florida Parishes	75	33	1	109
St. Tammany	Greater New Orleans	66	26	1	93
Calcasieu	Acadiana	69	17	2	88
Caddo	North Louisiana	53	27	0	80
Lafayette	Acadiana	45	27	0	72
Tangipahoa	Florida Parishes	57	13	0	70
Jefferson	Greater New Orleans	40	26	0	66
Orleans	Greater New Orleans	27	30	0	57
Ouachita	North Louisiana	32	7	2	41
Rapides	Central Louisiana	28	11	1	40
Grand Total		492	217	7	716

NumFatalities broken down by Protection System vs. Parish and Louisiana Regions. Color shows numFatalities. The marks are labeled by numFatalities. The data is filtered on Top10ParishesbyCrash and Driver & Occupant. The Top10ParishesbyCrash filter keeps 10 members. The Driver & Occupant filter keeps 2 members. The view is filtered on ProtectionSystem- Proper, which keeps 3 members.

Figure 13.1 shows the highest number of fatalities in parishes (top 10 parishes) while properly wearing protection systems. East Baton Rouge ranks at number one with a total of 109 fatalities (deaths) while wearing proper equipment, followed by St. Tammany and Calcasieu. Critically, this indicates that these fatalities are a result of another factor other than the use of protection

systems, because wearing protection systems should reduce the severity of injury, and the occupant wearing these systems is a relatively safe driver that is aware of the rules. With that said, it could be the fact that these locations are highly populated, congested or have a high number of traffic accidents, which drives the number of fatalities. Another factor that is influencing this high number of fatalities over the years could be road conditions, weather conditions, condition of driver, alcohol use, etc. in those regions. In summary, there should be another driving factor that is influencing this number of fatalities in particular regions, which will be explored throughout this report.

Figure 13.2: Proper Use of Protection Systems (Bottom 10 in Fatal)



NumFatalities broken down by Protection System vs. Parish and Louisiana Regions. Color shows numFatalities. The marks are labeled by numFatalities. The data is filtered on Driver & Occupant, which keeps 2 members. The view is filtered on bottom10parishesbyfatalities and ProtectionSystem-Propor. The bottom10parishesbyfatalities filter keeps 10 members. The ProtectionSystem-Propor filter keeps 3 members.

The above **Figure 13.2** shows good numbers that include the “Bottom 10” in number of fatalities (least fatal parishes) while using proper safety systems. This does again confirm that the safest parishes are located in North Louisiana, with 6 of them in this list. Additionally, no crashes were recorded when child safety seats were used in the 10 safest-driving parishes in Louisiana. East Carroll and Tensas recorded no fatalities while wearing the protection systems, which ranks them as the best parishes to drive as a safe driver.

-The following section will focus on time of day per crashes and fatalities: on average, what time of day was recorded as the most frequent crashes in terms of road accidents? Which hour of the

day is the least/most dangerous to drive? Also, how does substance use influence crashes (alcohol and drugs)?

Figure 14: Crashes/Fatalities by Time of Day



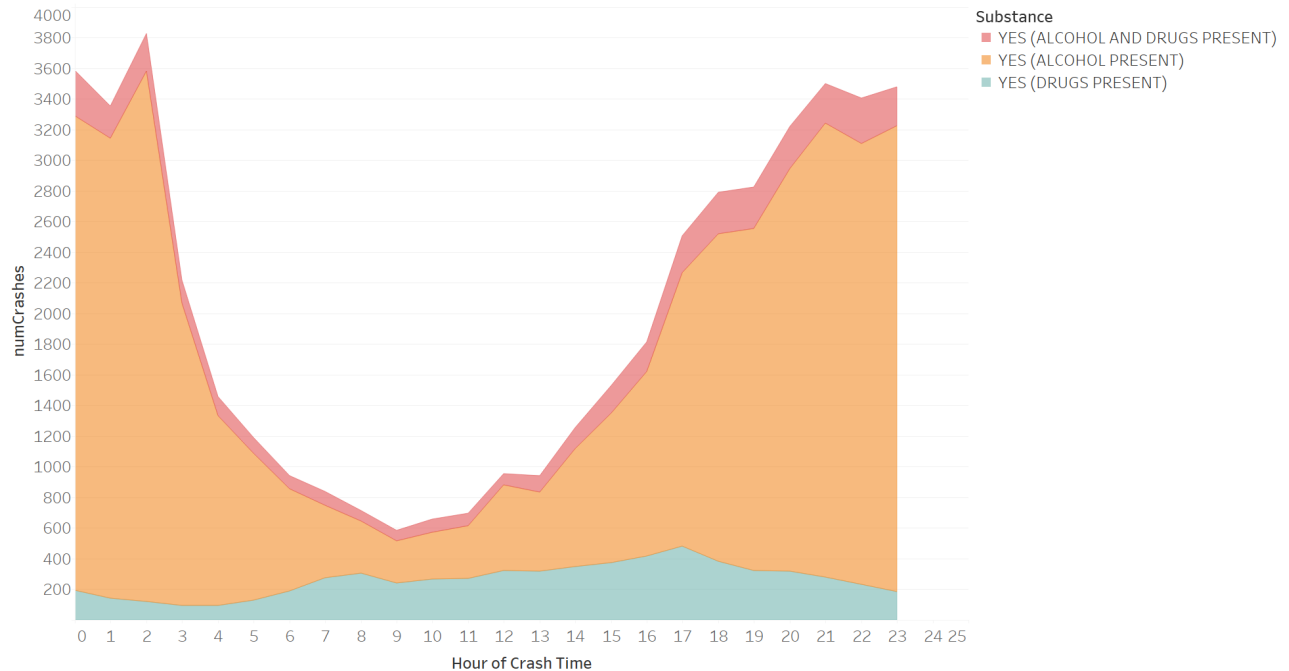
The trends of numCrashes and numFatalities for Crash Time Hour. Color shows details about numCrashes and numFatalities.

To start, looking at the graph above (**Figure 14**) shows a general view of crash trends in Louisiana. Note that hour of crash time is represented on the x-axis and '0' is equivalent to 12AM up to '23', which is 11PM. The number of fatalities (deaths) in a crash is equal to an average of 0.01% of crashes. Moreover, it can be seen that the trend of fatalities vs. crashes vary throughout the day, except from 8AM to 6PM, where they follow a similar pattern, as people commute to and from work. Also, 5PM is recorded as the time with the most number of crashes, most likely due to people being fatigued and commuting back home from work, not to mention the change in lighting, road, weather patterns and driver itineraries as we progress through the day.

From 6PM to 11PM, the number of crashes starts to drop significantly, because most people are already home from work, but average fatalities start to rise because there are more likely to be dangerous drivers at those times, who might be under the influence of substances, more fatigued, stressed, confused or have other itineraries than the usual work route. Furthermore, 9PM is recorded is the most frequent time of fatal accidents. Then, from 12AM to 6AM, there is an obvious higher risk of fatalities, as well. Specifically, the number of fatalities rise by 25%

between 1AM and 2AM, likely due to the fact that it is a peak time where some drivers are commuting back home while intoxicated. To help explain further, we will dive into more detail:

Figure 15.1: Crashes by Time of Day (w/Alcohol & Drugs)



The plot of numCrashes for Crash Time Hour. Color shows details about Substance. The view is filtered on Substance, which keeps YES (ALCOHOL AND DRUGS PRESENT), YES (ALCOHOL PRESENT) and YES (DRUGS PRESENT).

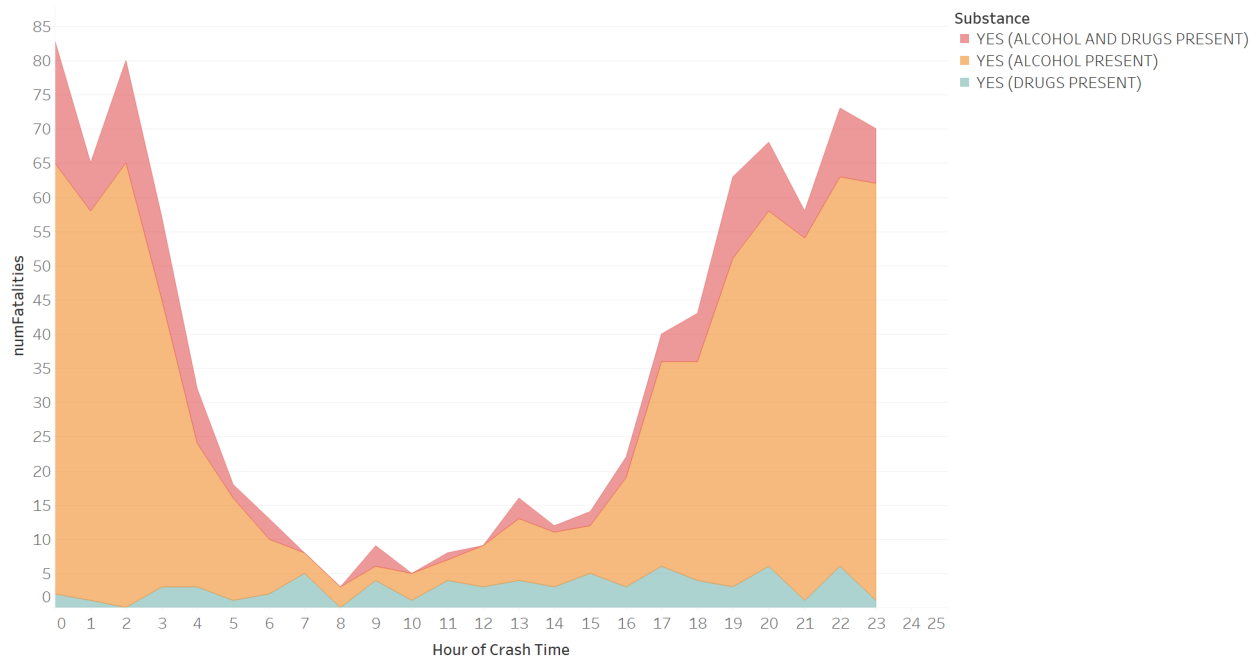
In **Figure 15.1**, notice the U-shaped curve as we transition throughout the day. Peak crash hours are between 12AM to 2AM, and from 6PM to 9PM. In other hours, people are usually sleeping at home, or are at work or school. Also, during work hours people are less likely to indulge in alcohol or any other substance-related activities. The filled colors on the graph indicate whether or not there was alcohol involved in the crash incident. Also note that these are recorded incidents in the state of Louisiana only, which is the focus of this report, and there might be different-shaped peak times for vehicle accidents in other states.

Looking at the chart, it can be seen that most of the crashes indeed happened while alcohol only was involved (the driver had some level of alcohol in his/her system), much more than when drugs were involved. Moreover, when both drugs and alcohol were involved in the system, there were much less recorded instances because most people are unwilling or do not have the capacity to drive while both being intoxicated and under the influence of drugs.

In terms of time of the day with substance-related crashes, 2AM and 9PM are the peak hours of alcohol-related incidents, with 3,463 and 2,961 recorded crashes, respectively. This can be explained by a number of reasons, including people being intoxicated after a long night, their motor skills slightly impaired, and choose to drive at 2AM. Also, people who choose to start

drinking around after work times and peak at 9PM as can be seen on the graph that the U-shaped curve starts inclining (increasing) after work hours. Furthermore, there is a slight spike at noon (12PM) where people sometimes commute to indulge in lunch break activities, and the spike relaxes after lunch hours. Furthermore, it is not a perfectly-shaped U curve because after 1PM and 2PM, some people are either leaving work earlier or picking up their children from school. Other people might have night shifts and start their day afternoon.

Figure 15.2: Fatalities by Time of Day (w/Alcohol and Drugs)

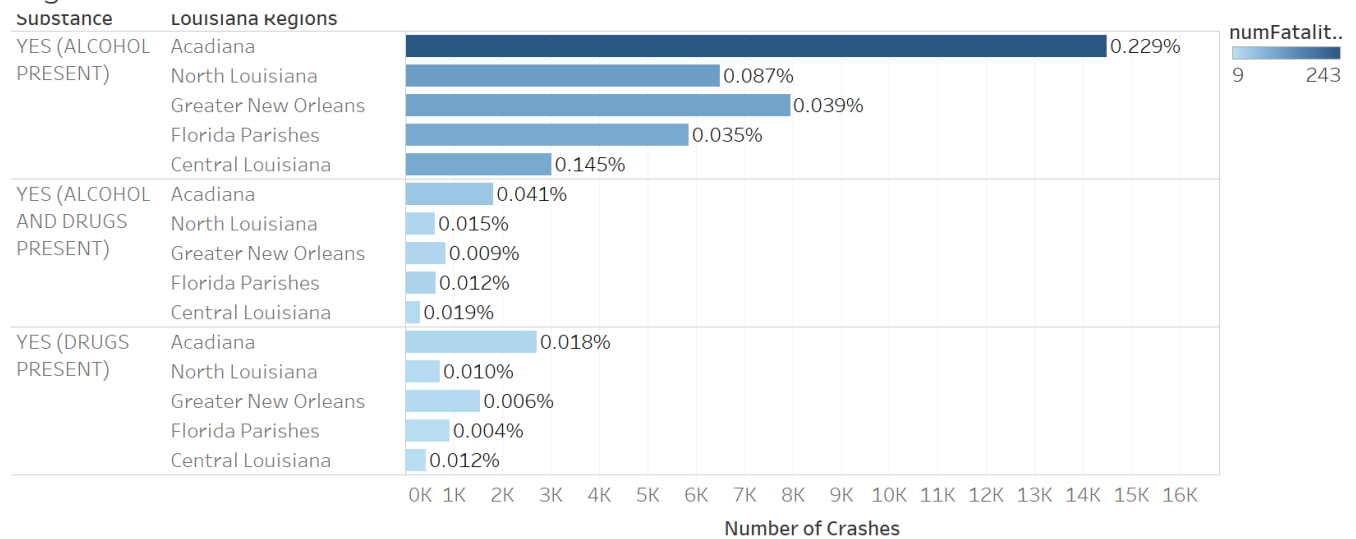


The plot of numFatalities for Crash Time Hour. Color shows details about Substance. The view is filtered on Substance, which keeps YES (ALCOHOL AND DRUGS PRESENT), YES (ALCOHOL PRESENT) and YES (DRUGS PRESENT).

Figure 15.2 shows the average number of fatalities in each hour of the day. Note that, even though in the previous chart we found that 9PM and 2AM to be the hours with the most frequent number of crashes recorded, the case with actual fatalities is more restricted, according to the above graph. We find 12AM and 2AM to be the times of highest recorded fatalities with 83 and 80 on average, respectively. Also, in this case, 8PM (68 fatalities) and 10PM (73 fatalities) cause 22% more fatalities than crashes at 9PM (58 fatalities), even though crashes at 9PM occur more frequently. Moreover, alcohol substance is again the most influential in those incidents, with drugs showing no noticeable trends or spikes but rather consistently low averages (1-5 fatalities) throughout each hour of the day. However, crashes with the combination of alcohol and drugs cause more fatalities on average. In other words, drivers under the influence of both drugs and alcohol at the same time are 10% more likely to cause fatal car crashes than frequent crashes with no injuries.

The following bar charts will visually summarize the above information on substance:

Figure 16: Crashes and Fatalities with Substance Present

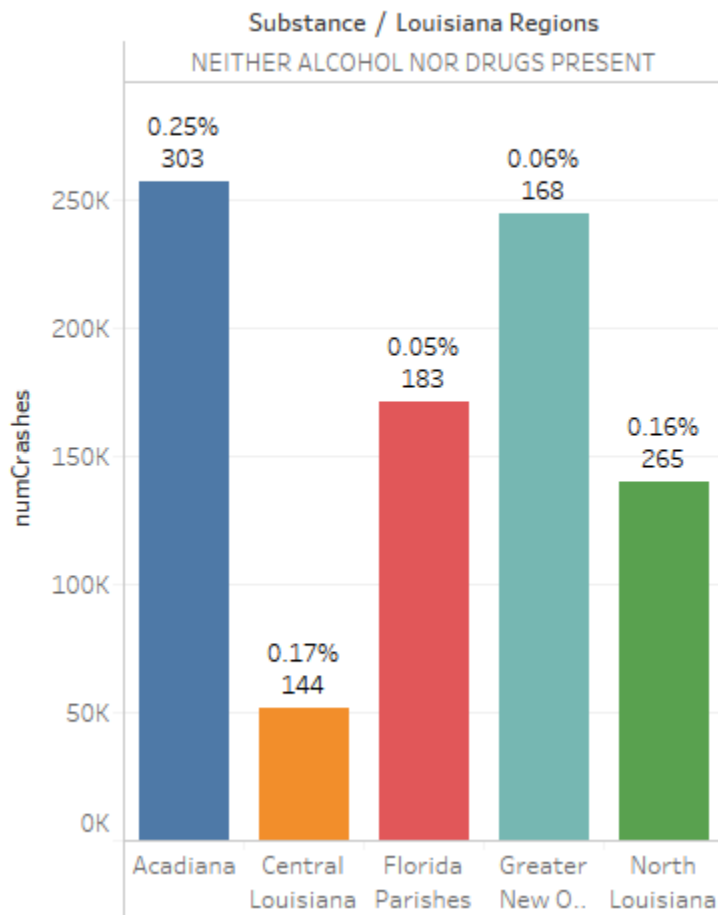


NumCrashes and numFatalities for each Louisiana Regions broken down by Substance. Color shows numFatalities. The marks are labeled by %fatalities of Population. The view is filtered on Substance, which keeps YES (ALCOHOL AND DRUGS PRESENT), YES (ALCOHOL PRESENT) and YES (DRUGS PRESENT).

Figures 16 and 17 show fatalities as a percentage of the total population in a region. In figure 16, it is showing percentages of fatalities as per population with substance present (such as alcohol). In figure 17, it is showing percentages with no substance present, above the number of fatalities for that region.

Looking at the chart above, the bar size indicates number of crashes, while the color saturation indicates number of fatalities. Acadiana once again has the highest number of fatalities on all three conditions of substance abuse with 243 fatalities while under the influence of alcohol, 23 fatalities with drugs alone, and 48 while having alcohol and drugs at the same time. While North Louisiana is ranked 2nd in terms of fatalities with substances, Greater New Orleans is ranked 3rd on fatalities, but on average has 30% higher frequency of crashes than North Louisiana. On the other hand, fatalities occurring in crashes with no substance involved 0.25% of the population in Acadiana, with a total of 256,429 crashes and 303 fatalities. Furthermore, a total of 244,171 non-substance crashes were recorded in Greater New Orleans, with 168 fatalities that make up 0.06% of the population in that region. The number of fatalities with no substance involved in Acadiana is double that of Greater New Orleans, and the percentage of fatalities-to-population is 4x higher, as seen in the bar chart below:

Figure 17: Crashes and Fatalities with No Substance Present



CONCLUSION

The data showed us that alcohol plays a major factor in the amount of crashes and amount of fatal crashes in Louisiana. The time of day which had the most fatal crashes was 3:00am. It is no coincidence that most bars and nightclubs close between 2:00am and 3:00am, when the fatal crash rate spikes. Logically this would mean there would be an increase of drunk drivers on the road at these times. Also, the lowest amount of fatal crashes occur at 8:00am. This is usually when people are driving to work or school. There are no bars or nightclubs open at 8:00am so that logic also correlates. Another contributing factor was road type. Most fatal crashes occur on two lane roads with no divider, and State highways, which are usually two lane roads. This finding correlates with the time of night at 3:00am being the hour with most fatalities as drunk drivers may accidentally steer out of their lane just for a few seconds and be hit by oncoming

traffic at the speed limit or higher. When we analyzed protection systems, our data showed that in East Baton Rouge parish, 135 fatalities occurred when the driver and/or occupant did not wear their seat belt properly compared to only 75 fatalities when the driver and/or occupant did wear their seat belt properly. That's a 45% reduction in fatalities simply from wearing seat belts correctly. Also, in Catahoula parish, there were 20 fatalities when the driver and/or occupant did not wear a seat belt properly compared to 5 fatalities when the driver and/or occupant did wear their seat belt properly. The data shows that proper use of the seat belt helps reduce fatalities in crashes. When looking at how weather conditions affected crashes, we can see that a majority of crashes occur during clear weather, but this is likely due to the fact that most people try to stay off of the roads during adverse weather. There are about 35% - 45% the number of crashes occurring during adverse weather conditions than there are during clear weather conditions, however, fatalities in these crashes are much lower. Our data showed evidence that weather conditions play a part in fatalities during crashes, but as stated before, the numbers are likely low because people do not usually drive in adverse weather unless they need to.

After breaking down drunk drivers by age group and gender, our data showed that more accidents and fatal crashes involved adult males than any other age group and gender.

Our recommendations to help reduce fatal crashes in louisiana would be as follows:

- Acadiana Parishes -
 - enforce seat belt laws
 - enhance programs to make people more aware of the dangers of improperly wearing seat belts.
 - Provide better information on careful driving in rainy, and foggy conditions.
 - Enhance undivided roadways
 - Better lighting
 - Reflectors in the center of the road
 - Create/Enhance programs to target adult males for increasing safer driving.
 - Stress the dangers of drunk driving
 - Create more DWI checkpoints
 - More psa's about drunk driving
 - Offer programs to assist in getting drunk drivers home
- Florida Parishes -
 - enforce seat belt laws
 - enhance programs to make people more aware of the dangers of improperly wearing seat belts.
 - Enhance undivided roadways
 - Better lighting
 - Reflectors in the center of the road
 - Create/Enhance programs to target adult males for increasing safer driving.

- Greater New Orleans parishes -
 - enforce seat belt laws
 - enhance programs to make people more aware of the dangers of improperly wearing seat belts.
 - Enhance roadways with physical separation
 - Better lighting
 - Better signage
 - Create/Enhance programs to target adult males for increasing safer driving.
 - Stress the dangers of drunk driving
 - Create more DWI checkpoints
 - More psa's about drunk driving
 - Offer programs to assist in getting drunk drivers home

- North Louisiana Parishes -
 - Enhance undivided roadways
 - Better lighting
 - Reflectors in the center of the road
 - Stress the dangers of drunk driving
 - Create more DWI checkpoints
 - More psa's about drunk driving
 - Offer programs to assist in getting drunk drivers home

Overall, enhance programs to stress the dangers of drunk driving, add more DWI checkpoints between 2:00am and 3:00am, and have a greater effort to bring drunk driving awareness to adult males. Improve the safety of state roads, with better lighting, reflectors, and warning tracks. Also, make lanes more visible in poor lighting and adverse weather conditions. Lastly, stress the importance of properly using safety/protection systems and incorporate more seat belt checks. We believe that these changes could have a positive impact in reducing fatalities given the factors our data has revealed.