Improvement of Fatal Crash Analysis and Follow-Up

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Research Report
KTC-18-19/M3DA-18-05-1F

Improvement of Fatal Crash Analysis and Follow-Up

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Executive Summary

Fatalities resulting from traffic crashes in Kentucky increased from a low of 638 in 2013 to 834 in 2016 (a 31% increase), and there is not a full understanding of the underlying causes for this trend. This study analyzes fatal crashes using data from both Kentucky's crash reports and the National Highway Traffic Safety Administration's (NHTSA) Fatal Accident Reporting System (FARS) to identify countermeasures to combat increasing fatal crash rates. In addition, this study compares Kentucky's crash reports to the fatal crash data in FARS to identify data inconsistencies and recommend procedures to eliminate these inconsistencies.

Emphasis was placed on fatal crashes involving alcohol and drugs because police-reported crash data in Kentucky do not clearly represent the magnitude of alcohol- and drug-related fatal crashes. More detailed analysis of fatal crashes involving alcohol and drugs provides an understanding of the patterns of impaired drivers in terms of their overall characteristics, crash locations, time of day, types of drugs, and other identifying factors that affect patterns and behavior.

The study identified crashes involving mature drivers (65+) and lane departure crashes as fatal crash types with the greatest increases since 2013. Pedestrian, motorcycle, intersection, and impairment-related fatal crashes also demonstrated increasing fatal crash rates in 2016. Analysis of restraint use showed that almost 54% of the fatally injured people in 2016 were not wearing a seatbelt when one was available to them. Of those fatally injured in a motorcycle crash, nearly 72% were not wearing a helmet.

Based on FARS data, there were 160 fatal crashes in Kentucky in which a driver tested positive for alcohol and 266 fatal crashes where a driver tested positive for at least one drug. The drugs most frequently found in drivers were tetrahydrocannabinol (THC), hydrocodone, and Xanax. In general, fatal crash frequency spiked during the morning and afternoon peak hour periods, with fatalities occurring more frequently between 11 am and 11 pm. The percent of potentially impaired (alcohol- and drug-involved) fatal crashes increased between 5 pm and 4 am from around 40% to a peak of 81% at 4 am.

Eastern Kentucky was identified as a region with high fatal crash rates and potentially impaired fatal crash rates. Both Ballard and Union Counties in Western Kentucky showed high fatality and potentially impaired fatality rates as well.

Comparisons between the FARS database and Kentucky's crash reports revealed inconsistencies between the date, time, location, injury severity, and impairment indications in the two databases. Recommendations stemming from this study were divided into four categories: enforcement, legislation/licensing, public involvement, and data collection. The recommendations are aimed at reducing crash fatalities, improving crash data collection, and improving consistency between Kentucky's crash reports and the national FARS database.

1. Introduction

Fatalities resulting from traffic crashes in Kentucky increased from a low of 638 in 2013 to 834 in 2016 (a 31% increase), and there is not a full understanding of the underlying causes for this trend. It is unknown whether improvements in the data collection and reporting of fatal crashes can result in more directed and applicable methods than presently being employed. Varying levels of investigation and reconstruction are being used by police agencies for fatal crashes and a comparative analysis of the information provided could determine whether the actual causes are being identified and reported. Results from the analysis could be used to identify countermeasures (e.g., legislation, engineering, education, enforcement, and emergency medical) to reduce fatal crashes.

In addition, a subset of all fatal crashes — those involving alcohol and drugs — would be given special attention. Police-reported collision data in Kentucky do not clearly represent the magnitude of alcohol- and drug-related fatal crashes. There is a significant level of underreporting when police-reported data are compared to data compiled by the National Highway Traffic Safety Administration (NHTSA) as part of the Fatal Accident Reporting System (FARS). For alcohol crashes in 2015, there were 110 police-reported fatal collisions. But when medical data are reviewed as part of FARS, the number of alcohol crashes increases to 162 (47% increase). Similarly, and with a much more significant increase, collisions with drug involvement totaled only 34 from police-reported data but increased to 233 when medical data from FARS were analyzed (nearly 600% increase).

The level of awareness associated with impaired driving is and has been an issue of significant importance; however, there appears to be an absence of positive results in the campaigns and countermeasures used to address the problem. More detailed analysis of the fatal crashes involving alcohol and drugs would be the first step in understanding the patterns of impaired drivers in terms of their overall characteristics, crash locations, time of day, types of drugs, and other identifying factors that affect patterns and behavior.

1.1 Goals and Objectives

- To identify countermeasures to reduce fatalities by 10% per year.
- To eliminate the variance of police-reported alcohol- and drug-related fatalities when compared to FARS data from 175% toward 0%.

1.2 Strategies and Activities

- Review all fatal crash reports for 2016.
- Analyze and document the consistency of investigation for fatal collisions.
- Compare results from police-reported fatal collision data and FARS data to identify differences.
- Recommend processes and procedures to improve inconsistencies between police-reported fatal collision data and FARS data.
- Recommend supplemental types of data for inclusion in fatal crash reports.
- Identify countermeasures to reduce fatal crashes.

2. Linking FARS and KyOPS Crashes

One of the goals of this study was to identify any inconsistencies between Kentucky's police-reported fatal collisions and the national FARS database. The databases are independent of one another, and therefore do not have a common unique crash identifier that can be used to match a police report to a FARS crash entry. Kentucky's police reports are housed in the Kentucky Open Portal Solution (KyOPS) database, which is maintained by the Kentucky State Police (KSP). Within this system, each crash has a unique identifier field called a Masterfile Number. Each FARS crash has a unique ID titled ST_CASE, which is a combination of a state's numerical ID and a fatal crash's assigned number. Although the unique IDs for each database cannot be used to link the two databases, both databases contain information about crash locations and times that can be used to link the crash reports to the FARS summaries.

Both databases contain a latitude and longitude to mark each fatal crash's location. The 763 fatal crashes in 2016 from each database were plotted separately in ArcMap based on latitude and longitude. Then the two databases were spatially joined so that each fatal crash from the FARS dataset was linked to the nearest fatal crash from the KSP dataset. The spatial join process also created a field showing the distance between each FARS crash and its nearest KSP crash. This spatial join showed the FARS and KSP database did not contain identical latitude and longitude values for each fatal crash because the distances to the nearest crash were not all zero. In some cases, multiple fatal crashes happened in close geographic proximity to others, so to ensure that each FARS crash was joined to its correct corresponding KSP crash, the research team manually reviewed each crash match.

The manual review compared the date and time of collisions of the matched crashes to ensure they were temporally and spatially coincident. Of the 763 spatial matches, 51 FARS crashes did not exactly match the date and time listed for the matched KSP crash. Of the 51 non-matching entries, 46 were found to have the same date, but the time was off by minutes to hours. These 46 crash pairs were determined to have been correctly linked, but the inconsistency in crash times between the two databases were noted. Of the remaining five crashes, two were to the correct KSP crash; however, the dates and times were off by a day and several minutes. The remaining three geographic crash matches did not match in location, date, or time. These crashes were reviewed further and matched to the correct KSP crash using date and time rather than spatial location, as it was determined that the coordinates of the FARS database did not accurately reflect the coordinates in the KSP crash reports. As a result of this matching process, each of the 763 FARS ST_CASE IDs were matched to each of the 763 KSP Masterfile Numbers to create a table was used to associate a single crash report with each entry in the FARS dataset.

3. Fatal Crash Statistics

In 2016, there were 763 fatal crashes on public roads in Kentucky resulting in 834 fatalities. This represents an increase of 69 fatal crashes and 73 fatalities over the previous year. Table 1 shows a summary of the crashes and people involved in the 2016 fatal crashes.

Table 1 2016 Fatal Crashes and People Involved Summary

2016 Fatal Crash Statistics	Total
Fatal Collisions	763
Fatalities	834
Single Vehicle Crashes	407
Multi Vehicle Crashes	356
Total People Involved	1894
Drivers	1175
Non-Driver Occupants	614
Non-Motorized People	105

In 2016, there was a relatively even distribution between single vehicle and multi-vehicle fatal crashes. Of the 1,894 people involved in fatal crashes, 834 were fatally injured. Greater analysis of each person type (driver, non-driver occupant, and non-motorized) involved in the fatal crashes is presented in Chapter 4. Figure 1 provides a visual representation of the increase in fatal crashes/fatalities and fatal crash rate, which has been evident since Kentucky reached a minimum in 2013.

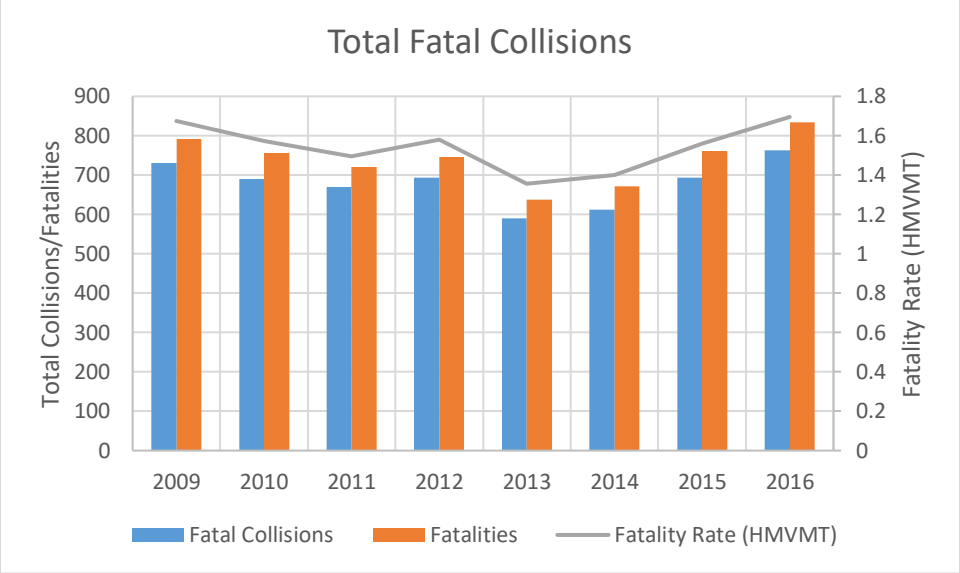

Figure 1 Annual Fatal Crashes, Fatalities, and Fatal Crash Rates

The fatal crashes and fatalities in Figure 1 are total numbers for each year. However, these total numbers do not account for any increases in traffic volumes, which would increase fatal crash exposure. Therefore, the fatal crash rates were also included in Figure 1. These rates are normalized by 100 million vehicle miles travelled (HMVMT) to account for changes in traffic volumes (i.e., crash exposure) throughout the years. As seen in Figure 1, Kentucky's fatal crash rate had shown a decreasing trend until hitting a low of 590 fatal crashes with 638 fatalities in 2013. Since 2013, the fatal crash rate has been increasing, with the pronounced increases in both 2015 and 2016. In order to identify possible countermeasures to combat increasing fatal crash rates, the research team first analyzed fatalities by crash type.

Kentucky has identified certain crash emphasis areas to track annually as a part of its Highway Safety Improvement Program (HSIP). Kentucky's emphasis areas include the following types of crashes:

- Aggressive driving (as indicated by police in police report)
- Bicyclist (involving vehicle and bicycle)
- Commercial vehicle
- Distracted driving (as indicated by police in police report)
- Impaired driving (as indicated by police in police report)
- Intersection
- Lane departure
- Mature driver (65+)
- Motorcycle
- Pedestrian (involving vehicle and pedestrian)
- Young driver (Teens)
- Construction work zone

The purpose of these emphasis areas is to monitor fatal and serious injury crashes in each of these categories to ensure Kentucky is actively implementing meaningful crash countermeasures using federal HSIP funds to combat these specific crash types. Figures 2-13 show the trends in fatal crashes, fatalities, and fatal crash rates in these 12 emphasis areas from 2009 to 2016.

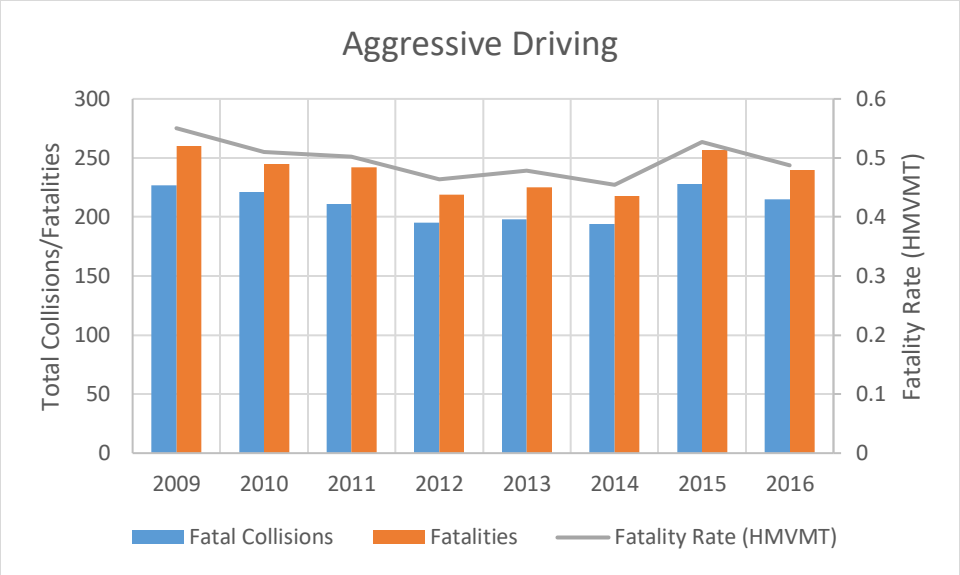

Figure 2 Aggressive Driving Fatal Crashes, Fatalities, and Fatal Crash Rates

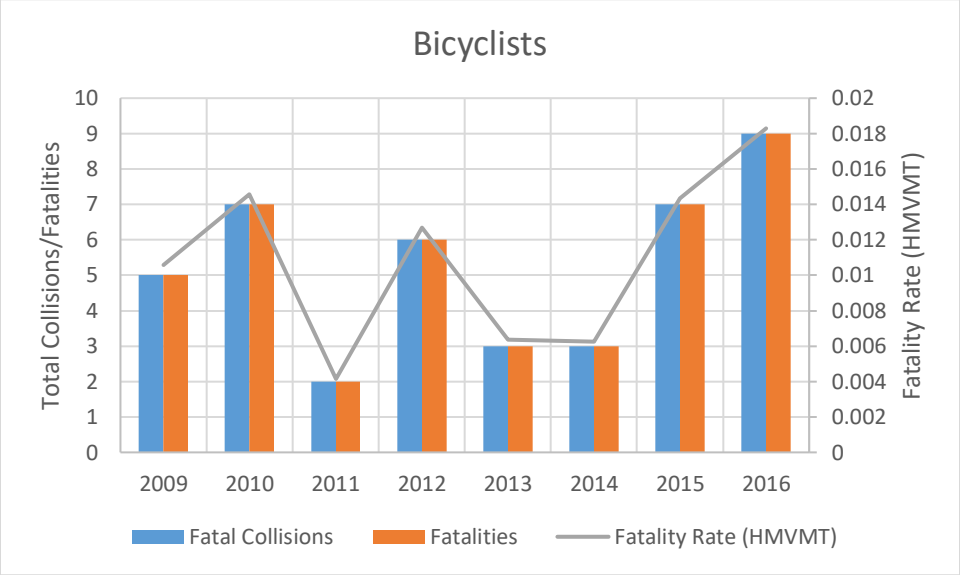

Figure 3 Bicyclist Fatal Crashes, Fatalities, and Fatal Crash Rates

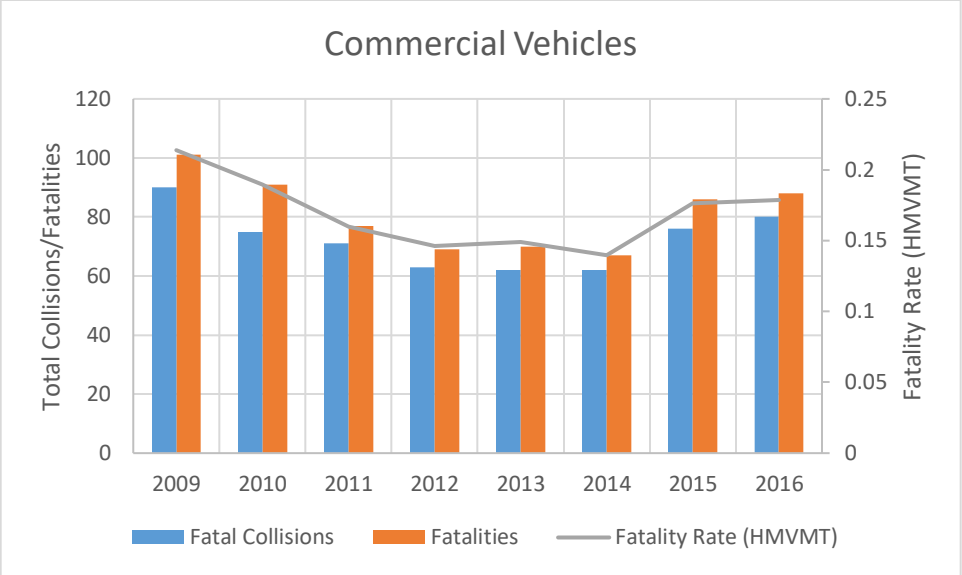

Figure 4 Commercial Vehicle Fatal Crashes, Fatalities, and Fatal Crash Rates

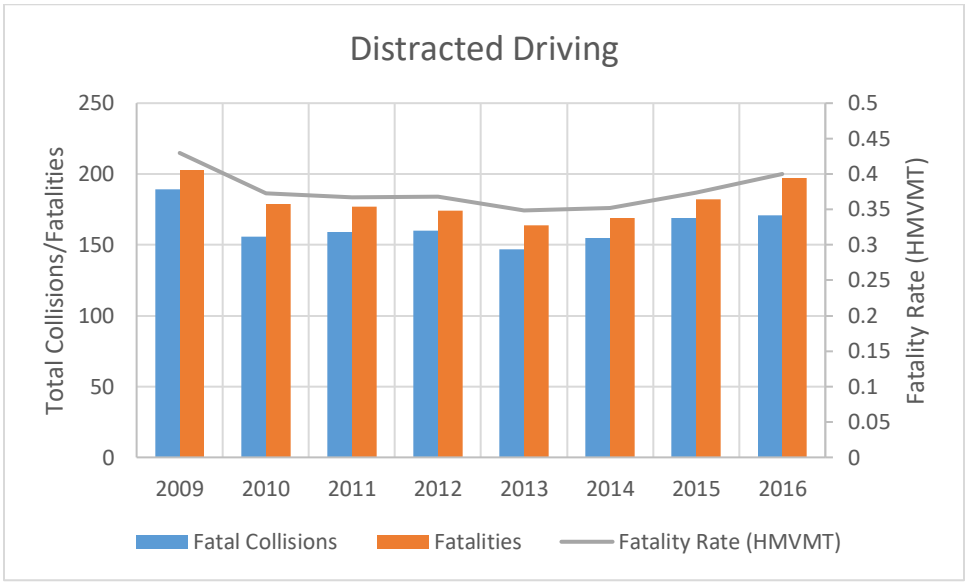

Figure 5 Distracted Driving Fatal Crashes, Fatalities, and Fatal Crash Rates

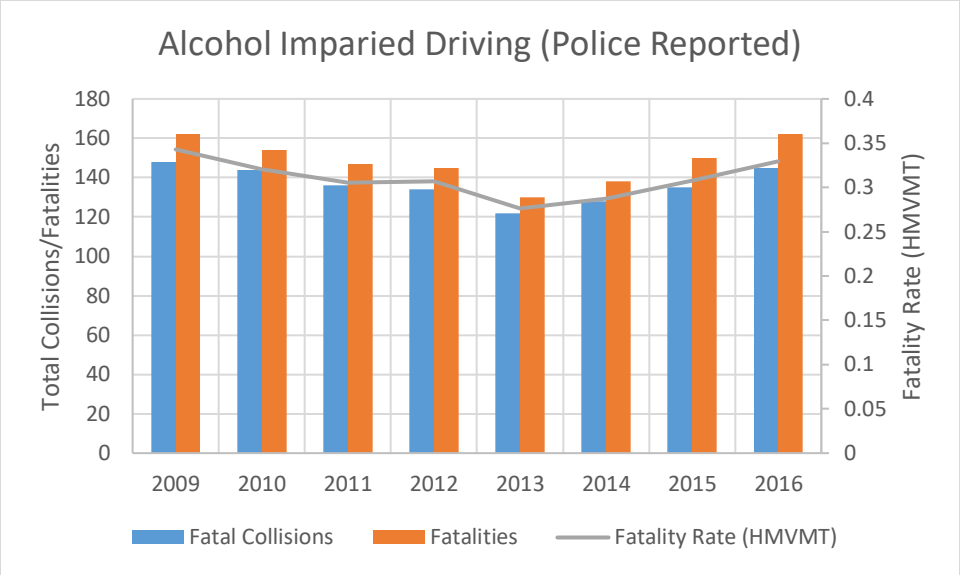

Figure 6 Impaired Driving Fatal Crashes, Fatalities, and Fatal Crash Rates

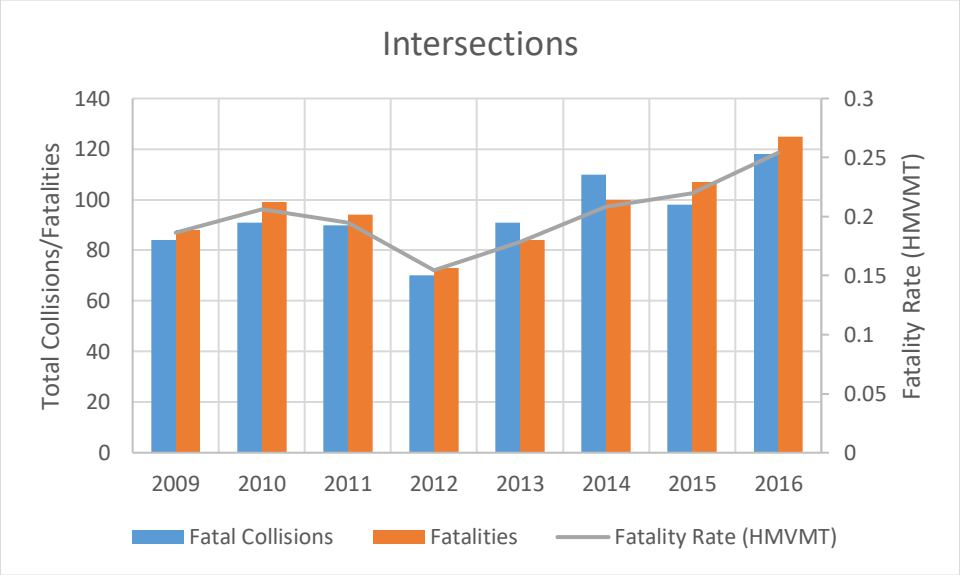

Figure 7 Intersection Fatal Crashes, Fatalities, and Fatal Crash Rates

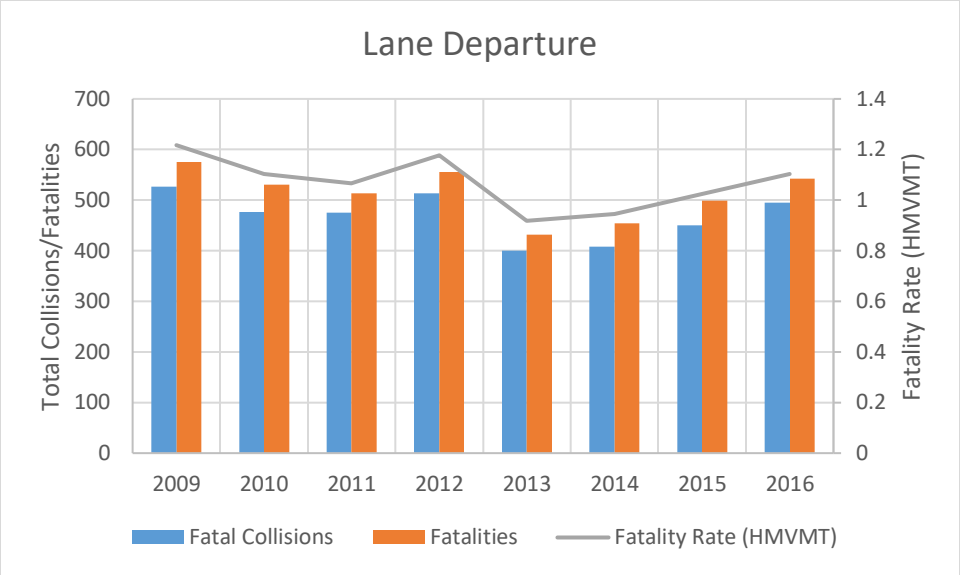

Figure 8 Lane Departure Fatal Crashes, Fatalities, and Fatal Crash Rates

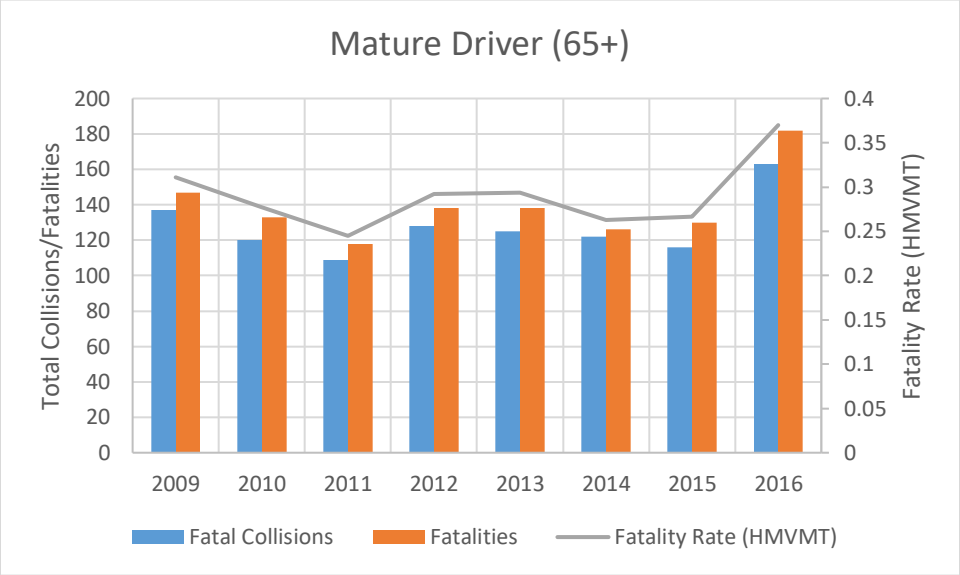

Figure 9 Mature Driver Fatal Crashes, Fatalities, and Fatal Crash Rates

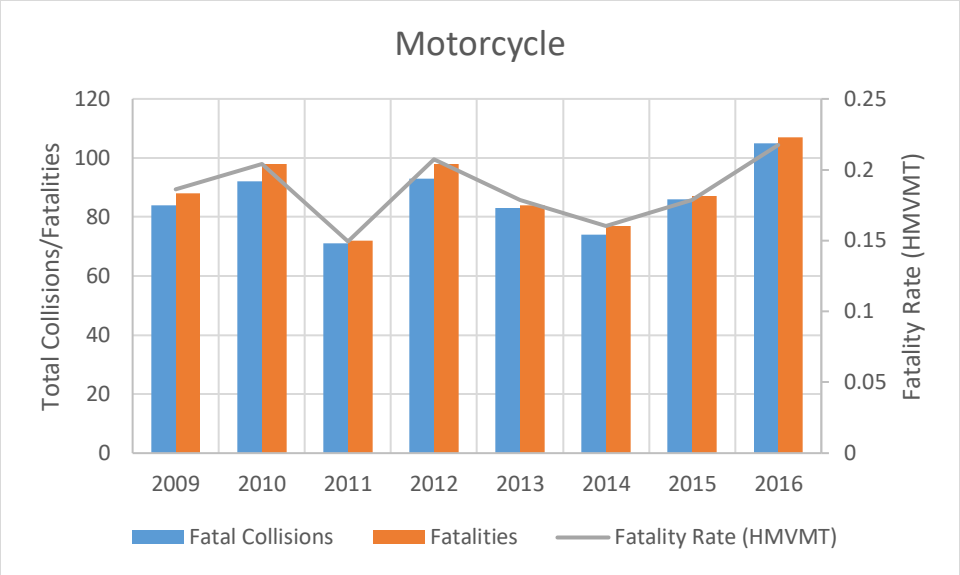

Figure 10 Motorcycle Fatal Crashes, Fatalities, and Fatal Crash Rates

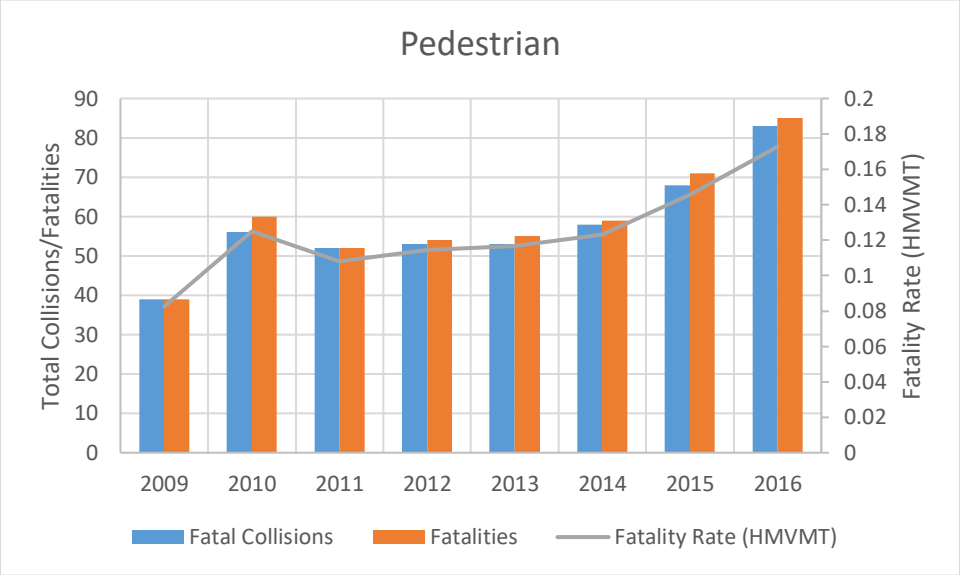

Figure 11 Pedestrian Fatal Crashes, Fatalities, and Fatal Crash Rates

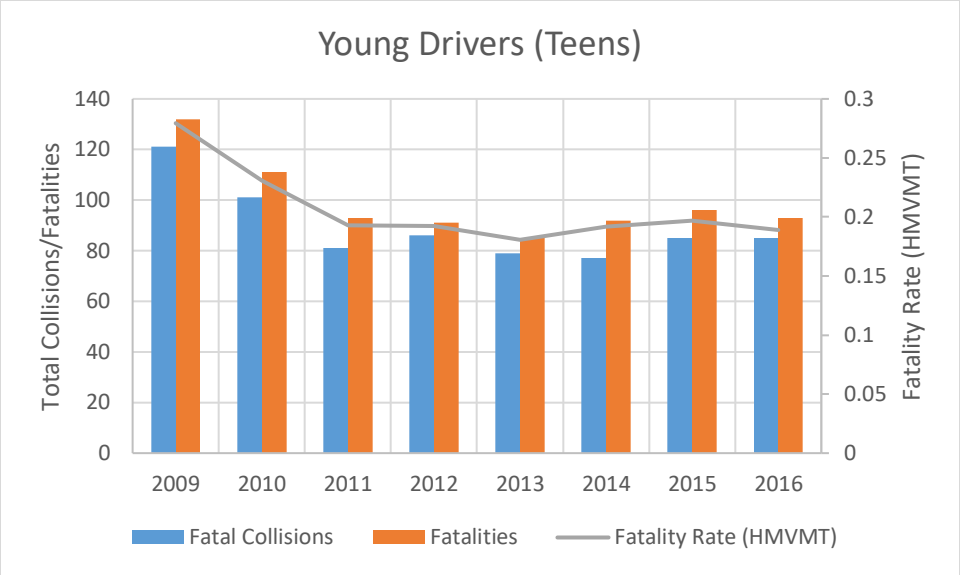

Figure 12 Young Driver Fatal Crashes, Fatalities, and Fatal Crash Rates

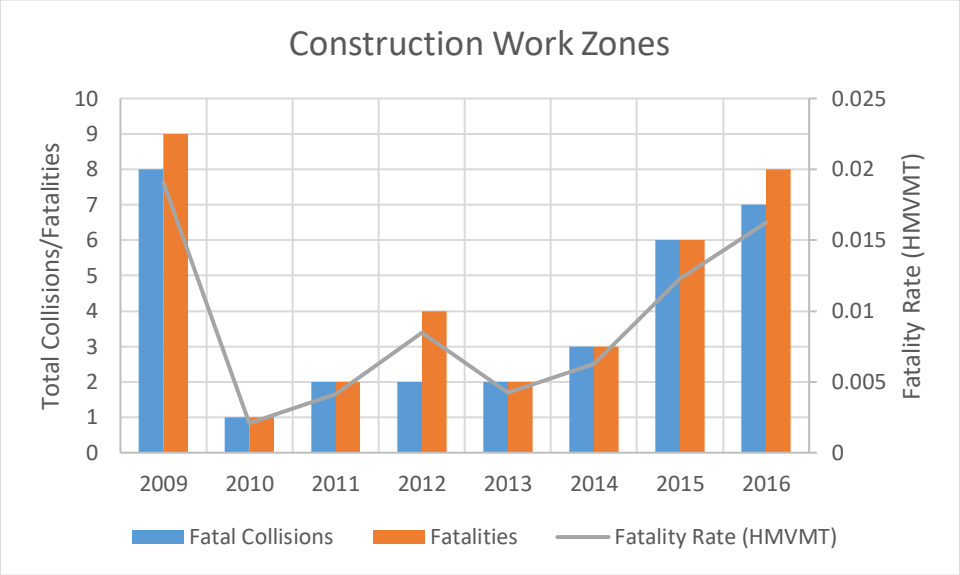

Figure 13 Construction Work Zone Fatal Crashes, Fatalities, and Fatal Crash Rates

Most of the emphasis areas mirror the overall fatal crash trends by showing increasing crash rates since around 2013. However, the mature driver emphasis area stands out from the rest due to its drastic increase in fatal crash rate. Between 2015 and 2016, mature driver fatal crashes increased by 47 crashes and 52 fatalities (an increase of 0.1 fatalities per HMVMT). The second highest increase was with lane departure crashes, which increased by 45 crashes and 44 fatalities (an increase of 0.08 fatalities per HMVMT) from 2015 to 2016.

The impaired driver, motorcycle, pedestrian, and intersection emphasis areas show increasing fatal crash rates. However, the magnitudes of these increases are significantly less than for mature

drivers and lane departure crashes, with increases of between 10 to 20 fatal crashes from 2015 to 2016. The aggressive driving, young driver, and commercial vehicle emphasis areas show either decreasing or stagnant trends for fatal crashes. Cyclist and construction work zone crashes appear to be increasing in both number of crashes and rates, but there are so few of these crashes happening annually that it is difficult to draw strong conclusions about these emphasis areas.

Tables 2 through 5 summarize the number of vehicles involved in crashes, manner of collision, location of the first event of the crash, and type of vehicles involved in the 2016 fatal collisions as coded in the police crash reports.

Table 2 Number of Vehicles Involved per Fatal Crash

Vehicles Involved	Number of Fatal Crashes
1	407
2	294
3	44
4	12
5	4
6	1
9	1

The majority of the 763 fatal collisions involved a single vehicle, with two-vehicle collisions being the second most common. One fatal collision involved nine vehicles.

Table 3 Manner of Collision for Fatal Crashes

Manner of Collision	Number of Fatal Crashes
Single Vehicle	407
Angle	125
Head On	116
Sideswipe Opposite Direction	25
Rear End	55
Opposing Left Turn	16
Sideswipe Same Direction	16
Rear to Rear	2
Backing	1

Other than single-vehicle collisions, angle collisions were the most fatal manner of collision. Head-on collisions had the third highest number of fatal collisions. These are as expected as head-on and angle crashes expose occupants to the more severe forces during a collision.

Table 4 Location of First Event for Fatal Crashes

Location of First Event	Number of Fatal Crashes
On Roadway	483
Outside Shoulder (Right)	128
Outside Shoulder (Left)	76
Other	30
Shoulder	29
Median	17

The location of the first event for a crash indicates where the action that caused the crash to occur happened. Based on the police reports, the actions that caused the majority fatal crashes happened on the roadway. The left and right shoulders were the next most common locations for first events as these indicate run-off-road fatal collisions.

Table 5 Vehicle Type of Fatally Injured Persons

Vehicle Type	Number of Fatalities
Sedan	255
Motorcycle	104
Non-Motorized	94
Standard Pickup	76
Compact Utility	74
Coupe	55
Compact Pickup	38
Minivan	24
Station Wagon	19
ATV	17
2/3-Door Hatch	13
Large Utility	13
Large Van	8
Truck-Tractor	8
4/5-Door Hatch	6
Convertible	5
Other Motored cycle	4
SU Truck (>26k lbs)	3
Other Vehicle	3
Unknown Pickup	2
SU Truck (19.5-26k lbs)	2

Three-Wheel Motorcycle	2
Farm Equipment	2
Car-Pickup	1
Utility Wagon	1
SU Truck (10-19.5K lbs)	1
SU Truck (unknown lbs)	1
Medium/heavy Pickup	1
Camper (Unknown Type)	1
Moped	1

Table 5 summarizes the vehicle type for each of the 834 fatalities, whereas the previous three tables showed summaries for the 763 fatal crashes. Sedans accounted for the highest percentage of fatalities, which is expected since sedans are the most common vehicle type on the road. Motorcycles and non-motorized persons were the next two most common groups for fatalities. Both motorcyclists and non-motorized persons (pedestrian and cyclists) have the least protection against impacts and are therefore more susceptible to fatal injuries during a crash. ATVs accounted for 17 fatalities on public roads, even though the use of ATVs are restricted on public highways in Kentucky according to KRS198.515. [1]

The time of a collision can provide information as to why it may have occurred. Figure 14 displays the time of day for the 763 fatal crashes in 2016 in one-hour blocks.

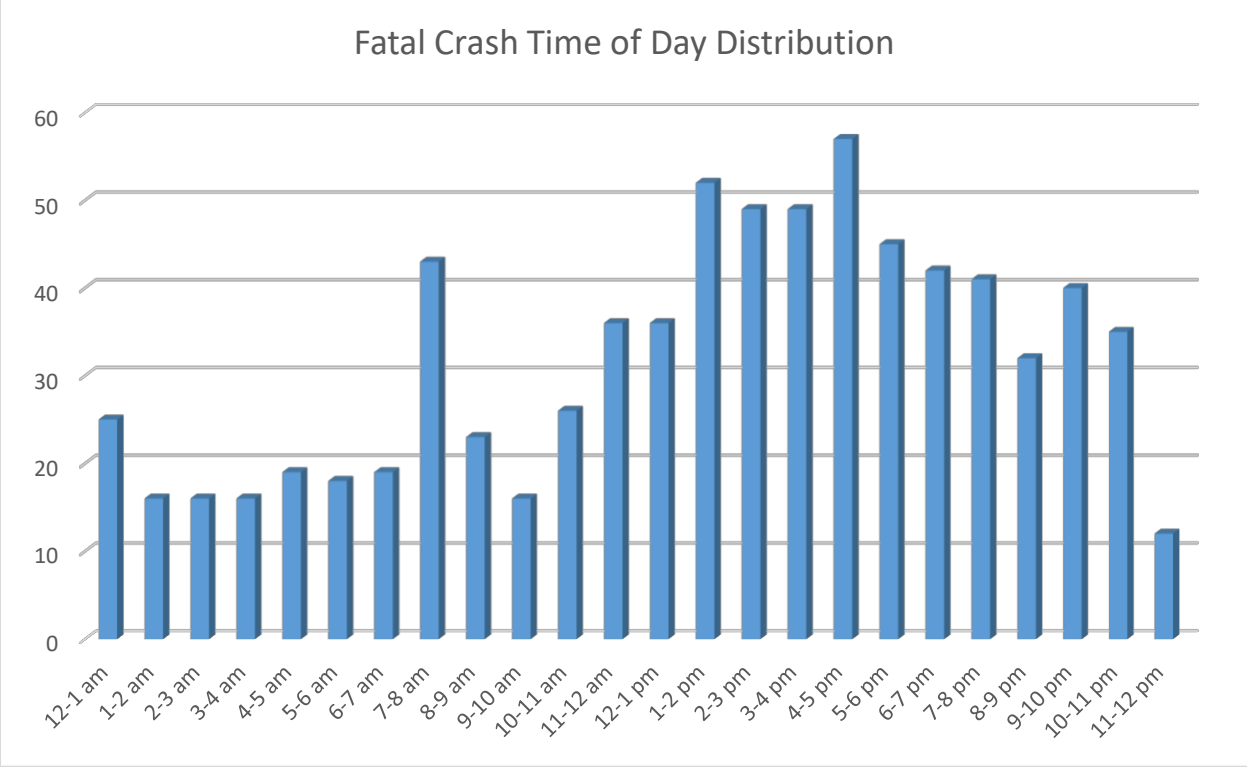

Figure 14 Temporal Distribution of Fatal Crashes

There are two noticeable peaks at 7-8 am and 4-5 pm — times corresponding to rush hour traffic from daily commutes. These are the times when roadways experience the highest daily traffic volumes, which increases crash exposure. In general, fatal collisions occur more frequently between 11 am and 11 pm, as these times coincide with higher traffic volumes. Crash frequency drops significantly during the overnight hours up until the morning rush hour peak at 7 am to 8 am. Fatal crashes occurring overnight could possibly be attributed to drug or alcohol impairment Chapter 4 explores this issue further.

In addition to a general analysis of the crashes, it is necessary to study the human factors related to the fatal crashes in order to identify effective crash countermeasures. One of the simplest and most effective actions a person can take to protect themselves from fatal injuries during a crash is to properly use their available safety restraint. Table 6 summarizes all persons involved in fatal collisions and their respective restraint usage as reported in the police crash reports.

Table 6 Restraint Use in Fatal Crashes

	Vehicle	**Motorcycle**	**Ped./Cyclist**	**Other/Unknown**	**Total**
Total Involved in Fatal Crashes	1,580	152	105	57	1,894
Total Fatalities	602	127	94	11	834
Restraint/Helmet Not Used (All People)	476	109	N.A.	N.A.	585
Restraint/Helmet Not Used (Fatally Injured Only)	324	91	N.A.	N.A.	415
% Unrestrained Fatality	53.82	71.65	N.A.	N.A.	N.A.

In 2016 of the 1,894 people involved in the 763 fatal crashes, 1,580 were in a vehicle (non-motorcycle) of some type. Out of the 1,580 people in vehicles, 602 were fatally injured. Of the 602 fatally injured, 324 were not wearing a seatbelt. This means almost 54% of the people fatally injured in a vehicle were not restrained by a seatbelt. These fatalities could have possibly been avoided had those 324 people used the proper restraint. Motorcycle riders accounted for 152 of the 1,894 total people involved in fatal crashes. Motorcycle fatalities accounted for 127 of the 834 total fatalities. Or the 127 motorcycle fatalities, 91 people were not wearing a helmet (almost 72%). The number of fatally injured people would likely have been reduced if the helmet usage increased.

Kentucky's crash reports include a field in which police officers can indicate any human factor they suspect may have lead a driver to crash. A police officer can assign multiple human factors to each person. This information is helpful for determining the cause of a crash, and therefore is useful to identify crash countermeasures. Table 7 summarizes the human factors reported by police for all available persons.

Table 7 Human Factor Summary

Human Factor	Total Persons
None Detected	545
Not Under Proper Control	269
Inattention	155
Alcohol Involvement	111
Other	102
Failed to Yield Right of Way	83
Overcorrecting/Oversteering	75
Exceeded Stated Speed Limit	73
Drug Involvement	52
Too Fast for Conditions	40
Disregard Traffic Control	30
Misjudge Clearance	21
Lost Consciousness/Fainted	19
Distraction	18
Fell Asleep	15
Fatigue	12
Cell Phone	8
Improper Passing	8
Following Too Close	6
Sick	5
Turning Improperly	5
Weaving in Traffic	5
Emotional	4
Physical Disability	3
Medication	2
Improper Backing	1

No human factors were reported for 545 people, meaning either these people did not cause the crash (their involvement was due to actions of another driver) or that the entire crash occurred due to a non-human related factor. Drivers not properly controlling their vehicles, driver inattention, and alcohol involvement each contributed to over 100 fatal crashes, indicating that these are areas where targeted countermeasures could have a high potential to reduce fatalities.

4. Alcohol and Drug Impairment

Kentucky crash reports currently have two fields in which a police officer can indicate if a driver may have been under the influence of alcohol at the time of a crash. One field is called *Suspected Drinking*, in which officers indicate if they believe a driver was under the influence of alcohol. The second option is the *Human Factor* field, in which officers indicate if they believe alcohol impairment was a contributing factor to a crash. Crash reports only offer the option to indicate drug involvement through the *Human Factor* field, which only applies if officers believe drug use to be a contributing factor to the crash. Officer-indicated alcohol and drug involvement are reported for all crashes in Kentucky, not just fatal crashes, however, crash reports currently offer no details about alcohol or drug levels. Since alcohol and drug impairment indications in crash reports are based on the best judgement of a police officer at the time of the crash, there could be issues with the accuracy of the information provided.

The FARS database contains detailed information about alcohol and drug tests for only fatal crashes. Unlike the crash reports, FARS identifies if a person was given an alcohol or drug test, the type of test performed, and limited results from the tests. If blood alcohol content (BAC) was measured from an alcohol test, the BAC is reported in the FARS database. If a person tested for drugs is found to be positive for at least one drug, FARS will report the name of the drugs for up to three different drugs. However, there is no specified order in which the drugs are reported (i.e., highest to lowest concentrations) and no information is provided about the level of drugs in a person's body. For the purposes of this study, and in order to compare alcohol and drug reporting consistency between crash reports and FARS, the alcohol and drug indications from FARS were treated as ground truth because they are based on laboratory tests as opposed to police officer opinion.

To analyze alcohol involvement in fatal crashes, BAC concentrations from the FARS database were summarized by four different person types: fatally injured persons, drivers, non-motorized persons, and non-driver occupants. The most important of these person types is the drivers, as they are responsible for operating the vehicle. Drivers are also the only person type that have legal restrictions in place for their BAC. In Kentucky, drivers are considered to be driving under the influence if their BAC is 0.08% or greater. If a driver is under 21, the BAC limit is dropped down to 0.02%. For drivers of commercial vehicles, the BAC limit is 0.04%. [2] Table 8 displays a summary of BAC levels for the four person types.

Table 8 BAC for All Persons Involved in Fatal Crashes

	Fatalities	**Drivers**	**Non-Motorized**	**Non-driver Occupants**
Total People	834	1175	105	614
Total Tested	593	704	68	78
0%	424	543	48	60
0-0.08%	36	31	3	7
0.08-0.16%	39	45	2	5
0.16-0.24%	59	59	8	2
0.24-0.32%	26	20	5	3
0.32-0.40%	5	4	1	0
0.40-0.48%	1	1	0	0
0.48-0.56%	1	0	0	1
0.56-0.64%	0	0	0	0
0.64-0.72%	0	0	0	0
0.72-0.80%	0	0	0	0
>0.80%	0	0	0	0
Positive, no reading	2	1	1	0
Total Positive	169	161	20	18

For drivers, 161 tested positive for alcohol, with 129 of those being above 0.08% and one with an unknown concentration. Further analysis of these drivers showed that they were involved in 160 separate crashes. According to the crash reports, 125 crashes were flagged as a suspected drinking driver by police officers, and 109 crashes had a driver with an alcohol involvement *Human Factor* indication. Further analysis comparing these indications of alcohol involvement will be explored in Chapter 6.

Fewer alcohol tests were performed on non-driver occupants than drivers, likely because their results would have little impact on determining the cause of a crash. Alcohol concentrations of non-motorized persons could be cited as the cause of a crash. It is possible that an intoxicated cyclist or pedestrian could end up in the path of a motor vehicle as a result of their intoxication; therefore, it is important to test these persons as well. Over 65% of the 105 non-motorized persons involved in a fatal crash were tested for alcohol, but only 20 had a positive BAC, with 16 being above 0.08% and one with an unknown concentration. Of those fatally injured, 169 were had a positive BAC, with 131 being greater than 0.08% and two unknown concentrations.

Similar to the BAC concentrations, the results of the drug test data from FARS were also summarized by the four person types listed above. Each person involved in a fatal crash is listed with up to three drugs found in their system. Table 9 summarizes drug test results including information about the number of drugs and broad category of drugs in a person's system.

Table 9 Summary of Drug Tests for All Persons Involved in Fatal Crashes

	Fatalities	**Drivers**	**Non-Motorized**	**Non-driver Occupants**
Total People	834	1175	105	614
Total people tested	583	650	64	79
Positive for ≥1 drug	277	276	27	35
Positive for ≥2 drugs	156	139	19	21
Positive for ≥3 drugs	88	76	10	13
Total positive	277	276	27	35
No drug found	306	374	37	44
Narcotic	123	120	13	11
Depressant	81	84	7	7
Stimulant	60	57	6	12
Hallucinogen	6	2	1	3
Cannabinoid	110	111	8	16
PCP	0	0	0	0
Anabolic Steroid	0	0	0	0
Inhalant	0	0	0	0
Other Drug	12	13	3	1

Based on the FARS data, of the 1,175 drivers, 650 were tested for drugs, and 276 of those drivers (42%) tested positive for at least one drug. An analysis of these drivers show that they were involved in 266 separate fatal crashes. According to the police reports for the 763 fatal crashes, only 52 crashes (7%) were listed with a *Human Factor* of drug involvement. Further analysis comparing these indications of drug involvement is explored in Chapter 6.

Narcotics and cannabinoids were the most common drug types found in almost all of the person types in Table 9. Depressants and stimulants also appeared with high frequencies. Similar to the alcohol tests, non-driver vehicle occupants were tested less frequently than drivers and non-motorized persons. Many more people tested positive for drugs than tested positive for alcohol. One explanation that could account for this phenomenon is that some of the drugs could be prescription drugs rather than illicit substances. To explore this further, the specific drugs found in each person's system were summarized by frequency. Table 10 shows a breakdown of the specific drugs found in the systems of persons involved in fatal crashes and the number of persons testing positive for each drug.

Table 10 Drug Frequency for All Persons Involved in Fatal Crashes

Drug	Fatalities	Drivers	Non-Driver Occupants	Non-motorized	Total
Not Tested/No Additional Drugs	213	397	531	36	964
No Drugs Found	306	374	44	37	455
Not Reported	38	128	4	5	137
Tetrahydrocannabinols (THC, Marijuana)	106	106	15	7	128
Hydrocodone	46	47	5	2	54
Alprazolam (Xanax)	41	43	5	2	50
Methamphetamine	29	27	9	2	38
Amphetamine	30	23	10	4	37
Oxycodone	25	29	2	3	34
Morphine	27	22	3	4	29
Hydromorphone	25	25	0	1	26
Buprenorphine	24	20	2	3	25
Oxymorphone	20	18	2	2	22
Benzoylecgonine	16	17	1	2	20
Benzodiazepines	17	16	1	2	19
Other Drug	12	13	1	3	17
Fentanyl	14	10	2	4	16
Codeine	15	10	2	3	15
Clonazepam	11	10	1	1	12
Diazepam (Valium)	9	9	0	1	10
Nordiazepam	8	8	0	2	10
Methadone	7	6	0	1	7
Cocaine	6	6	1	0	7
Oxazepam	7	5	0	2	7
Amphetamine Variants	5	2	2	1	5
“Cannabinoid, Type Unknown”	5	2	2	1	5

Delta 9	0	3	0	0	3
Lorazepam (Ativan)	2	2	0	0	2
Phenobarbital	0	2	0	0	2
Meprobamate	2	1	0	1	2
Midazolam	2	1	0	1	2
Temazepam	2	0	1	1	2
Meperidine (Pethidine)	0	1	0	0	1
Myrophine	1	1	0	0	1
Butabarbital (secbutabarbital)	1	1	0	0	1
Butalbital	1	1	0	0	1
Chlordiazepoxide	1	1	0	0	1
Oxazolam	1	1	0	0	1
Zolpidem (Ambien)	0	1	0	0	1
Phentermine	1	1	0	0	1
Fenproporex	1	0	1	0	1
Ketamine	1	0	1	0	1

THC was by far the most commonly used drug across all person categories. The next most common were hydrocodone and Xanax, both of which are common prescription drugs that are widely abused. These prescription drugs are not illegal in all cases, and it is not necessarily considered to be driving under the influence to have these drugs in your system when driving. Without information on drug concentrations, conclusions cannot be drawn as to whether these drugs were being abused at the time of the crash and are therefore a factor in the crash. Methamphetamine, an illegal substance, was the fourth most common drug in the systems of people involved in fatal crashes.

It is more difficult to draw conclusions about drug impairment than alcohol impairment. Alcohol impairment has been studied extensively and there are regulations in place that designate an illegal concentration of alcohol in a driver's blood stream. Studies such as these are not widely available for most drugs. The presence of a specific drug in a person's system does not necessarily constitute an impairment or driving under the influence in the case of a driver. Many of the drugs listed in Table 10 are legal prescription drugs, some of which have no driving restrictions associated with them. Moreover, drug concentrations are not provided in the FARS database, so no conclusions can be drawn about the magnitude of influence the drugs may have on a person. For the purposes of this study, persons who tested positive for alcohol (at any level) and or drugs are referred to as

potentially impaired. Definite conclusions on impairment based on the detection of alcohol or drugs cannot be made with the available data.

Based on alcohol and drug test results reported in FARS, 704 drivers were tested for alcohol while only 650 drivers were tested for drugs. The combination of alcohol and drugs in a person's system can heighten impairment, yet in many cases drivers were not tested for both alcohol and drugs to confirm the extent of the impairment. The type of impairment — alcohol or drug — influences what treatment program a driver would be enrolled in if they were convicted of a DUI. It is important that, especially in the case of a fatal or serious injury collision, as much information about impairment be gathered as possible to ensure the cause of the crash is attributed to the correct factors. According to KRS 189A.105, "If the incident involves a motor vehicle accident in which there was a fatality, the investigating peace officer shall seek such a search warrant for blood, breath, or urine testing unless the testing has already been done by consent."[3] Based on this statue, all drivers of fatal collisions should be being tested for impairment, which ideally would involve testing for both drugs and alcohol. However, not all of the 1,175 drivers involved in the 2016 fatal crashes were tested, and those that were tested were not always tested for both alcohol and drugs.

The non-motorized persons involved in fatal crashes could have been under the influence of alcohol or drugs, which may have contributed to their involvement in a fatal crash. Table 11 summarizes the involvement of the various non-motorized person types by total, number killed, and alcohol/drug presence.

Table 11 Non-Motorized Fatalities and Impairment

Non-Motorized Person Type	Total Persons	Killed	Total Alcohol Present	Total Drug Present	Total Alcohol and Drug Present
Non-Motor Vehicle Transport Device	4	0	0	0	0
Pedestrian	88	81	19	26	7
Bicyclist	9	9	0	1	0
Person on Personal Conveyances	4	4	1	0	0
Total	105	94	20	27	7

There were 105 non-motorized persons involved in the 2016 fatal crashes, the majority of whom were pedestrians. Ninety-four of the 105 were fatally injured. From Tables 8 and 9, 68 and 64 non-motorized persons were tested for alcohol and drugs, respectively. Twenty non-motorized persons tested positive for alcohol, 27 tested positive for drugs, and 7 tested positive for both. The presence of alcohol and drugs in these persons' systems indicates that their potential impairment may have been a contributing factor in their involvement in a fatal crash.

In an effort to explore the temporal distribution of potentially impaired fatal crashes, the number of crashes involving a driver testing positive for drugs or alcohol were plotted again time in one-hour intervals, similar to Figure 14. In some instances, drivers tested positive for both drugs and alcohol. Figure 15 shows the distribution of drug- and alcohol-related fatal crashes alongside the distribution for all fatal crashes throughout a 24-hour day.

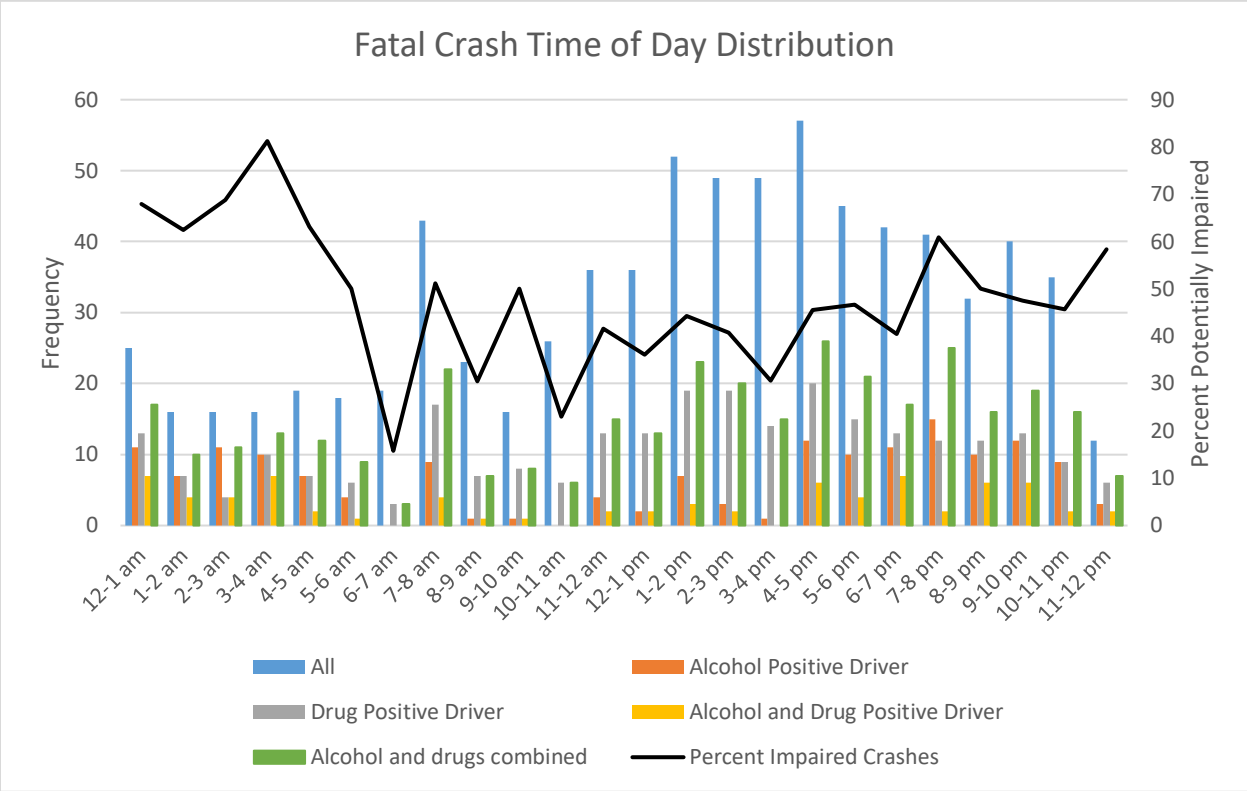

Figure 15 Temporal Distribution of Fatal Crashes with Drug and Alcohol Involvement

As previously discussed, the 2016 fatal crashes (blue bars) indicate frequency spikes coinciding with peak hour traffic and general high frequency during midday and evening hours. Fatal crashes with drivers testing positive for alcohol (orange bars) peak in the late evening from 5 pm to 11 pm and again from 2 am to 4 am. Alcohol-involved fatal crashes are relatively low to non-existent from 6 am to 4 pm. Fatal crashes with a driver testing positive for drugs (grey bars) follow a nearly identical distribution as all fatal crashes. Crashes with a driver testing positive for both alcohol and drugs (yellow bars) follow a similar trend to that of the alcohol-positive drivers. The green bars show the fatal crashes where a driver was under the influence of alcohol, or drugs, or both. The percentage of potentially impaired fatal crashes (green bars) compared to the total number of fatal crashes (blue bars) in a given hour is shown by the black line. The percentage of crashes with a potentially impaired driver oscillates around 40% from 7 am to 5 pm, after which it increases until it peaks between 3 am and 4 am, where 81% of fatal crashes involved a driver that was potentially impaired. This temporal analysis shows that fatal crashes with potentially impaired drivers occur more frequently in the overnight hours.

5. County Summaries

To visualize fatal crash problems across the state, fatal crashes occurring were summarized by county. Fatal crash totals in each county were normalized by a county's annual VMT in 2016 to eliminate bias from differences in traffic volumes and create an even comparison across the state. The resulting map is shown in Figure 16, with counties in red having the highest fatal crash rates.

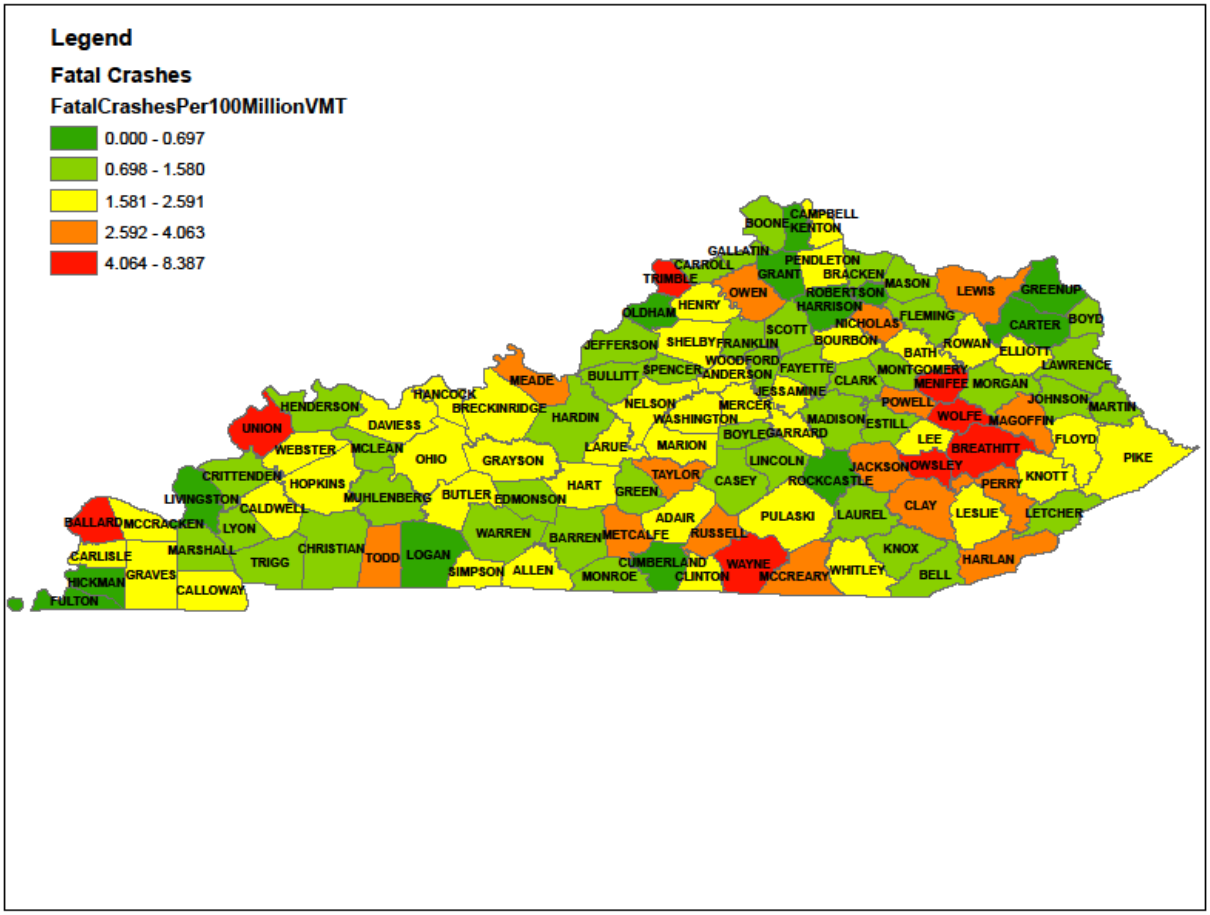

Figure 16 Fatal Crashes per 100 million VMT

Eastern Kentucky has a cluster of counties with high fatal crash rates, displayed in both red and orange. Eastern Kentucky is known for having mountainous roads with poor roadway geometry and lower seatbelt usage rates than the rest of the state.[4] These two factors in concert can contribute to an increase in fatalities. Several other counties have high fatal crash rates including Ballard, Union, and Trimble counties, but these counties are all geographically distinct.

Potentially alcohol-involved fatal crashes were also summarized by county and normalized by VMT to identify counties having a potential issue with alcohol-impaired driving. The potentially alcohol-impaired fatal crashes are the 160 crashes where a driver tested positive for alcohol. The map in Figure 17 shows the distribution of potential alcohol impaired fatal crashes across the state.

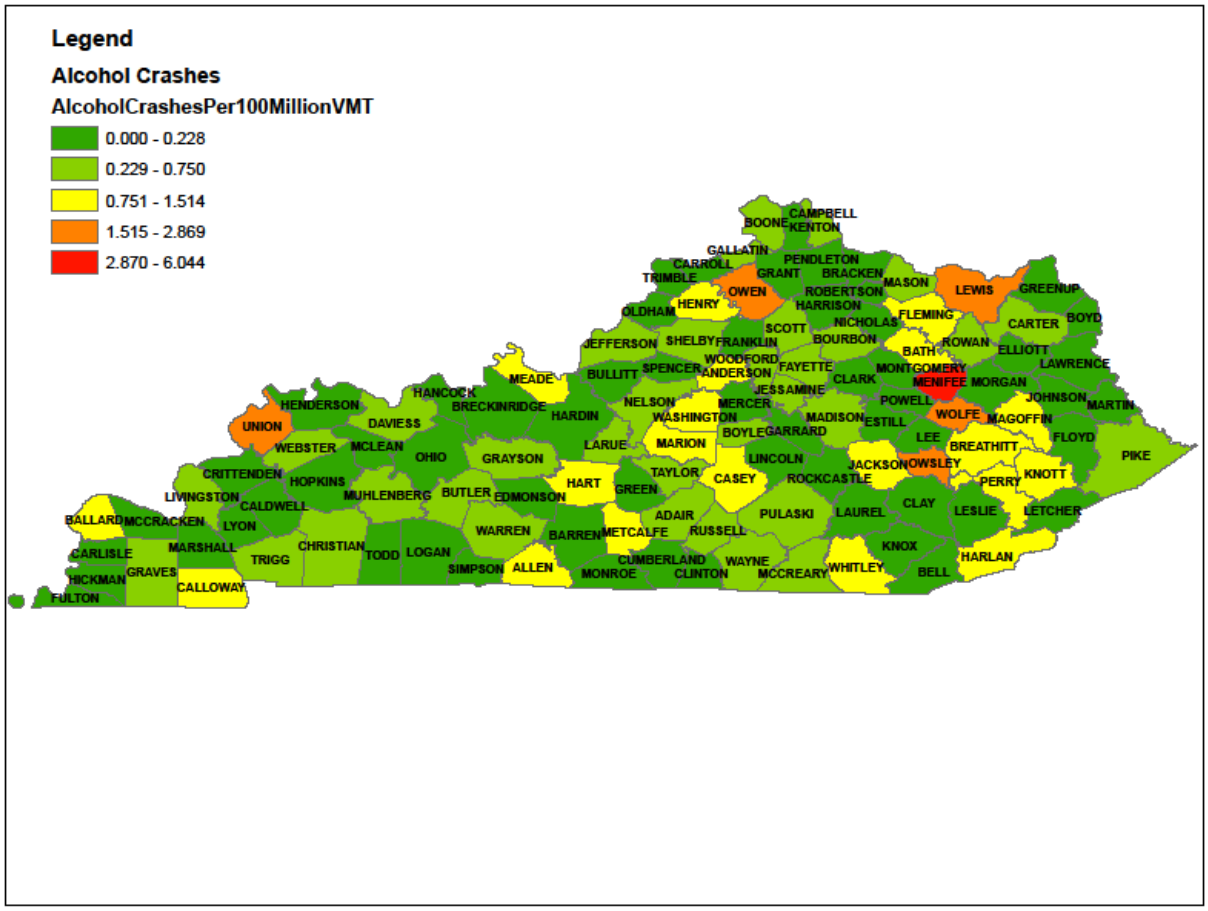

Figure 17 Alcohol-Involved Fatal Crashes per 100 million VMT

The distribution of alcohol-impaired crash rates throughout the state is more uniform than the rates for all fatal crashes captured in Figure 16. This is evident based on the number of counties shown in green and yellow in Figure 17 compared to Figure 16. The counties with the highest rates of potential alcohol-impaired fatal crashes again cluster around Eastern Kentucky. Also, Ballard and Union counties are toward the top with alcohol impaired crash rates, similar to the general fatal crash rates.

Figure 18 shows the statewide distribution of potential drug-impaired fatal crash rates by county normalized by VMT. The potentially drug-impaired fatal crashes are the 266 crashes where a driver tested positive for at least one drug.

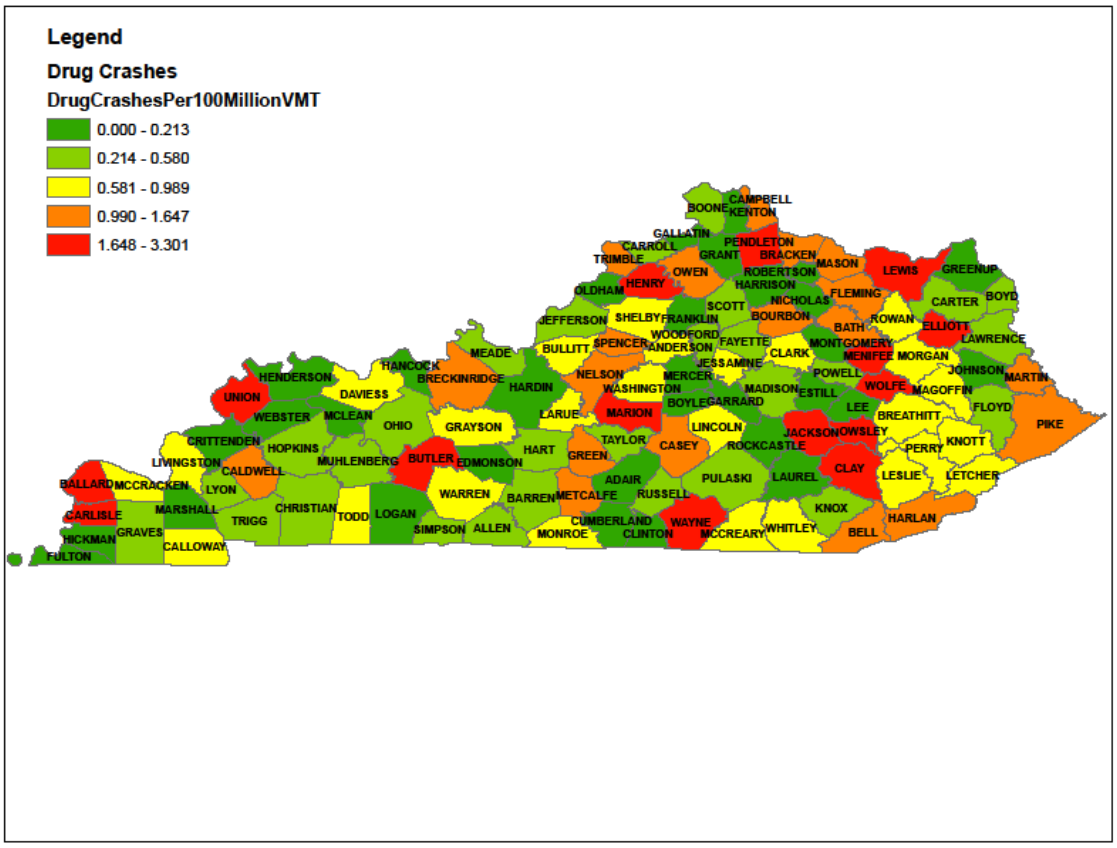

Figure 18 Drug-Involved Fatal Crashes per 100 million VMT

Among crash types, drug-impaired crashes have the least uniform distribution across the state, as each of the five crash rate ranges in Figure 18 apply to a large number of counties. Again, many counties in Eastern Kentucky have high fatal crash rates, but with potential drug-impairment, the highest counties are more geographically dispersed. Western Kentucky has several counties with high potential drug-impairment fatal crash rates, as do south-central Kentucky and northern Kentucky.

The main similarity among the overall fatal, potential alcohol-impaired fatal, and potential drug-impaired fatal crash rates is the presence of the highest rates in the more rural counties, particularly in eastern Kentucky.

6. Consistency Between Crash Reports and FARS Data

The research team was tasked with identifying inconsistencies between Kentucky's fatal crashes in the FARS database and the crash reports maintained by KSP. Inconsistencies between the two datasets indicate inaccurate information. It is important for crash data, especially fatal crash data, to be accurate at both the state and national levels to ensure the accuracy of research aimed at preventing crashes. Throughout the analysis of the fatal crash data in 2016, the research team noted several inconsistencies between the FARS and crash report datasets and one inconsistency within the crash reports themselves.

As discussed in Chapter 2, several inconsistencies with GPS coordinates, dates, and times of fatal crashes were discovered when linking the FARS dataset to the crash report dataset. Of the 763 fatal crashes in 2016, 712 had identical GPS coordinates, dates, and times in both datasets. There were 46 crashes with matching locations and dates, but the times were off by minutes to hours. Of the five remaining crashes, two had the same locations, but the dates and times were both different in the two datasets. The other three crashes had matching dates and times, but the GPS coordinates were off by up to 0.11 miles between the two datasets. These errors in dates, times, and location could be attributed to transposing numbers when summarizing data from the crash reports into the FARS format. It is also possible that the FARS dataset is being updated from hospital or EMS records with more accurate data than what was available in the crash reports. In either case, for the sake of consistency, both sets of fatal crash data should be compared to each other to ensure they are referencing the same locations, dates, and times for each crash before the FARS dataset is submitted to NHTSA.

Inconsistencies with impairment reporting between FARS and crash reports were identified during the impairment analysis discussed in Chapter 4. As previously discussed, crash reports contain two fields in which police officers can indicate alcohol impairment — the suspected drinking and human factor fields. The human factor field is the only data item in the crash report to indicate drug involvement in the crash report. Both alcohol and drug indications in the crash reports are based on officer intuition and/or field sobriety tests. Indications of drug and alcohol involvement in the FARS database are based on laboratory tests, and for the purposes of this analysis, were treated as the ground truth to indicate potential impairment. A comparison of the crashes with police-reported and FARS-reported alcohol and drug involvement for drivers shows great inconsistency.

Based on the FARS data summarized in Tables 8 and 9, 161 drivers in 160 separate crashes tested positive for some level of alcohol, and 276 drivers in 266 separate crashes tested positive for at least one drug. Only 125 crash reports indicated a fatal crash with a suspected drinking driver. From the human factor field, 109 crashes had alcohol involvement and 52 crashes had drug involvement listed as a factor for at least one driver in the crash. The police indicated alcohol and drug involvement for fatal crashes is much lower than what is shown from the alcohol and drug tests summarized in the FARS database. The crashes indicated with potential impairments from each dataset were compared to identify the number of crashes that were identified in both datasets. A summary of this comparison is shown in Table 11.

Table 12 Crash Report vs. FARS Impairment Indication Comparison

Impairment Type	KSP (human factor)	KSP (suspected drinking)	FARS	KSP (human factor) and FARS Match	KSP (suspected drinking) and FARS Match
Alcohol	109	125	160	95	93
Drug	52	N/A	266	37	N/A

Between the 109 human factor alcohol involvement crashes from the KSP crash report database and the 160 crashes with a driver testing positive for alcohol in the FARS database, only 95 match. This means police identified alcohol as a human factor in 14 crashes where a laboratory test was not performed or a test showed no alcohol presence. This also indicates that officers did not identify the presence of alcohol as a human factor in 65 fatal crashes where alcohol tests showed a positive reading. Similar consistency metrics are seen with the suspect drinking field in the crash reports. Officers identified 125 crashes with a suspected drinking driver, but only 93 of those match with the alcohol test results in FARS. It could be the case that officers are confusing a drug impairment with alcohol impairment, so the crash reports with either indication of alcohol involvement were checked against the FARS drug test results. There were three additional crashes with an alcohol involvement human factor where a driver tested positive for drugs, but not alcohol. There were nine additional crashes with a suspected drinking driver where a driver tested positive for drugs, but not alcohol. This would bring the alcohol involved matches between the two databases for the human factor and suspected drinking driver fields up to 98 and 96, respectively.

With only one field in the crash reports to indicate police-suspected drug involvement, the consistency analysis is simplified. Between the 52 police-identified and 266 FARS drug-involved crashes, only 37 matched. Similar with the alcohol-involvement consistency analysis, assuming police officers could be confusing drug impairment with alcohol impairment, the remaining unmatched crash reports were checked for drivers testing positive for alcohol in the FARS database. Three additional crashes identified with drug involvement by police officers were discovered to have a driver testing positive for alcohol but not drugs. This increases the total drug-impaired matches from 37 to 40.

Analysis of fatal crashes involving impairment show differing trends depending on which database is used to identify impaired fatal crashes. To demonstrate the magnitude of this difference, the research team created a series of tables comparing crash statistics using crash reports to identify impairment against crash statistics using FARS to identify impairment. The crash statistics used for comparison were adopted from the annual "Kentucky Traffic Collision Facts" report published by KTC.[5] The fatal crash statistic comparisons are displayed in Appendix A, with data labeled *As Reported* indicating the impairment was identified from crash reports and data labeled *FARS Adjusted* indicating the impairment was identified from FARS.

Injury and fatality reporting between crash reports and FARS were also checked for consistency by comparing the number of injured and deceased people for each crash in the two databases. Every fatal crash in FARS matched the crash reports for the number of persons deceased. There were 12 (out of 763) crashes in the KSP database that did not match the number of persons injured

in the FARS database. Of these 12 cases, five involve crash reports indicating one more injury than FARS, six show FARS reporting one more injury than the crash report, and one shows FARS reporting two more injuries than the crash report. The fact that there is a difference in number of injuries reported by the two systems is logical because police officers are not medical professionals, so they cannot always make accurate judgements on the existence of an injury. During the process of summarizing the fatal crashes into the national FARS format, Kentucky's FARS reporter gathers information from various labs and agencies on a crash-by-crash basis to fulfill every FARS data element. The FARS database benefits from the most accurate and recent information.

In an effort to increase consistency between impairment and injury identification in crash reports and the FARS database, crash reports should be updated to reflect the updated information obtained during the FARS data summary process. The research team contacted Kentucky's FARS reporter to inquire about the possibility of crash reports being updated once FARS data are gathered and received the following response: "There is no procedure in place to update the crash database with FARS data. There is only one person at KSP that has the capability to alter reports, however it is the investigating agencies' responsibly to supplement/update their report." This response indicates that it would be possible to update crash reports with FARS data. However, it may be difficult to determine who is responsible for updating the reports.

Kentucky crash reports have two sets of data fields indicating the location of a crash. The first being X and Y GPS coordinates. The second set of fields are the unique route identified and milepoint. Since 2007, police officers in Kentucky have been using a software called MapIt to help generate digital crash reports at the scene of a crash. Using MapIt software, a police officer simply clicks on the location of a crash on a map in their computer. The software automatically generates the GPS coordinates and the route and milepoint fields for the digital crash report.[6] However, plotting the location of the 763 fatal crashes in 2016 by both GPS coordinates and route and milepoint do not place the crashes in the same location. Figure 19 shows each crash plotted by route and milepoint color coded by its distance to the same crash plotted by GPS coordinates.

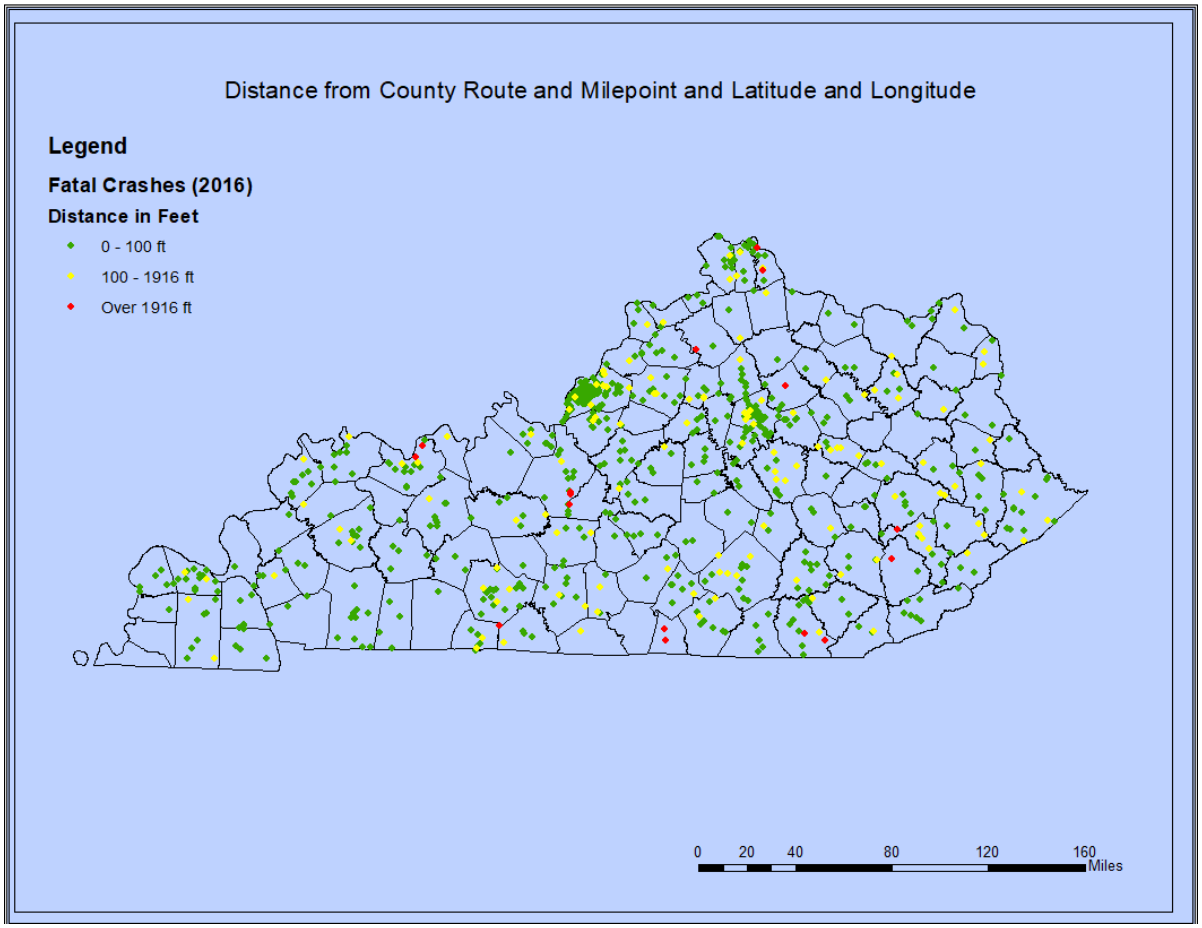

Figure 19 Distance Errors between GPS and Route/Milepoint Fatal Crash Locations

Green dots are fatal crashes where the route and milepoint location differ from the GPS coordinate location by less than 100 feet. There is some expected variation between GPS coordinates and the route and milepoint because the route and milepoint location are based on a linear referenced network of roadways, so the crash location will always be at some point along a line representing a road. The GPS coordinates are not bound by the linearly referenced road network and can be plotted at any point in space. Naturally, the GPS coordinate will not always exactly coincide with the linear roadway network, depending on where on the MapIt system the officer clicks. Therefore, some small distance of error should be expected between GPS coordinates and the route and milepoint locations. It is more troublesome when the two locations plot more than 100 feet apart, as is shown by the yellow and red points in Figure 19. These larger distances between locations indicate that either crashes are occurring in locations far from the nearest linearly referenced road, such as on private property or a parking lot, or that there is some underlying error in the MapIt software. It may be that the MapIt software is not using the most updated linearly referenced roadway network, or there is some underlying error in the software that is causing the points to differ by great distances. Accurate crash locations are vital for effective crash analysis and countermeasure identification. It is recommended that the errors between the two sets of location identifiers in Kentucky's crash reports be analyzed in greater detail to identify their cause.

7. Summary

Based on the analysis of fatal crash trends using Kentucky's HSIP emphasis areas, in 2016 there was a steep increase in fatalities and fatal crash rates among mature drivers and lane departure crashes compared to previous years. These emphasis areas showed increases of 47 and 45 fatal crashes from 2015 to 2016, respectively. Pedestrian, motorcycle, intersection, and impairment-related fatal crashes also saw increasing fatal crash rates in 2016, although less severe than mature drivers and lane departure crashes.

Aside from sedans, motorcycles were the vehicle type with the highest number of fatalities. Pedestrians and cyclists accounted for the third highest number of fatalities. ATVs accounted for a large number of fatalities, even though their use is restricted on Kentucky's public roads. Analysis of restraint use showed that almost 54% of the fatally injured people in 2016 were not wearing a seatbelt when one was available to them. Of those fatally injured in a motorcycle crash, nearly 72% were not wearing a helmet.

Based on FARS data, Kentucky experienced 160 fatal crashes with a driver testing positive for alcohol and 266 fatal crashes with a driver testing positive for at least one drug. The drugs most frequently found in drivers were THC, hydrocodone, and Xanax. FARS reports BAC levels for people who were tested for alcohol, but no data are provided on drug levels for the people tested for drugs. The lack of data makes it difficult to draw conclusions about drug impairment as a factor in fatal crashes.

In general, fatal crash frequency spiked during the morning and afternoon peak hour periods, with fatalities occurring more frequently between 11 am and 11 pm. Potential alcohol-involved fatal crashes occurred more frequently in the overnight hours, however potential drug-related crashes mirrored the distribution of all fatal crashes. The percent of potentially impaired (alcohol- and drug-involved) fatal crashes increased between 5 pm and 4 am from around 40% to a peak of 81% at 4 am.

Spatial analysis of fatal and potentially impaired fatal crashes by county, normalized by a county's 2016 annual VMT, identified eastern Kentucky as a region with high fatal crash and potentially impaired fatal crash rates. Both Ballard and Union Counties in Western Kentucky showed high fatal crash and potentially impaired fatal crash rates as well.

Comparisons between the FARS database and Kentucky's crash reports revealed several inconsistencies. Of the 763 fatal crashes, 46 had a discrepancy in date, time of crash, or GPS location between the two databases. In many cases, crash reports where police officers indicate drug or alcohol involvement are not being substantiated by the drug and alcohol test results in the FARS database. Conversely, the FARS database is identifying drug and alcohol use that has not been identified in the crash reports by police officers. Twelve of the 763 crashes showed discrepancies in the number of persons injured in the crashes. The consistency of crash reports would benefit from updates based on the more detailed analysis of the crash during the FARS data summary process. Additionally, FARS would have a more complete dataset if impaired persons identified by officers were always tested for both drugs and alcohol.

One inconsistency was noted just within the crash report database. The GPS coordinates and the route and milepoint location fields in crash reports should identify nearly the same location for crashes, but in many cases, the two locations are over 100 feet apart. This error could be a function of the MapIt software police officers use to complete crash reports as both sets of location identifiers are automatically coded based on a single click of a map on the part of the officer.

8. Recommendations

A review of the 2016 fatal crash data resulted in a list of crash countermeasures and data improvements that can be used to both reduce fatalities and increase data consistency between Kentucky's crash reports and the NHTSA's FARS database. The recommendations are divided into four categories.

8.1 Enforcement

- Continue emphasizing the enforcement of safety belt laws.
- Increase enforcement of impaired driving regulations.
- Target the counties with high fatality rates and low seatbelt usage discussed in Chapter 5.
- Increase enforcement of ATV regulations when possible.

8.2 Legislation/Licensing

- Implement older driver retesting for both the skills and vision aspects of driver's licenses.
- Utilize the Medical Review Board to ensure that only drivers free of physical or mental impairments are issued license renewals.[7]

8.3 Public Involvement

- Public information campaigns on the effects of impaired driving.
- Public information campaigns stressing the importance of helmet use when riding motorcycles.[8]
- Continue public information campaigns on safety belt usage (i.e. Click It or Ticket, Local Heroes Program).[9]

8.4 Data Collection

- Use KRS 189A.105 to pursue a warrant to test all drivers and non-motorized persons involved in fatal crashes for both alcohol and drugs.
- Develop a process through which researchers can access drug concentration data for fatal crashes to allow researchers to study the effect of drug impairment on roadway safety.
- Ensure that location, date, and time of fatal crashes from crash reports match the FARS summaries before submitting Kentucky's FARS data to NHTSA.
- Update crash reports with the more accurate FARS data to ensure consistency of alcohol, drug, and injury reporting between both databases.
- Investigate the source of the discrepancy between the GPS coordinates and the route and milepoint location identifications created from the MapIt software.

9. References

[1] . KRS 189.151, "Restrictions on operation of all-terrain vehicles." *Kentucky Revised Statutes*, July 14, 2018. http://www.lrc.ky.gov/statutes/statute.aspx?id=47685

[2] KRS 189A.010, "Operating motor vehicle with alcohol concentration of or above 0.08, or of or above 0.02 for persons under age twenty-one, or while under the influence of alcohol, a controlled substance, or other substance which impairs driving ability prohibited -- Admissibility of alcohol concentration test results -- Presumptions -- Penalties -- Aggravating circumstances.", *Kentucky Revised Statutes*, April 9, 2016. http://www.lrc.ky.gov/statutes/statute.aspx?id=44872

[3] KRS 189A.105, "Effect of refusal to submit to tests -- Information required to be provided when tests requested -- Ignition interlock license -- Court-ordered testing -- Right to consult attorney before submitting to tests -- Personal testing option.", *Kentucky Revised Statutes*, June 24, 2015. http://www.lrc.ky.gov/statutes/statute.aspx?id=44682

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[5] University of Kentucky and Kentucky State Police, "Kentucky Traffic Collision Facts 2016" (2017). *Kentucky Transportation Center Research Report*. 1583. https://uknowledge.uky.edu/ktc_researchreports/1583

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[7] KYTC, "Kentucky Medical Review Board Program." *Department of Vehicle Regulation*, 2018. https://drive.ky.gov/driver-licensing/Pages/Kentucky-Medical-Review-Board-Program.aspx

[8] Agent, Kenneth R. and Pigman, Jerry G., "Causes and Countermeasures Related to Motorcycle Crashes" (2011). *Kentucky Transportation Center Research Report*. 27. https://uknowledge.uky.edu/ktc_researchreports/27

[9] KOHS, "Local Heroes 'Click It or Ticket'." *Kentucky Office of Highway Safety*, 2018. https://transportation.ky.gov/HighwaySafety/Pages/LocalHeroes-ClickItorTicket.aspx

Appendix A — Supplemental Crash Data

Fatalities by Age and Sex

Alcohol Related

	As Reported		FARS Adjusted	
Age	**Male**	**Female**	**Male**	**Female**
0-14	2	2	2	1
15-24	15	4	23	8
25-34	14	5	22	6
35-44	21	6	32	7
45-54	16	8	23	10
55-64	17	1	23	3
65-74	3	1	6	1
75+	2	0	3	1
TOTAL	**90**	**27**	**134**	**37**

Fatalities by Age and Sex

Drug Related

	As Reported		FARS Adjusted	
Age	**Male**	**Female**	**Male**	**Female**
0-14	1	1	5	7
15-24	11	3	33	13
25-34	9	9	47	20
35-44	9	3	37	6
45-54	6	4	35	14
55-64	1	2	38	7
65-74	1	1	15	6
75+	0	1	11	3
TOTAL	**38**	**24**	**221**	**76**

TYPES OF FATAL COLLISIONS - AS REPORTED

ALCOHOL RELATED

COLLISIONS WITH PEDESTRIAN:

Persons Killed:	8
% of Total Fatalities:	6.667
No. of Fatal Collisions:	6
% of All Fatal Collisions:	5.357

COLLISIONS WITH FIXED OBJECT:

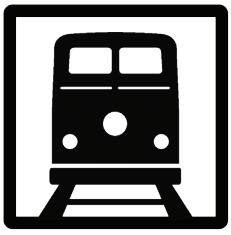
Persons Killed:	60
% of Total Fatalities:	50.0000
No. of Fatal Collisions:	58
% of All Fatal Collisions:	51.7857

COLLISIONS WITH PEDALCYCLIST:

Persons Killed:	1
% of Total Fatalities:.	.8333
No. of Fatal Collisions:	1
% of All Fatal Collisions:	.8929

COLLISIONS WITH OTHER OBJECTS:

Persons Killed:	1
% of Total Fatalities:	.8333
No. of Fatal Collisions:	1
% of All Fatal Collisions:	.8929



COLLISIONS WITH RAILWAY TRAIN:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

PARKED VEHICLE COLLISIONS:

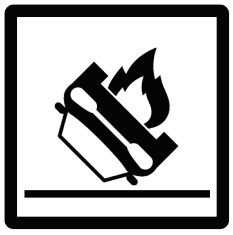
Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

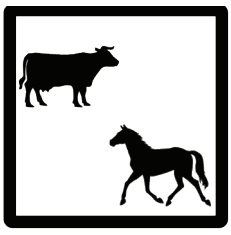
COLLISIONS WITH DEER:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

NON-COLLISIONS OVERTURNED:

Persons Killed:	6
% of Total Fatalities:	5.0000
No. of Fatal Collisions:	6
% of All Fatal Collisions:	5.3571





COLLISIONS WITH ANIMALS (excluding deer):

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

OTHER NON-COLLISIONS:

Persons Killed:	9
% of Total Fatalities:	7.5000
No. of Fatal Collisions:	9
% of All Fatal Collisions:	8.0357

COLLISIONS WITH MOVING MOTOR VEHICLE:

Persons Killed:	34
% of Total Fatalities:	28.3333
No. of Fatal Collisions:	50.0000
% of All Fatal Collisions:	51.7851

PARKING LOT COLLISIONS:

Persons Killed:	1
% of Total Fatalities:	.8333
No. of Fatal Collisions:	1
% of All Fatal Collisions:	.8929

TYPES OF FATAL COLLISIONS - FARS ADJUSTED

ALCOHOL RELATED

COLLISIONS WITH PEDESTRIAN:

Persons Killed:	8
% of Total Fatalities:	4.6784
No. of Fatal Collisions:	6
% of All Fatal Collisions:	3.7500

COLLISIONS WITH FIXED OBJECT:

Persons Killed:	90
% of Total Fatalities:	52.6316
No. of Fatal Collisions:	85
% of All Fatal Collisions:	53.1250

COLLISIONS WITH PEDALCYCLIST:

Persons Killed:	1
% of Total Fatalities:.	.5848
No. of Fatal Collisions:	1
% of All Fatal Collisions:.	.6250

COLLISIONS WITH OTHER OBJECTS:

Persons Killed:	2
% of Total Fatalities:	1.1696
No. of Fatal Collisions:	2
% of All Fatal Collisions:	1.2500

COLLISIONS WITH RAILWAY TRAIN:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

PARKED VEHICLE COLLISIONS:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

COLLISIONS WITH DEER:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

NON-COLLISIONS OVERTURNED:

Persons Killed:	10
% of Total Fatalities:	5.8480
No. of Fatal Collisions:	10
% of All Fatal Collisions:	6.2500

COLLISIONS WITH ANIMALS (excluding deer):

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

OTHER NON-COLLISIONS:

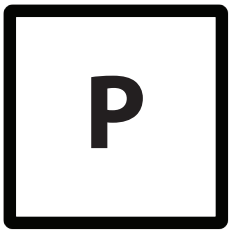
Persons Killed:	16
% of Total Fatalities:	9.3567
No. of Fatal Collisions:	15
% of All Fatal Collisions:	9.3750

COLLISIONS WITH MOTOR VEHICLE:

Persons Killed:	44
% of Total Fatalities:	25.7310
No. of Fatal Collisions:	41
% of All Fatal Collisions:	25.6250

PARKING LOT COLLISIONS:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000



TYPES OF FATAL COLLISIONS - AS REPORTED

DRUG RELATED

COLLISIONS WITH PEDESTRIAN:

Persons Killed:	3
% of Total Fatalities:	4.8387
No. of Fatal Collisions:	3
% of All Fatal Collisions:	5.7692

COLLISIONS WITH FIXED OBJECT:

Persons Killed:	19
% of Total Fatalities:	30.6452
No. of Fatal Collisions:	17
% of All Fatal Collisions:	32.6923

COLLISIONS WITH PEDALCYCLIST:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

COLLISIONS WITH OTHER OBJECTS:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

COLLISIONS WITH RAILWAY TRAIN:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

PARKED VEHICLE COLLISIONS:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

COLLISIONS WITH DEER:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

NON-COLLISIONS OVERTURNED:

Persons Killed:	5
% of Total Fatalities:	8.0645
No. of Fatal Collisions:	4
% of All Fatal Collisions:	7.6923

COLLISIONS WITH ANIMALS (excluding deer):

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

OTHER NON-COLLISIONS:

Persons Killed:	2
% of Total Fatalities:	3.2258
No. of Fatal Collisions:	2
% of All Fatal Collisions:	3.8462

COLLISIONS WITH MOVING MOTOR VEHICLE:

Persons Killed:	33
% of Total Fatalities:	53.2258
No. of Fatal Collisions:	26
% of All Fatal Collisions:	50.0000

PARKING LOT COLLISIONS:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

TYPES OF FATAL COLLISIONS - FARS ADJUSTED

DRUG RELATED

COLLISIONS WITH PEDESTRIAN:

Persons Killed:	9
% of Total Fatalities:	3.0303
No. of Fatal Collisions:	9
% of All Fatal Collisions:	3.3835

COLLISIONS WITH FIXED OBJECT:

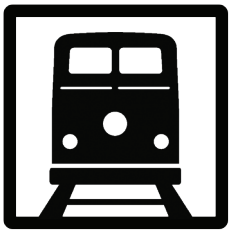
Persons Killed:	107
% of Total Fatalities:	36.0269
No. of Fatal Collisions:	100
% of All Fatal Collisions:	37.5940

COLLISIONS WITH PEDALCYCLIST:

Persons Killed:	3
% of Total Fatalities:	1.0101
No. of Fatal Collisions:	3
% of All Fatal Collisions:	1.1278

COLLISIONS WITH OTHER OBJECTS:

Persons Killed:	1
% of Total Fatalities:	.3367
No. of Fatal Collisions:	1
% of All Fatal Collisions:	.3759



COLLISIONS WITH RAILWAY TRAIN:

Persons Killed:	1
% of Total Fatalities:	.3367
No. of Fatal Collisions:	1
% of All Fatal Collisions:	.3759

PARKED VEHICLE COLLISIONS:

Persons Killed:	2
% of Total Fatalities:	.6734
No. of Fatal Collisions:	2
% of All Fatal Collisions:	.7519

COLLISIONS WITH DEER:

Persons Killed:	1
% of Total Fatalities:	.3367
No. of Fatal Collisions:	1
% of All Fatal Collisions:	.3759

NON-COLLISIONS OVERTURNED:

Persons Killed:	13
% of Total Fatalities:	4.3771
No. of Fatal Collisions:	12
% of All Fatal Collisions:	4.5113

COLLISIONS WITH ANIMALS (excluding deer):

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000

OTHER NON-COLLISIONS:

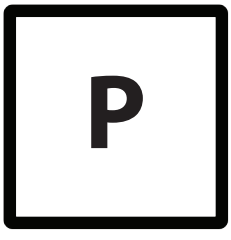
Persons Killed:	23
% of Total Fatalities:	7.7441
No. of Fatal Collisions:	20
% of All Fatal Collisions:	7.5188

COLLISIONS WITH MOVING MOTOR VEHICLE:

Persons Killed:	137
% of Total Fatalities:	46.1279
No. of Fatal Collisions:	117
% of All Fatal Collisions:	43.9850

PARKING LOT COLLISIONS:

Persons Killed:	0
% of Total Fatalities:	.0000
No. of Fatal Collisions:	0
% of All Fatal Collisions:	.0000



Pedestrian Fatal Collisions As Reported

Alcohol Related

Pedestrian Action	Age 1-4	Age 5-9	Age 10-14	Age 15-19	Age 20-24	Age 25-44	Age 45-64	Age 65+	Not Stated	Killed	Injured
Approaching or Leaving Vehicle	0	0	0	0	0	1	0	0	0	0	1
At Intersection	0	0	0	1	0	0	1	0	0	0	2
Crossing Against Signal	0	0	0	0	0	0	0	0	0	0	0
Crossing With Signal	0	0	0	0	0	0	0	0	0	0	0
Dark Clothing/ Not Visible	0	0	0	0	0	0	0	0	0	0	0
Darting Into Roadway	0	0	0	0	0	0	1	0	0	0	1
Pedestrian Drinking	0	0	0	0	0	5	1	0	0	0	6
Pedestrian Drug Related	0	0	0	0	0	0	0	0	0	0	0
Getting On or Off Vehicle	0	0	0	0	0	0	0	0	0	0	0
In Crosswalk	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Jogging	0	0	0	0	0	0	0	0	0	0	0
Laying in Roadway	0	0	0	0	0	0	0	0	0	0	0
Not at Intersection	0	0	2	1	1	5	2	0	0	6	5
Not in Roadway	0	0	4	2	0	0	1	0	0	5	2
Physical Impairment	0	0	0	0	0	0	0	0	0	0	0
Playing in Roadway	0	0	0	0	0	0	0	0	0	0	0
Pushing Vehicle	0	0	0	0	0	0	0	0	0	0	0
Skating/ Skateboarding	0	0	0	0	0	0	0	0	0	0	0
Walking in Roadway	0	0	0	1	0	6	3	0	0	2	8
Working in Roadway	0	0	0	0	0	0	0	0	0	0	0
Working on Vehicle	0	0	0	0	0	4	3	0	0	3	4
TOTALS	0	0	6	5	1	21	12	0	0	16	29

Pedestrian Fatal Collisions FARS Adjusted

Alcohol Related

Pedestrian Action	Age 1-4	Age 5-9	Age 10-14	Age 15-19	Age 20-24	Age 25-44	Age 45-64	Age 65+	Not Stated	Killed	Injured
Approaching or Leaving Vehicle	0	0	0	0	0	0	0	0	0	0	0
At Intersection	0	0	0	0	0	0	0	0	0	0	0
Crossing Against Signal	0	0	0	0	0	0	0	0	0	0	0
Crossing With Signal	0	0	0	0	0	0	0	0	0	0	0
Dark Clothing/ Not Visible	0	0	0	0	0	0	0	0	0	0	0
Darting Into Roadway	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Drinking	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Drug Related	0	0	0	0	0	0	0	0	0	0	0
Getting On or Off Vehicle	0	0	0	0	0	0	0	0	0	0	0
In Crosswalk	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Jogging	0	0	0	0	0	0	0	0	0	0	0
Laying in Roadway	0	0	0	0	0	0	0	0	0	0	0
Not at Intersection	0	0	2	1	0	4	2	0	0	6	6
Not in Roadway	0	0	4	2	0	0	1	0	0	5	5
Physical Impairment	0	0	0	0	0	0	0	0	0	0	0
Playing in Roadway	0	0	0	0	0	0	0	0	0	0	0
Pushing Vehicle	0	0	0	0	0	0	0	0	0	0	0
Skating/ Skateboarding	0	0	0	0	0	0	0	0	0	0	0
Walking in Roadway	0	0	0	0	0	4	0	0	0	2	2
Working in Roadway	0	0	0	0	0	0	0	0	0	0	0
Working on Vehicle	0	0	0	0	0	4	3	0	0	3	3
TOTALS	0	0	6	3	0	12	6	0	0	16	11

Pedestrian Fatal Collisions As Reported

Drug Related

Pedestrian Action	Age 1-4	Age 5-9	Age 10-14	Age 15-19	Age 20-24	Age 25-44	Age 45-64	Age 65+	Not Stated	Killed	Injured
Approaching or Leaving Vehicle	0	1	0	0	0	1	0	0	0	0	2
At Intersection	0	0	0	0	0	1	1	0	0	0	2
Crossing Against Signal	0	0	0	0	0	0	0	0	0	0	0
Crossing With Signal	0	0	0	0	0	0	0	0	0	0	0
Dark Clothing/ Not Visible	0	0	0	0	0	0	0	0	0	0	0
Darting Into Roadway	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Drinking	0	0	0	0	0	5	0	0	0	0	5
Pedestrian Drug Related	0	0	0	0	0	1	0	0	0	0	1
Getting On or Off Vehicle	0	0	0	0	0	1	1	0	0	0	2
In Crosswalk	0	0	0	0	0	0	1	0	0	0	1
Pedestrian Jogging	0	0	0	0	0	0	0	0	0	0	0
Laying in Roadway	0	0	0	0	0	0	0	0	0	0	0
Not at Intersection	0	0	0	0	0	0	0	0	0	0	0
Not in Roadway	0	0	0	0	2	0	2	0	0	2	2
Physical Impairment	0	0	0	0	0	0	0	0	0	0	0
Playing in Roadway	0	0	0	0	0	0	0	0	0	0	0
Pushing Vehicle	0	0	0	0	0	0	0	0	0	0	0
Skating/ Skateboarding	0	0	0	0	0	0	0	0	0	0	0
Walking in Roadway	0	0	0	0	0	8	1	1	0	3	7
Working in Roadway	0	0	0	0	0	0	0	0	0	0	0
Working on Vehicle	0	0	0	0	1	1	1	0	0	1	2
TOTALS	0	1	0	0	3	18	7	1	0	6	24

Pedestrian Fatal Collisions FARS Adjusted

Drug Related

Pedestrian Action	Age 1-4	Age 5-9	Age 10-14	Age 15-19	Age 20-24	Age 25-44	Age 45-64	Age 65+	Not Stated	Killed	Injured
Approaching or Leaving Vehicle	0	0	0	0	4	6	2	0	0	2	10
At Intersection	0	0	0	0	0	0	0	0	0	0	0
Crossing Against Signal	0	0	0	0	0	0	0	1	0	1	0
Crossing With Signal	0	0	0	0	0	0	0	0	0	0	0
Dark Clothing/ Not Visible	0	0	0	0	0	0	0	0	1	1	0
Darting Into Roadway	0	1	0	0	0	0	0	0	0	1	0
Pedestrian Drinking	0	0	0	0	0	0	1	0	0	1	0
Pedestrian Drug Related	0	0	0	0	0	0	0	0	0	0	0
Getting On or Off Vehicle	0	0	0	0	0	0	0	0	0	0	0
In Crosswalk	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Jogging	0	0	0	0	0	0	0	0	0	0	0
Laying in Roadway	0	0	0	0	0	0	0	0	0	0	0
Not at Intersection	0	0	0	0	1	0	0	0	0	1	0
Not in Roadway	0	0	0	0	2	0	2	0	0	2	2
Physical Impairment	0	0	0	0	0	0	0	0	0	0	0
Playing in Roadway	0	0	0	0	0	0	0	0	0	0	0
Pushing Vehicle	0	0	0	0	0	0	0	0	0	0	0
Skating/ Skateboarding	0	0	0	0	0	0	0	0	0	0	0
Walking in Roadway	0	0	0	0	1	4	0	1	1	5	2
Working in Roadway	0	0	0	0	0	0	0	0	0	0	0
Working on Vehicle	0	0	0	0	1	0	1	0	0	1	1
TOTALS	0	1	0	0	9	10	6	2	2	15	15

Pedestrian Fatal Collisions As Reported
Vehicle Actions

Alcohol Related

Pedestrian Action	Straight	Right Turn	Left Turn	Starting in Traffic	Slowing	Parking	Backing	Other	Totals
Approaching or Leaving Vehicle	1	0	0	0	0	0	1	0	2
At Intersection	0	1	1	0	0	0	0	0	2
Crossing Against Signal	0	0	0	0	0	0	0	0	0
Crossing With Signal	0	0	0	0	0	0	0	0	0
Dark Clothing/ Not Visible	0	0	0	0	0	0	0	0	0
Darting Into Roadway	0	1	0	0	0	0	0	0	1
Pedestrian Drinking	3	1	0	0	0	0	0	0	4
Pedestrian Drug Related	0	0	0	0	0	0	0	0	0
Getting On or Off Vehicle	0	0	0	0	0	0	0	0	0
In Crosswalk	0	0	0	0	0	0	0	0	0
Pedestrian Jogging	0	0	0	0	0	0	0	0	0
Laying in Roadway	0	0	0	0	0	0	0	0	0
Not at Intersection	5	0	0	0	1	3	0	0	9
Not in Roadway	3	0	0	0	0	0	0	0	3
Physical Impairment	0	0	0	0	0	0	0	0	0
Playing in Roadway	0	0	0	0	0	0	0	0	0
Pushing Vehicle	0	0	0	0	0	0	0	0	0
Skating/ Skateboarding	0	0	0	0	0	0	0	0	0
Walking in Roadway	8	0	0	0	0	0	0	0	8
Working in Roadway	0	0	0	0	0	0	0	0	0
Working on Vehicle	3	0	0	0	0	4	0	0	7
TOTALS	23	3	1	0	1	7	1	0	36

Pedestrian Fatal Collisions FARS Adjusted Vehicle Actions

Alcohol Related

Pedestrian Action	Straight	Right Turn	Left Turn	Starting in Traffic	Slowing	Parking	Backing	Other	Totals
Approaching or Leaving Vehicle	0	0	0	0	0	0	0	0	0
At Intersection	0	0	0	0	0	0	0	0	0
Crossing Against Signal	0	0	0	0	0	0	0	0	0
Crossing With Signal	0	0	0	0	0	0	0	0	0
Dark Clothing/ Not Visible	0	0	0	0	0	0	0	0	0
Darting Into Roadway	0	0	0	0	0	0	0	0	0
Pedestrian Drinking	0	0	0	0	0	0	0	0	0
Pedestrian Drug Related	0	0	0	0	0	0	0	0	0
Getting On or Off Vehicle	0	0	0	0	0	0	0	0	0
In Crosswalk	0	0	0	0	0	0	0	0	0
Pedestrian Jogging	0	0	0	0	0	0	0	0	0
Laying in Roadway	0	0	0	0	0	0	0	0	0
Not at Intersection	3	0	0	0	0	0	0	0	3
Not in Roadway	3	0	0	0	0	0	0	0	3
Physical Impairment	0	0	0	0	0	0	0	0	0
Playing in Roadway	0	0	0	0	0	0	0	0	0
Pushing Vehicle	0	0	0	0	0	0	0	0	0
Skating/ Skateboarding	0	0	0	0	0	0	0	0	0
Walking in Roadway	2	0	0	0	0	0	0	0	2
Working in Roadway	0	0	0	0	0	0	0	0	0
Working on Vehicle	3	0	0	0	0	4	0	0	7
TOTALS	11	0	0	0	0	4	0	0	15

Pedestrian Fatal Collisions As Reported
Vehicle Actions

Drug Related

Pedestrian Action	Straight	Right Turn	Left Turn	Starting in Traffic	Slowing	Parking	Backing	Other	Totals
Approaching or Leaving Vehicle	1	0	0	0	0	0	0	1	2
At Intersection	0	0	0	0	0	0	0	2	2
Crossing Against Signal	0	0	0	0	0	0	0	0	0
Crossing With Signal	0	0	0	0	0	0	0	0	0
Dark Clothing/ Not Visible	0	0	0	0	0	0	0	0	0
Darting Into Roadway	0	0	0	0	0	0	0	0	0
Pedestrian Drinking	3	0	0	0	0	0	0	0	3
Pedestrian Drug Related	0	0	0	0	0	1	0	0	1
Getting On or Off Vehicle	0	0	0	0	0	0	0	2	2
In Crosswalk	0	1	0	0	0	0	0	0	1
Pedestrian Jogging	0	0	0	0	0	0	0	0	0
Laying in Roadway	0	0	0	0	0	0	0	0	0
Not at Intersection	0	0	0	0	0	0	0	0	0
Not in Roadway	1	0	0	0	0	2	0	2	5
Physical Impairment	0	0	0	0	0	0	0	0	0
Playing in Roadway	0	0	0	0	0	0	0	0	0
Pushing Vehicle	0	0	0	0	0	0	0	0	0
Skating/ Skateboarding	0	0	0	0	0	0	0	0	0
Walking in Roadway	5	0	0	0	0	0	2	0	7
Working in Roadway	0	0	0	0	0	0	0	0	0
Working on Vehicle	1	0	0	0	0	1	0	1	3
TOTALS	11	1	0	0	0	4	2	8	26

Pedestrian Fatal Collisions FARS Adjusted Vehicle Actions

Drug Related

Pedestrian Action	Straight	Right Turn	Left Turn	Starting in Traffic	Slowing	Parking	Backing	Other	Totals
Approaching or Leaving Vehicle	2	0	0	0	8	4	0	4	18
At Intersection	0	0	0	0	0	0	0	0	0
Crossing Against Signal	1	0	0	0	0	0	0	0	1
Crossing With Signal	0	0	0	0	0	0	0	0	0
Dark Clothing/ Not Visible	0	0	0	0	0	0	0	1	1
Darting Into Roadway	1	0	0	0	0	0	0	0	1
Pedestrian Drinking	1	0	0	0	0	0	0	0	1
Pedestrian Drug Related	0	0	0	0	0	0	0	0	0
Getting On or Off Vehicle	0	0	0	0	0	0	0	0	0
In Crosswalk	0	0	0	0	0	0	0	0	0
Pedestrian Jogging	0	0	0	0	0	0	0	0	0
Laying in Roadway	0	0	0	0	0	0	0	0	0
Not at Intersection	1	0	0	0	0	0	0	0	1
Not in Roadway	0	0	0	0	0	2	0	2	4
Physical Impairment	0	0	0	0	0	0	0	0	0
Playing in Roadway	0	0	0	0	0	0	0	0	0
Pushing Vehicle	0	0	0	0	0	0	0	0	0
Skating/ Skateboarding	0	0	0	0	0	0	0	0	0
Walking in Roadway	4	0	0	0	0	0	0	1	5
Working in Roadway	0	0	0	0	0	0	0	0	0
Working on Vehicle	0	0	0	0	0	1	0	1	2
TOTALS	10	0	0	0	8	7	0	9	34

Fatal Hit-and-Run Collisions

Alcohol Fatal Collisions As Reported	Alcohol Persons Killed As Reported	Alcohol Fatal Collisions FARS Adjusted	Alcohol Persons Killed FARS Adjusted
6	6	5	5

Drug Fatal Collisions As Reported	Drug Persons Killed As Reported	Drug Fatal Collisions FARS Adjusted	Drug Persons Killed FARS Adjusted
2	2	6	6

HIT-AND-RUN VICTIMS

Type of Victim	Alcohol Persons Killed As Reported	Alcohol Persons Killed FARS Adjusted	Drug Persons Killed As Reported	Drug Persons Killed FARS Adjusted
Pedestrian	2	2	1	1
Pedalcyclist	0	0	0	0
Other	3	2	1	4
Total	4	4	2	5

LOCATION OF HIT-AND-RUN COLLISIONS

TYPE OF ROADWAY	Alcohol Fatal Collisions As Reported	Alcohol Fatal Collisions FARS Adjusted	Drug Fatal Collisions As Reported	Drug Fatal Collisions FARS Adjusted
INTERSTATE	1	1	1	1
U.S. ROUTE	1	1	0	0
STATE ROUTE	4	3	1	4
PARKWAY	0	0	0	0
COUNTY ROADS	0	0	0	0
CITY STREETS	0	0	0	0
OTHER	0	0	0	1
TOTAL	**6**	**5**	**2**	**6**

Fatal Collisions - Land Use

Alcohol Involved - As Reported		
LAND USE	NUMBER	PERCENT
RURAL	67	59.8%
BUSINESS	13	11.6%
INDUSTRIAL	-	-
RESIDENTIAL	20	17.9%
SCHOOL	1	0.9%
PARK	-	-
LIMITED ACCESS	9	8.0%
*TOTAL	112	100%

Alcohol Involved - FARS Adjusted		
LAND USE	NUMBER	PERCENT
RURAL	91	56.9%
BUSINESS	23	14.4%
INDUSTRIAL	-	-
RESIDENTIAL	26	16.3%
SCHOOL	1	0.6%
PARK	-	-
LIMITED ACCESS	19	11.9%
*TOTAL	160	100%

Drug Involved - As Reported		
LAND USE	NUMBER	PERCENT
RURAL	34	65.4%
BUSINESS	6	11.5%
INDUSTRIAL	-	-
RESIDENTIAL	5	9.6%
SCHOOL	-	-
PARK	-	-
LIMITED ACCESS	7	13.5%
*TOTAL	52	100%

Drug Involved - FARS Adjusted		
LAND USE	NUMBER	PERCENT
RURAL	148	55.6%
BUSINESS	38	14.3%
INDUSTRIAL	2	0.8%
RESIDENTIAL	37	13.9%
SCHOOL	-	-
PARK	-	-
LIMITED ACCESS	41	15.4%
*TOTAL	266	100%

*** Does not include "Unknown" Land Use**

COLLISION LOCATIONS RURAL VS. URBAN

For the purpose of tabulating collision locations, an urban area is an area including and adjacent to a municipality or other place of 5,000 or more population. Rural areas are those places that do not meet this specification.

Alcohol Involved - As Reported				
AREA	FATAL	% of Total	Killed	% of Total
RURAL	65	60	72	62
URBAN	44	40	45	38
TOTAL	109	100	117	100

Alcohol Involved - FARS Adjusted				
AREA	FATAL	% of Total	Killed	% of Total
RURAL	90	56	97	57
URBAN	70	44	74	43
TOTAL	160	100	171	100

Drug Involved - As Reported				
AREA	FATAL	% of Total	Killed	% of Total
RURAL	32	62	40	65
URBAN	20	38	22	35
TOTAL	52	100	62	100

Drug Involved - FARS Adjusted				
AREA	FATAL	% of Total	Killed	% of Total
RURAL	151	57	174	59
URBAN	115	43	123	41
TOTAL	266	100	297	100

LOCATION OF COLLISIONS

TYPE OF ROADWAY	Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Fatal Collisions FARS Adjusted
INTERSTATE	8	17	5	33
U.S. ROUTE	15	32	13	70
STATE ROUTE	64	85	30	133
PARKWAY	2	2	1	5
COUNTY ROAD	13	14	1	13
CITY STREET	7	10	1	11
OTHER	3	0	1	1
+ TOTAL	**112**	**160**	**52**	**266**

+ Note that totals may vary slightly between roadway types and specific roadway totals due to date of data collection.

INTERSTATES AND PARKWAYS

Interstate	Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Number Killed As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Alcohol Involved Number Killed FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Number Killed As Reported	Drug Involved Fatal Collisions FARS Adjusted	Drug Involved Number Killed FARS Adjusted
I-24	0	0	1	1	0	0	1	1
I-64	5	5	6	6	1	1	7	7
I-65	1	1	3	3	1	1	6	6
I-69	-	-	-	-	-	-	-	-
I-71	0	0	0	0	1	2	3	4
I-75	1	1	5	6	1	1	9	9
I-264	1	1	1	1	0	0	2	2
I-265	0	0	1	1	0	0	0	0
I-275	0	0	0	0	1	1	4	4
I-471	0	0	0	0	0	0	0	0
Total	**8**	**8**	**17**	**18**	**5**	**6**	**32**	**33**

Parkway	Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Number Killed As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Alcohol Involved Number Killed FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Number Killed As Reported	Drug Involved Fatal Collisions FARS Adjusted	Drug Involved Number Killed FARS Adjusted
Audubon	1	1	1	1	1	1	1	1
Bluegrass	1	1	1	1	0	0	1	1
Cumberland	0	0	0	0	0	0	0	0
Daniel Boone	0	0	0	0	0	0	3	4
Green River	0	0	0	0	0	0	0	0
Mountain	0	0	0	0	0	0	1	1
Pennyrile	0	0	0	0	0	0	0	0
Purchase	0	0	0	0	0	0	0	0
Western Kentucky	0	0	0	0	0	0	0	0
Total	**2**	**2**	**2**	**2**	**1**	**1**	**6**	**7**

FATAL COLLISIONS BY ROADWAY CONDITIONS, ROADWAY CHARACTER AND LIGHT CONDITIONS

COLLISIONS BY ROADWAY SURFACE

Roadway Condition	Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Fatal Collisions FARS Adjusted
Dry	79	135	41	214
Wet	15	25	11	50
Ice	0	0	0	2
Snow/Slush	0	0	0	0
Mud	0	0	0	0

COLLISIONS BY ROADWAY CHARACTER

Roadway Condition	Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Fatal Collisions FARS Adjusted
Straight & Level	39	55	20	108
Straight & Grade	14	20	12	46
Staight & Hillcrest	0	2	3	8
Curve & Level	26	40	7	54
Curve & Grade	26	38	9	44
Curve & Hillcrest	4	5	1	6

COLLISIONS BY LIGHT CONDITION

Roadway Condition	Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Fatal Collisions FARS Adjusted
Daylight	32	50	30	151
Dawn	1	2	1	5
Dusk	7	7	4	9
Dark	68	100	17	98

FATAL COLLISIONS BY VEHICLE ACTION, DAY OF WEEK AND MONTH

COLLISIONS BY VEHICLE ACTION

Roadway Condition	Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Fatal Collisions FARS Adjusted
Head On	10	11	12	34
Rear End	2	3	2	13
Side Swipe	0	0	0	7
Other	8	8	4	14
Angle	6	10	5	26
Backed Into	0	0	0	0

COLLISIONS BY DAY OF WEEK

Roadway Condition	10Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Fatal Collisions FARS Adjusted
Sunday	28	37	8	39
Monday	13	13	12	41
Tuesday	8	13	5	31
Wednesday	15	24	7	32
Thursday	7	14	6	41
Friday	16	22	6	34
Saturday	20	33	7	43

COLLISIONS BY MONTH

Roadway Condition	Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Fatal Collisions FARS Adjusted
January	7	10	3	19
February	8	12	5	20
March	8	8	1	19
April	11	17	4	28
May	11	15	3	30
June	12	16	4	24
July	7	10	6	26
August	5	12	4	21
September	14	16	8	24
October	11	13	6	20
November	10	16	4	12
December	5	15	4	23

TYPE VEHICLES IN FATAL COLLISIONS

VEHICLE TYPE	Alcohol Involved Fatal Collisions As Reported	Alcohol Involved Fatal Collisions FARS Adjusted	Drug Involved Fatal Collisions As Reported	Drug Involved Fatal Collisions FARS Adjusted
Passenger Cars*	130	182	74	338
Taxicabs	0	0	0	0
Trucks	6	14	7	36
Motorcycles	16	26	5	53
Motor Schooters/Motor Bikes	2	2	0	4
School Buses	0	0	0	3
Other Buses	0	0	0	0
Farm Tractors/Equipment	0	2	0	0
Emergency	0	1	0	1
Other Public Owned	1	2	1	1
Go Carts	0	0	0	0
Other	17	16	6	20
Not Stated	0	0	0	0
Total	172	245	93	456

* Passenger cars include automobiles and trucks registered for 6,000 pounds or less.

VEHICLES REGISTERED IN KENTUCKY

PASSENGER CARS	**2,340,732**
COMMERCIAL TRUCKS	**164,556**
MOTORCYCLES	**91,181**
Other (Inc. Special Issue Plates)	**1,323,190**
TOTAL (ALL TYPES)	**3,919,659**

Fatal Truck Collisions

TYPE OF ROADWAY	Alcohol Fatal Collisions As Reported	Alcohol Fatal Collisions FARS Adjusted	Drug Fatal Collisions As Reported	Drug Fatal Collisions FARS Adjusted
INTERSTATE	2	6	2	10
U.S. ROUTE	1	4	3	14
STATE ROUTE	1	2	1	10
PARKWAY	2	2	1	2
COUNTY ROADS	0	0	0	0
CITY STREETS	0	0	0	0
OTHER	0	0	0	0
TOTAL	**6**	**14**	**7**	**36**

Truck Driver Residence in Fatal Collisions

TYPE OF ROADWAY	Alcohol Fatal Collisions As Reported	Alcohol Fatal Collisions FARS Adjusted	Drug Fatal Collisions As Reported	Drug Fatal Collisions FARS Adjusted
Local Resident	1	2	3	9
State Resident	0	4	0	3
Out of State Resident	2	3	1	9
Not Stated	3	5	3	15

Residence of Driver

TYPE OF ROADWAY	Alcohol Fatal Collisions As Reported	Alcohol Fatal Collisions FARS Adjusted	Drug Fatal Collisions As Reported	Drug Fatal Collisions FARS Adjusted
Local Resident	93	130	51	265
State Resident	38	64	21	111
Out of State Resident	22	31	13	55
Not Stated	0	0	0	0

Sex of Driver in Fatal Collisions

TYPE OF ROADWAY	Alcohol Fatal Collisions As Reported	Alcohol Fatal Collisions FARS Adjusted	Drug Fatal Collisions As Reported	Drug Fatal Collisions FARS Adjusted
Male	119	175	63	335
Female	37	50	22	97
Unknown	0	0	0	0

Age of Drivers in Fatal Accidents

TYPE OF ROADWAY	Alcohol Fatal Collisions As Reported	Alcohol Fatal Collisions FARS Adjusted	Drug Fatal Collisions As Reported	Drug Fatal Collisions FARS Adjusted
Under 16	0	1	0	1
16-19	5	7	2	15
20-24	22	32	9	48
25-34	38	52	25	99
35-44	28	40	16	72
45-54	30	46	19	82
55-64	20	33	8	71
65-74	6	8	3	30
75 and over	4	6	3	14
Not Stated	0	0	0	0
TOTAL	**153**	**225**	**85**	**432**

Teenage Drivers

TYPE OF ROADWAY	Alcohol Fatal Collisions As Reported	Alcohol Fatal Collisions FARS Adjusted	Drug Fatal Collisions As Reported	Drug Fatal Collisions FARS Adjusted
Fatal Collisions	5	7	2	15

Safety Restraints

TYPE OF ROADWAY	Alcohol Fatal Collisions As Reported	Alcohol Fatal Collisions FARS Adjusted	Drug Fatal Collisions As Reported	Drug Fatal Collisions FARS Adjusted
Restraint Used	19	39	21	93
Restraint Not Used	67	92	30	136
Not Applicable	31	40	11	68