In-Vehicle Safety Features and Their Impacts on Fatal Crashes

By

Mubarak Hussain Alshatti

Submitted to the graduate degree program in Civil, Environmental and Architectural Engineering and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Master of Science in Civil Engineering.

_____

Chairperson, Dr. Steven Schrock

_____

Dr. Chen-Ho Ko

_____

Dr. Alexandra Kondyli

_____

Dr. Hemin Mohammed

Date Defended: 28th July 2022

The Thesis Committee for Mubarak Hussain Alshatti

Certifies that this is the approved version of the following thesis:

In-Vehicle Safety Features and Their Impacts on Fatal Crashes

_____

Chairperson, Dr. Steven Schrock

Date approved: 28th July 2022

ABSTRACT

One of the most important safety metrics in transportation engineering is fatal crashes, and a major effect to improve safety is to reduce fatal crashes. Therefore, safety features are continuously tested and equipped in vehicles to reduce fatal crashes and provide safety to road users. This study was initiated to explore the relationship between two in-vehicle safety features and their impact on fatal crashes. These two in-vehicle safety features are the Lane Keep Assist System (LKAS) and the Forward Collision Warning System (FCWS).

This thesis analyzed nine different General Motors (GM) vehicles' make, model, and year to test which in-vehicle safety feature reduced fatal crashes. To test the LKAS safety feature, run-off-road fatal crashes were analyzed using the Fatality Analysis Reporting System (FARS) data for the Chevrolet Silverado, the Chevrolet Equinox, the GMC Yukon, the GMC Sierra, and the Cadillac Escalade model vehicles. To test the FCWS safety feature, rear-end fatal crashes were analyzed using FARS data for the Chevrolet Equinox, the Chevrolet Traverse, the Buick Enclave, the GMC Acadia, and the GMC Terrain.

The odds ratios for the LKAS safety feature for the Chevrolet Silverado, the Chevrolet Equinox, the GMC Sierra, the GMC Yukon, and the Cadillac Escalade model vehicles were 0.704, 0.615, 0.601, 0.446, and 1.149, respectively. The odds ratio showed, when examining the LKAS safety feature for the Chevrolet Silverado, the Chevrolet Equinox, the GMC Yukon, the GMC Sierra, and the Cadillac Escalade model vehicles, that four of the five vehicle models examined resulted in reductions in run-off-road fatal crashes; the GMC Yukon was not statistically significant in reducing this type of crashes.

Additionally, the odds ratios for the FCWS safety feature for the Chevrolet Equinox, the GMC Terrain, the Chevrolet Traverse, the GMC Acadia, and the Buick Enclave model vehicles were 0.814, 0.199, 0.873, 0.638, and 0.143, respectively. The odds ratio showed, when examining the FCWS safety feature for the Chevrolet Equinox, the Chevrolet Traverse, the Buick Enclave, the GMC Acadia, and the GMC Terrain model vehicles, that four of the five vehicles examined resulted in a reduction in rear-end crashes; the Chevrolet Equinox, the Chevrolet Traverse, and the GMC Acadia were not statistically significant in reducing run-off-road fatal crashes. In addition, the GMC Terrain results were undefined.

Key Words: Lane Keep Assist System (LKAS), Forward Collision Warning (FCWS), fatal crashes, and General Motors (GM)

ACKNOWLEDGMENTS

"My Lord! Uplift my heart for me, and ease for me my task. And remove the impediment from my tongue, so that they may understand my speech." (Surah Ta Ha, 20:25-28). All praise be to Almighty Allah, the most merciful, and most gracious for His blessing given to me during my study and in completing this thesis.

I would like to thank the committee chairperson, Dr. Steven Schrock for his advice, support, and guidance throughout my two years of the master's program. Second, I would like to thank committee members Dr. Alexandra Kondyli, Dr. Chen-Ho Ko, and Dr. Hemin Jalal Mohammed for their advice and valuable guidance that made me reach success in conducting my thesis.

I would like to thank my family, my father, Hussain Alshatti, my mother, Anaam Altoura, and my brother, Fawaz Alshatti, who have shown me love and support since the first day of my arrival to the U.S and never gave up hope on me. Last but not least, I would like to thank my beloved Luz Tapia who showed me love, kindness, and always believed in me, and I dedicate this thesis to her.

TABLE OF CONTENTS

LIST OF TABLES

TABLE OF FIGURES

CHAPTER 1. INTRODUCTION

Road user safety is an important topic in the transportation world, and studies on technologies used in-vehicle to promote the safety of drivers and passengers are rapidly increasing. As explained by Leonard Evans in his book “Traffic Safety”, there are two different types of harm-reduction methods. The first method refers to the improvement of crashworthiness which, defined by Evans, “refers to engineering features aimed at reducing losses, given that a specific crash occurs.” (Evans, 2014). Essentially, the purpose of these engineering features is to reduce risks to occupants during a crash, such as seatbelts and airbags. The second method mentioned by Evans refers to the improvement of crash prevention. Crash prevention is defined as “measures aimed at preventing the crash from occurring.” (Evans, 2014). “Such measures may be either of an engineering nature (making vehicles easier to see, better braking, radar, etc.) or of a behavioral nature (driver selection, training, motivating, and licensing, enforcing traffic laws, etc.).” (Evans, 2014). Essentially, the improvement of crash prevention reduces the possible risks that can be measured within the vehicle build or its surroundings before a crash. The Lane Keep Assist System (LAKS) and the Forward Collision Warning System (FCWS) safety features can be considered features that assist in crash prevention.

Currently, there is a variety of in-vehicle technologies equipped in a vehicle. These technologies can be front and rear parking sensors, blind spot monitoring, forward collision warning with automatic emergency braking, lane-keep assist system, and other numerous technologies. Some technologies, which maybe not exactly be artificial intelligence, are capable of reacting to specific situations. Other technologies operate as an extra set of eyes, alerting to possible danger and allowing drivers to respond early to prevent harm to themselves, their vehicle, or others while driving.

This research was built on early generations of in-vehicle safety features studies conducted by Evans such as antilock brakes and airbags (Evans, 2014). Evans used the Fatality Analysis Reporting System (FARS) data in order to conduct multiple studies on in-vehicles safety features as shown in Table 1. The method used in this research was modeled on Evans' earlier studies. The focus of this research was to compare recent advances in in-vehicle safety features for several of the most-sold vehicles' make, model, and year in the U.S. by analyzing crash data for these vehicles sold before and after the installation of in-vehicle safety features using the odds ratio method. Szumilas refers to an odds ratio (OR) as, "a measure of association between an exposure and an outcome. The OR represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure." (Szumilas, 2010)

Table 1. Effect on Fatality Risk of U.S, Adapted from (Evans, 2014)

Description	*Occupants Protected*	*Fatalities Prevented*	
		Protected Occupants	*Average Over All Occupants*
Energy absorbing column	driver	6.6%	4.4%
Column displacement	driver	6.6%	4.4%
Instrument panels	front passengers	7.0	1.7
Side structure	all	1.7	1.7
Door locks	all	1.5	1.5
Roof crush resistance	all	0.43	0.43
windshield glazing	all	0.39	0.39
Head restraints	driver and right-front passenger	0.36	0.33
Hydraulic brake systems	all	0.9	0.9

1.1 Research Overview

The purpose of this research was to examine and analyze in-vehicle safety features and whether they were associated with a reduction in fatal crashes. To accomplish this purpose, the

following tasks were fulfilled: (a) Identifying in-vehicle safety features and ranking their importance on a scale from high to low, (b) choosing vehicle models with enough data to analyze, (c) identifying the types of crashes these safety features could prevent, (d) identifying different analysis methods, and (e) conducting the analysis.

1.2 Contribution to the State of the Art

The research demonstrated the extent that in-vehicle safety features reduced fatal crashes. The results will aid future researchers in understanding the importance of in-vehicle safety features and the effectiveness of analysis methods used to test the data given by FARS.

1.3 Organization of the Thesis

The thesis is organized into the following chapters: 1) Introduction; 2) Literature Review; 3) Methodology; 4) Data Collection; 5) Data Analysis; 6) Findings and Recommendations; and 7) Future Research. Finally, a list of references and appendices are presented following these chapters.

Chapter 1, Introduction, discusses the different types of safety features and their importance in preventing harm to the driver and vehicle. Chapter 2, Literature Review, reviews previous studies conducted by other researchers to evaluate the importance of in-vehicle safety features. Chapter 3, Methodology, shows the equations, hypothesis, and statistical method used to conduct this thesis. Chapter 4, Data Collection, shows the type of data collected from FARS for each vehicle's make, model, and year, why these specific data were requested, and how raw and unorganized data were reduced to what was necessary for this thesis. Chapter 5, Data Analysis, shows the analysis method used and how to apply the equations from Chapter 4. Chapter 6, Findings and Recommendations, presents the results for each vehicle tested in this

thesis concerning the safety feature that they include and recommendations for this study. Finally, Chapter 7, Future Research, presents why this study is important in understanding the relationship between safety features and fatal crashes, and what other relative studies could be conducted in the future.

CHAPTER 2. LITERATURE REVIEW

This chapter discusses fatality rates for different roadway classifications, a comparison between traffic fatalities in urban/rural regions, fatal crashes involving large numbers of vehicles and weather, and crash avoidance technologies. This research of pertinent literature was conducted using TRID, KU Library, and Google Scholar webpages.

2.1 Fatality Rates for Different Roadway Classifications

Fatal crashes have been an ongoing issue in the transportation world. A study conducted by Evans found that fatal crash rates differed for different roadway classifications (Evans, 2014). For rural roads, interstates have a fatality rate that was 65 percent lower than local roads, which was due to multiple reasons such as interstates having a separation from other roads and rail lines, a minimum of four lanes (two lanes in each direction), gentler curves, paved shoulders, median barriers, and rumble strips to warn drivers when they are leaving the roadway (Evans, 2014).

Acting FHWA Administrator Stephanie Pollack said, “Safer roads and safer speeds are key parts of addressing this crisis of fatalities and serious injuries on our roadways” (FHWA, 2021). According to Evans, a head-on crash is almost certainly fatal (Evans, 2014). Such crashes can occur as a result of many factors such as loss of control on a curve or improper overtaking. Also, multiple-vehicle crashes that occur on freeways often involve vehicles traveling in the same direction at a much lower relative speed. Freeways also eliminate many of the most dangerous types of crashes that occur on local roads, such as intersection crashes, collisions with trees near the road, and collisions with pedestrians (Evans, 2014).

2.2 Comparison Between Traffic Fatalities in Urban/Rural Regions

Despite the fact that fatality rates are lower on interstates compared to local roads, fatal crashes differ from rural to urban areas. A study conducted by Clark and Cushing in 2004 compared fatalities from motor vehicle collisions in the U.S. based on the estimated number of miles traveled on rural and urban roads in each state by using FARS data which found that the fatality rate is substantially higher in rural than in urban regions (Clark and Cushing, 2004). Researchers found that southern states tend to have higher fatality rates due to an increased number of collisions per vehicle miles traveled. A possible explanation for this increase is the extra time needed for the Emergency Medical Services (EMS) system to get the injured driver or passenger of a motor vehicle collision to the nearest hospital (Clark and Cushing, 2004). However, one of many alternative possibilities could be that people who live in rural areas drive more miles and are therefore more likely to get in a catastrophic crash. (Clark and Cushing, 2004).

2.3 Fatal Crashes Involving Large Numbers of Vehicles and Weather

According to a study conducted by Wang et al., describing the relationship between fatal crashes involving large numbers of vehicles and weather, found that 94 percent of all fatal crashes that occurred in the U.S from 1975 – 2014 (1,513,792 fatal crashes) involved at most two vehicles, and it was rare to have fatal crashes involving a larger number of vehicles (Wang et al., 2017). In their study, FARS data were used. The focus of the study was on four weather conditions: rain, clear, fog, and snow. The results showed fatal crashes that involved 35 vehicles or more, were more likely to occur in snow or fog. In addition, fatal crashes that occurred during rainy conditions were three times more likely to involve more than 10 vehicles than fatal crashes

that occurred in good weather (Wang et al., 2017). Table 2 shows the distribution of the 1,513,792 fatal crashes leading to 1,002,359 driver deaths.

Table 2. Distribution of the 1,513,792 Fatal Crashes Leading to 1,002,359 Driver Deaths, Adapted From (Wang et al., 2017)

Weather	Fatal Crashes	Percent	Driver Deaths	Percent
Clear	1,298,855	85.80	858,526	85.65
Rain	127,328	8.41	83,335	8.31
Snow	24,695	1.63	16,860	1.68
Fog	22,745	1.50	16,530	1.65
XTRA	40,169	2.65	27,108	2.7
Total	1,513,792.00	100.00	1,002,359.00	100.00

*XTRA condition includes hail, severe crosswinds, blowing sand, cloudy, not reported, and unknown conditions.

2.4 Crash Avoidance Technologies

Many crashes could be avoided or mitigated with advanced crash avoidance and driver assistance technologies. According to Mobility Insider, Advanced Driver-Assistance Systems (ADAS) are electronic systems equipped in a vehicle that assist the driver by using advanced technologies (Insider, 2020). Advanced technologies have received positive feedback in previous driver surveys; however, these results are not always indicative of all drivers or systems. It is critical to keep evaluating driver acceptance and use of technology as they spread throughout the vehicle fleet. A study conducted by Jermakian in 2011, which aimed to determine maximum potential crash reduction, found that 1 in 5 non-fatal injury crashes and 1 in 3 fatal crashes in the U.S could be prevented if four crash avoidance technologies were equipped in passenger vehicles: lane departure warning, forward collision avoidance, adaptive headlights, and blind spot detection (Jermakian, 2011).

Another study conducted by Evans and Gerrish in 1996 to look for clear links between antilock brakes (ABS) and the chances of being involved in two-vehicle crashes on wet roads had interesting results for five states (Indiana, Missouri, North Carolina, Pennsylvania, and Texas) (Evans and Gerrish, 1996). The researchers used seven General Motors passenger vehicles that are equipped with ABS on 1992 models but not on 1991 models. The data used in their study was FARS data and the odds ratio method was used to conduct the analysis. It was discovered that when driving on wet roads, ABS reduced the danger of a vehicle colliding with a lead vehicle by (48 ± 6) percent when compared to the risk of getting struck in the rear (Evans and Gerrish, 1996). This substantial effect could result from an increased risk of rear impacts or reduced risk of frontal impacts. Using the premise that side-impact crashes were used to estimate exposure, ABS reduced the probability of crashing into a leading vehicle by (32 ± 8) percent on wet roads but raised the risk of getting struck in the rear by (30 ± 14) percent (Evans and Gerrish, 1996).

Another study conducted by Eichelberger and McCartt (2016) explains why Dynamic Radar Cruise Control, Pre-Collision System, and Lane-Keeping Assist were important to improve vehicle safety. Dynamic Radar Cruise Control allows the driver to not only set a vehicle's speed, but also set a gap behind another vehicle. In addition, radar sensors detect slow-moving vehicles leading the equipped vehicle to slow down to maintain a gap and reduce the risk of rear-end crashes. The second major technology Eichelberger and McCartt mentioned was the Pre-Collision system. The Pre-Collision System (PCS) detects the possibility of a frontal collision using the radar sensor and alerts the driver with warning lights and a buzzer that says PCS and Brake. Eichelberger and McCartt also mentioned the importance of the Lane-Keeping Assist Systems (LKAS), which uses cameras in order to monitor lane markings. The LKAS can

be activated at a speed above 30 mph, and when turned on, the system detects the vehicle is drifting out of its lane, the driver is alerted by an instant beeping sound, blinking lane lines on the visual display, and a mild nudge to the steering wheel. The results of this study showed that 9 in 10 respondents wanted forward collision avoidance and adaptive cruise control on their next vehicle, and 71% wanted lane departure prevention/warning. Eichelberger and McCartt's study results are shown in Table 3.

Table 3. Drivers' Use of The System, Adapted from (Eichelberger and McCartt, 2016)

	Percent
Driver's use of Dynamic Radar Cruise Control	(N = 183)
On freeways, expressways, or other high-speed roads	
Always used	60
Sometimes used	21
Rarely used	5
On lower-speed roads with traffic signals or stop signs	
Always used	10
Sometimes used	30
Rarely used	24
Never used	13
Unknown	2
Setting typically used among drivers who	(N = 157)
Ever turned on Dynamic Radar Cruise Control	
Shorter gap	32
Medium setting	19
Longer gap (default setting)	42
Never changed	3
Unknown	4
Drivers' use of Pre-Collision System	(N = 181)
Never turn off	88
Sometimes or rarely turn off	3
Unknown	9
Drivers' use of Lane-keeping System	(N = 116)
Always used	13
Sometimes used	46
Rarely used	29
Never used	12

Other studies were conducted to further explain the LKAS and the FCWS as shown below.

2.5 Lane Keep Assist System

The introduction of the LKAS was in the early 2000s on Mercedes trucks in Europe, and it was called the lane-departure warning system (LDWS). The initial aim was to warn truck drivers in case they unintentionally drifted from their lane. In addition, Nissan and Toyota also introduced lane-departure warnings into their passenger vehicles sold in Japan in the early 2000s (Francis, 2021).

The LKAS and the LDWS are part of the ADAS that assist the driver while driving. There is a slight difference between these two terms. LDWS is described as a system that ceaselessly screens the position of the vehicle to be inside the lane markers (Narote et al., 2018). It cautions the driver by using vibration, visual, or sound alerts when the vehicle drifts from the lane marker boundaries. On the other hand, the LKAS is the latest version of the LDWS system. The LKAS system can automatically steer the vehicle back within the lane marking area (Chen et al., 2018).

2.5.1 LKAS Components/Components Error

The LKAS safety feature is made up of three components: cameras, the Electric Power Assist Steering System (EPAS), and the Electronic Control Unit (ECU) (Romano et al., 2021). To further explain, the camera is used in order to identify lane markings and the ECU by using data from the camera, to calculate the vehicle's orientation and position in the lane. Finally, to return the vehicle back in the lane in a limited time, a path calculation is conducted.

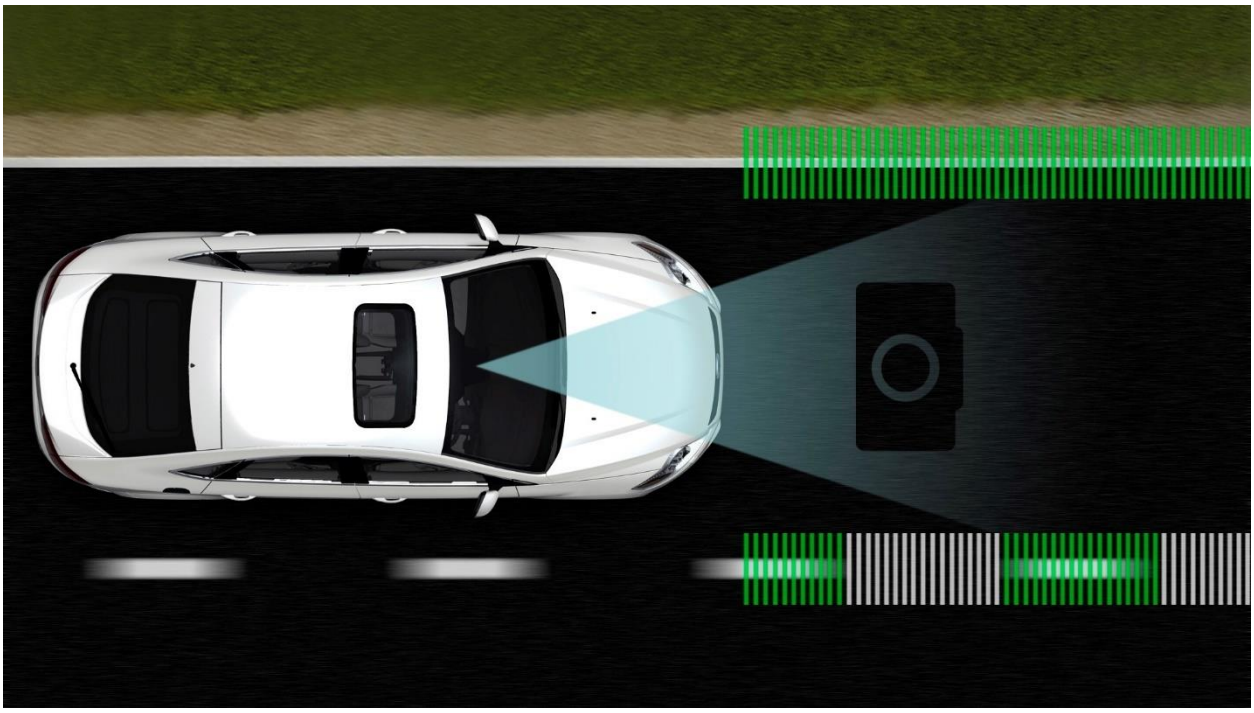

Figure 1. Lane Keep Assist System, Adapted from (Ottley, 2019)

2.5.2 LKAS Crashes Could Have Been Prevented

A study conducted by Benson et al. in 2018 reviewed previous literature to provide updated statistical estimates for the number of injuries, crashes, and deaths for vehicles equipped with ADAS found by using the National Highway Traffic Safety Administration's Crash Reporting Sampling System (CRSS) and FARS data, that there were a total of 519,000 crashes, 187,000 injury crashes, and 4,654 fatal crashes in 2016. According to Benson et al., these crashes were road departure, head-on, and sideswipe/angle crashes that could have been prevented if the LKAS and the LDWS were equipped in these vehicles (Benson et al., 2018). Table 4 shows the total crashes that could have been prevented in 2016 if vehicles were equipped with LKAS and LDWS.

Table 4. Total Crashes, Injuries, and Deaths that Could be Prevented Annually If Vehicle Equipped with the LKAS, Adapted From (Benson et al., 2018)

	Crashes	*Injuries*	*Deaths*
Road Departure	240,000	109,000	2,536
Sideswipe/Angle	103,000	25,000	406
Head-on	14,000	20,000	1,320
Others*	162,000	33,000	392
Total	519,000	187,000	4,654

*Others: crashes that occurred during rain, snow, or fog conditions

In another study conducted by Tan et al. in 2020 to assess the number of fatal crashes on China's roads that could be reduced by having vehicles equipped with the LKAS through 2030, using China's fatality and injury historical data, it was estimated that the total fatal crashes would occur in China would be 51,420 fatal crashes in 2025, and 47,484 fatal crashes in 2030 (Tan et al., 2020). Similarly, it was also estimated to have 164,135 and 143,163 total injury crashes in 2025 and 2030, respectively. The results showed that if the vehicle was equipped with the LKAS, the fatal crash rate could be decreased by 3,370 fatal crashes in 2025 and 5,465 fatal crashes in 2030. Also, crashes that result in injuries could decrease by 7,359 injury crashes in 2025 and 11,270 injury crashes in 2030 (Tan et al., 2020).

2.6 Forward Collision Warning System (FCWS)

A rear-end crash is a crash in which the front end of a following vehicle collides with the rear end of the leading vehicle (Singh, 2003). In addition, rear-end crashes occur frequently, resulting in large numbers of fatalities, injuries, and property damage (Singh, 2003). According to NHTSA, one-third and one-quarter of all road crashes are recognized as rear-end crashes (2005).

2.6.1 Warning Algorithm

The core of the FCWS system is the warning algorithm (Wang et al., 2016). Considerable effort has been devoted to developing better FCWS algorithms, and in general, these algorithms can be divided into two categories: kinematic-based and perception-based (Wang et al., 2016). Kinematic-based algorithms determine the minimum theoretical distance to safely stop. Kinematic-based algorithms are based on the fundamental laws of motion. When the following distance is less than the safe distance, the alarm will be triggered. On the other hand, perception-based algorithms trigger warnings using empirical risk indicators such as collision and headway time. As soon as the threshold value is reached, an alarm will be signaled (Wang et al., 2016).

2.6.2 Technology Description

The FCWS provides visual and/or audible warnings of objects or vehicles that occur within predefined intervals at the front end of the vehicle that is equipped with the FCWS (United States. Federal Motor Carrier Safety et al., 2009). The FCWS uses sensors like radar, lidar, and cameras to detect if a forward collision will occur (Zhu et al., 2020). The distance that triggers the warning varies based on the speed of the driver and the cross-factor setting. The FCWS uses Doppler-based radar to send and receive signals to determine relative speed difference, distance, and azimuth between an FCWS-equipped vehicle and an object or vehicle in front. When a vehicle equipped with the FCWS approaches an object or slow-moving vehicle, the system issues a highly urgent alert based on a preset threshold. These warnings are intended to improve driver behavior through targeted feedback for safer following distance (United States. Federal Motor Carrier Safety et al., 2009).

The FCWS has multiple benefits such as being integrated with an Adaptive Cruise Control (ACC) system. This system automatically maintains a constant distance between an equipped vehicle and vehicles in front. The ACC system interacts with the vehicle's engine management system "Transmission and Throttle" and the cruise control system to control the vehicle's speed (United States. Federal Motor Carrier Safety et al., 2009). As a result, the FCWS with ACC may prevent a rear-end collision where a vehicle collides with another vehicle (United States. Federal Motor Carrier Safety et al., 2009).

Another study conducted by Cicchino in 2017 evaluated the effectiveness of the FCWS and other ADAS technologies and found that the FCWS reduced rear-end-crashes by 27 percent for the years 2010 – 2014 for 22 states in the U.S (Cicchino, 2017). The study was conducted using police-reported data and by using the Poisson regression statistical analysis method. Cicchino also found that when the vehicle was equipped with both the FCWS and the Autonomous Emergency Braking (AEB), which according to Gibson "AEB safety technology is a collision-avoidance system that brings the vehicle to a complete stop without the active assistance of the driver" (Gibson, 2022), there was a reduction in rear-end-crashes by 50 percent for the years 2010 – 2014 for the 22 states in the U.S (Cicchino, 2017).

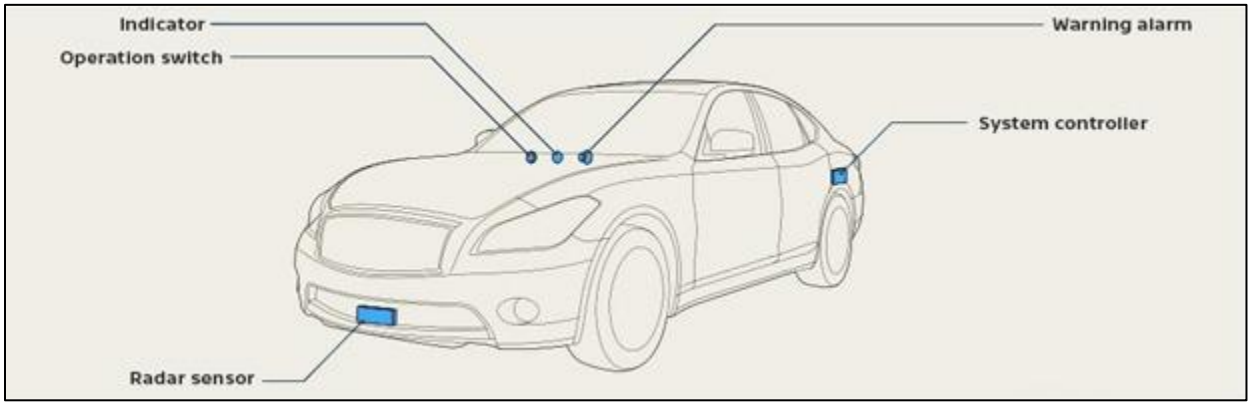

Figure 2. Forward Collision Warning System Mechanism, Adapted From (Nissan Motor Corporation)

A study conducted by Seyedi et al. analyzed the potential crash reduction on rear-end crashes using technological simulations with vehicles using both FCW and AEB systems. By the use of the simulations organized by Seyedi et al., the results showed a potential reduction in rear-end crashes FCW combined with AEB of 57 percent (Seyedi et al., 2021).

Summary

Several important considerations were developed through the review of literature review as shown below:

- According to Evans and Gerrish, it was discovered that when driving on wet roads, ABS reduced the danger of a vehicle colliding with a lead vehicle by (48 ± 6) percent when compared to the risk of getting struck in the rear (Evans and Gerrish, 1996). This substantial effect could result from an increased risk of rear impacts or reduced risk of frontal impacts. Using the premise that side-impact crashes were used to estimate exposure, ABS reduced the probability of crashing into a leading vehicle by (32 ± 8) percent on wet roads but raised the risk of getting struck in the rear by (30 ± 14) percent (Evans and Gerrish, 1996).
- According to Jermakian, 1 in 5 non-fatal injury crashes and 1 in 3 fatal crashes in the U.S could be prevented if four crash avoidance technologies were equipped in passenger vehicles: lane departure warning, forward collision avoidance, adaptive headlights, and blind spot detection (Jermakian, 2011).

- According to Tan et al., if the vehicle was equipped with the LKAS safety feature, the fatal crash rate could be decreased by 3,370 fatal crashes in 2025 and 5,465 fatal crashes in 2030. Also, crashes that result in injuries could decrease by 7,359 injury crashes in 2025 and 11,270 injury crashes in 2030 (Tan et al., 2020).
- According to Cicchino, the FCWS alone reduced rear-end-crashes by 27 percent for the years 2010 – 2014 for 22 states in the U.S, and when the vehicle was equipped with both the FCWS and the AEB, there was a 50 percent reduction in rear-end-crashes from 2010 – 2014 for 22 states in the U.S (Cicchino, 2017).
- According to Seyedi et al., by using simulations, the results showed a potential reduction in rear-end crashes if FCW combined with AEB of 57 percent (Seyedi et al., 2021).

Using the presented literature as a guide, the next chapter contains the methodology that was used in this study.

CHAPTER 3. METHODOLOGY

In this research, the objective was to evaluate the safety benefit of in-vehicle safety features that were added mid-generation of the vehicle to have enough data to conduct the analysis. In addition, comparing in-vehicle safety features to crash data in order to reach an understanding of whether or not these safety features were associated with a reduction in fatal crashes is presented. The chapter is divided into four sections. The first section discusses the lists of tasks completed for this research. The second section discusses the vehicles' make, model, and year used in this research. The third section discusses the in-vehicle safety feature scale. The fourth section discusses the statistical methods applied and equations that were examined in order to conduct the analysis.

3.1 List of Tasks

- Searching for the top five most-sold vehicles' make, model, and year for the calendar year 2021
- Searching for in-vehicle safety features added mid-generation for the five most-sold vehicle's make, model, and year by contacting dealerships and searching online resources. to have enough data to conduct the analysis
- Ranking in-vehicle safety features on a scale from high to low

3.2 Vehicles' Make, Model, and Year

The research initially started with the top five most-sold vehicles in the U.S for the year 2021 which were: the Ford F-150, the Chevrolet Silverado, the Dodge Ram Pickup, the Nissan Rogue, and the Toyota Camry. The most-sold vehicles in the U.S were assumed to be more likely to have enough fatal crash data associated with a larger population of vehicles, and more

likely to have in-vehicle safety features due to their company reputation. However, when a search for when in-vehicle safety features were added mid-generation, it was found that four of the top five most-sold in-vehicles safety features were added either at the beginning or end of the generation of the vehicle model such as the Ford F-150 equipped with the LKAS at the beginning of their newer generation for the Ford F-150. However, Chevrolet was the only company that had the LKAS equipped mid-generation of the Chevrolet Silverado. Additional research revealed that in general, only General Motors (GM) vehicles appear to make safety changes mid-generation. This then limited the study to GM vehicles including Chevrolet, Cadillac, GMC, and Buick. Further research showed that from all the GM vehicles, the Chevrolet Silverado, the Chevrolet Equinox, the Chevrolet Traverse, the Cadillac Escalade, the GMC Yukon, the GMC Sierra, the GMC Acadia, the GMC Terrain, and the Buick Enclave were the only nine vehicle models from GM that have safety features added mid-generation.

Searching for safety features added mid-generation is necessary since this study was built on Evans' earlier study on antilock brakes. In addition, when having in-vehicle safety features added mid-generation, it allows for a before and after comparison between nearly identical vehicles with the only change being the addition of the safety feature.

3.3 In-Vehicle Safety Features Scale

GM vehicles have many safety features, including the LKAS, the FCWS, automatic high-beam headlights, blind spot monitoring, rain-sensing windshield wipers, front and rear parking sensors, wireless device charging, heads-up display, parallel parking assist, integrated turn signal mirrors, child safety locks, cruise control, program speed and volume limits for trucks when other people are driving (For teen drivers), and GM's safety alert seat, which vibrates to warn drivers of a potential hazard. These in-vehicle safety features were ranked on a scale from high

to low. This scale was created based on each safety feature and its impact on head-on, rear-end, right angle, and run-off-road crashes which commonly result in a fatal crash. The focus was on safety features that were believed to have the largest statistical benefit on fatal crash reduction. The LKAS and the FCWS were placed in the high category due to the assumption that the LKAS and FCWS will show a greater statistical benefit in reducing fatal crashes. On the other hand, in-vehicle safety features such as programming the vehicle's speed and volume for teens and GM's safety alert seat, which vibrates to warn drivers of a potential hazard are safety features that can only be beneficial when activated were placed in the medium category, due to the assumption that these in-vehicle safety features in some measure have an impact on fatal crashes. Finally, for other in-vehicle safety features such as a rear view camera, and automatic high-beam headlights, the expectation was it will be harder to see any kind of statistical benefit, so it was placed in the low category. The ranked scale for this research then included:

High:

- Forward Collision Warning System (FCWS); and
- Lane Keep Assist System (LKAS).

Medium:

- GM's Safety Alert seat, which vibrates to warn drivers of a potential hazard; and
- Programming vehicle's speed and volume other people are driving (For teen drivers).

Low:

- Automatic high-beam headlights; and
- Rearview camera.

3.4 Statistical Method

The methodology that was used in this thesis is similar to Evans' study on antilock brakes and the risk of front and rear impact in two-vehicle crashes in which he used odds ratios. Evans's study also focused on vehicle types where these features were added in the middle of a vehicle generation. This focus would allow a before-and-after comparison between nearly identical vehicles with the only change being the addition of the safety feature. In addition, a statistics book by Agresti (2007) was also used for the odds ratio method equations. Thus, setting the hypothesis and equations was necessary to approach a finding. Below is the hypothesis used to test the LKAS and the FCWS.

3.4.1 Hypothesis Used to Test LKAS Feature

The hypothesis was a one-tailed test, and that is because it was assumed that there would not be an increase in fatal crashes after installation of the LKAS safety feature, and the area of interest was identifying if there was a reduction in fatal crashes after installation of LKAS.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of LKAS) ≥ μ (fatal crash rate before installation of LKAS)
- H_1: μ (fatal crash rate after installation of LKAS) < μ (fatal crash rate before installation of LKAS)
- Level of significance = 0.05

3.4.2 Hypothesis Used to Test FCWS Feature

The hypothesis was a one-tailed test, and that is because it was assumed that there would not be an increase in fatal crashes after installation of the FCWS safety feature, and the area of interest is identifying if there is a reduction in fatal crashes after installation of FCWS.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of FCWS) ≥ μ (fatal crash rate before installation of FCWS)
- H_1: μ (fatal crash rate after installation of FCWS) < μ (fatal crash rate before installation of FCWS)
- Level of significance = 0.05

3.4.3 Equations to be Used

Table 5. 2 × 2 Contingency Data Reduction Template Table

Group	**Type of Crash**		
	Exposed	**Unexposed**	**Total**
Treatment	A	B	**X**
Control	C	D	**X**

According to (Agresti, 2007), after conducting the 2 × 2 contingency table, the following values were calculated

1- $\text{Odds of Success before LKAS installation} = \frac{C}{D}$

2- $\text{Odds of Success after LKAS installation} = \frac{A}{B}$

3- Sample Odds Ratio $(\emptyset) = \frac{\text{Odds of Success before LKAS installation}}{\text{Odds of Success after LKAS installation}}$

Furthermore, setting the significance level to 0.05, calculating a 95% confidence interval, standard error of the log odds ratio, z statistic score, and significance interval was necessary in order to get actual results (Agresti, 2007).

4- Upper 95% CI $= e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{a}\right)+\left(\frac{1}{b}\right)+\left(\frac{1}{c}\right)+\left(\frac{1}{d}\right)}}$

5- Lower 95% CI $= e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{a}\right)+\left(\frac{1}{b}\right)+\left(\frac{1}{c}\right)+\left(\frac{1}{d}\right)}}$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{a}\right)+\left(\frac{1}{b}\right)+\left(\frac{1}{c}\right)+\left(\frac{1}{d}\right)}$

7- Standard normal deviate $(\text{z} - \text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}}$

8- Finally, calculating the p-value was performed to reach a finding. The findings showed whether or not the result was statistically significant.

The next chapter discusses the actual data collection and data reduction procedure following the methodology presented in this Chapter. In addition, assumptions used when collecting data will be presented.

CHAPTER 4. DATA COLLECTION

The objective of data collection for vehicle's make, model, and year was to test the LKAS and the FCWS in order to reach a finding as to whether or not are associated with a reduction in fatal crashes. These data were then used to analyze to reach findings. The purpose of this chapter is to describe the stages of collecting data and the procedures followed. This chapter is divided into three sections. The first section discusses the data collection procedure for both the LKAS and the FCWS. The second section discusses data reduction. Finally, the third section discusses assumptions conducted during data collection.

4.1 LKAS Data Collection

LKAS was assumed to prevent run-off-road crashes. Run-off-road crashes were assumed to be: run-off-roadway, end departure, cross median, or cross centerline crashes. The NHTSA was contacted to request FARS data for fatal crashes that involved run-off road crashes for vehicles needed. Table 5 shows the data requested from NHTSA for each vehicle Model.

4.2 FCWS Data Collection

FCWS was assumed to prevent rear-end crashes. NHTSA was contacted to request FARS data for fatal crashes when the initial impact point on the vehicle to be tested was the front bumper (clock points 11, 12, or 1), and the initial impact point on the other vehicle was the rear bumper (clock point 5, 6, or 7). Table 5 shows the data requested from NHTSA.

Table 6. Data Requested From NHTSA

Model	Model Year During Calendar Year	Safety Feature and Year of Installation	Data Provided By FARS
Chevrolet Silverado	2013 - 2019	LKAS in 2016	Run-off-road crashes
Chevrolet Equinox	2009 - 2019	1. LKAS in 2016 2. FCWS in 2014	1. Run-off-road crashes 2. Rear-end-crashes in which Chevrolet Equinox suffered frontal damage
Chevrolet Traverse	2008 - 2019	FCWS in 2014	Rear-end-crashes in which Chevrolet Traverse suffered frontal damage
Buick Enclave	2007 - 2019	FCWS in 2014	Rear-end-crashes in which Buick Enclave suffered frontal damage
GMC Acadia	2006 - 2019	FCWS in 2014	Rear-end-crashes in which GMC Acadia suffered frontal damage
GMC Yukon	2014 - 2019	LKAS in 2016	Run-off-road crashes
GMC Sierra	2013 - 2019	LKAS in 2016	Run-off-road crashes
GMC Terrain	2009 - 2019	FCWS in 2013	Rear-end-crashes in which GMC Terrain suffered frontal damage
Cadillac Escalade	2014 - 2019	LKAS in 2016	Run-off-road crashes

4.3 Data Reduction

This section outlines the procedure for reducing raw data provided by NHTSA to be compatible with data analysis. The steps outlined below discuss the procedures followed for data reduction.

4.3.1 NHTSA Data

The data provided by NHTSA was raw data, and the data was in Microsoft Excel format. The data received included eight columns listed as the following: crash year, case number, vehicle number, make, model, model year, type of crash, and the number of subject vehicles involved. In order to better understand the relationship between in-vehicle safety features and fatal crashes, the data needed to be reduced to what was necessary only. For example, the raw data received from FARS for the 3rd generation Chevrolet Silverado to test the LKAS feature as shown in table 5, contained a column for vehicle's number. According to FARS, the vehicle's number column indicates which vehicle led to the fatal crash. If the vehicle's number was 1, this indicates that the Chevrolet Silverado was the vehicle that ran off the road and caused the fatal crash, which is the data needed for this research. However, if the vehicle's number was 2 or greater, this indicates that there was another vehicle that ran off road and crashed into the Chevrolet Silverado and causing the fatal crash. So, data was reduced to vehicles numbered 1 only as shown in Table 6. The same data reduction procedure was used for the rest of the data provided by NHTSA for the rest of the vehicles.

Table 7. Raw Data Provided by NHTSA for The Chevrolet Silverado

Crash Year	Case Number	Vehicle Number	Make	Model	Model Year	Ran-Off-Road	Number of Subject Vehicles Involved
2013	10310	1	CHEVROLET	SILVERADO	2013	No	1
2013	40398	2	CHEVROLET	SILVERADO	2013	No	1
2013	50404	1	CHEVROLET	SILVERADO	2013	No	1
2013	60666	1	CHEVROLET	SILVERADO	2013	No	1
2013	60786	1	CHEVROLET	SILVERADO	2013	No	1
2013	62349	1	CHEVROLET	SILVERADO	2013	No	1
2013	62486	1	CHEVROLET	SILVERADO	2013	No	1
2013	80288	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	122079	1	CHEVROLET	SILVERADO	2013	No	1
2013	130042	2	CHEVROLET	SILVERADO	2013	No	1
2013	130870	1	CHEVROLET	SILVERADO	2013	No	1
2013	170144	2	CHEVROLET	SILVERADO	2013	No	1
2013	180685	2	CHEVROLET	SILVERADO	2013	No	1
2013	200292	1	CHEVROLET	SILVERADO	2013	No	1
2013	200312	1	CHEVROLET	SILVERADO	2013	No	1
2013	210464	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	220054	4	CHEVROLET	SILVERADO	2013	No	1
2013	220107	2	CHEVROLET	SILVERADO	2013	No	1
2013	220350	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	220445	2	CHEVROLET	SILVERADO	2014	No	1
2013	220519	1	CHEVROLET	SILVERADO	2013	No	1
2013	230113	1	CHEVROLET	SILVERADO	2013	No	1
2013	250113	1	CHEVROLET	SILVERADO	2013	No	1
2013	260755	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	280132	2	CHEVROLET	SILVERADO	2013	No	1
2013	290099	1	CHEVROLET	SILVERADO	2013	No	1
2013	290656	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	290672	1	CHEVROLET	SILVERADO	2013	No	1
2013	361101	1	CHEVROLET	SILVERADO	2013	No	1
2013	370563	2	CHEVROLET	SILVERADO	2013	No	1

Table 8. NHTSA Data After Reduction for The Chevrolet Silverado

Crash Year	Case Number	Vehicle Number	Make	Model	Model	Ran-Off-Road	Number of Subject Vehicles Involved
2013	10310	1	CHEVROLET	SILVERADO	2013	No	1
2013	50404	1	CHEVROLET	SILVERADO	2013	No	1
2013	60666	1	CHEVROLET	SILVERADO	2013	No	1
2013	60786	1	CHEVROLET	SILVERADO	2013	No	1
2013	62349	1	CHEVROLET	SILVERADO	2013	No	1
2013	62486	1	CHEVROLET	SILVERADO	2013	No	1
2013	80288	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	122079	1	CHEVROLET	SILVERADO	2013	No	1
2013	130870	1	CHEVROLET	SILVERADO	2013	No	1
2013	200292	1	CHEVROLET	SILVERADO	2013	No	1
2013	200312	1	CHEVROLET	SILVERADO	2013	No	1
2013	210464	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	220350	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	220519	1	CHEVROLET	SILVERADO	2013	No	1
2013	230113	1	CHEVROLET	SILVERADO	2013	No	1
2013	250113	1	CHEVROLET	SILVERADO	2013	No	1
2013	260755	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	290099	1	CHEVROLET	SILVERADO	2013	No	1
2013	290656	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	290672	1	CHEVROLET	SILVERADO	2013	No	1
2013	361101	1	CHEVROLET	SILVERADO	2013	No	1
2013	370999	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	380004	1	CHEVROLET	SILVERADO	2013	No	1
2013	400355	1	CHEVROLET	SILVERADO	2013	No	1
2013	400520	1	CHEVROLET	SILVERADO	2013	No	1
2013	420970	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	470816	1	CHEVROLET	SILVERADO	2014	Yes	1
2013	481731	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	481769	1	CHEVROLET	SILVERADO	2013	No	1
2013	482226	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	482260	1	CHEVROLET	SILVERADO	2013	No	1
2013	482336	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	482893	1	CHEVROLET	SILVERADO	2014	Yes	1
2013	530104	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	10482	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	10734	1	CHEVROLET	SILVERADO	2013	No	1
2014	40427	1	CHEVROLET	SILVERADO	2013	No	1
2014	40570	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	50058	1	CHEVROLET	SILVERADO	2013	No	1
2014	50402	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	60091	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	60222	1	CHEVROLET	SILVERADO	2014	No	1
2014	61366	1	CHEVROLET	SILVERADO	2014	No	1
2014	61606	1	CHEVROLET	SILVERADO	2013	No	1
2014	62090	1	CHEVROLET	SILVERADO	2013	No	1
2014	62510	1	CHEVROLET	SILVERADO	2013	No	1
2014	62798	1	CHEVROLET	SILVERADO	2013	No	1

4.4 Assumptions

After data reduction, three assumptions were formed. The first assumption was that every fatal crash for a certain vehicle totaled the vehicle, and it was no longer in a drivable condition. The alternative assumption was that none of the vehicles were damaged enough to be totaled and should be included in the analysis. This is shown in Appendix A. The statistical difference was minimal and so the first assumption was used in this research: fatal crashes were deducted from the total fleet built for the crashes that occurred before and after the installation of the safety feature. The third assumption was all confounding factors such as driver, age, gender, ecuation level, etc. were assumed fixed.

This thesis required total vehicles built before and after the installation of in-vehicle safety features. According to a Lawrence, Kansas Chevrolet dealership, it was advised to use the GoodCarBadCar website (2021) in order to get such data, and was assumed to provide an accurate count of vehicles sold in the U.S.

The next chapter discusses the data analysis procedure used and the results for each test conducted for the nine vehicles' make, model, and year. The results show whether or not the findings were statistically significant.

CHAPTER 5. DATA ANALYSIS

This chapter discusses the data analysis procedure used in order to reach the findings. The data analysis was conducted on all data provided by NHTSA for needed vehicles in order to reach findings of whether or not the LKAS or the FCWS were associated with a reduction in fatal crashes. This chapter contains two sections. The first section discusses the LAKS analysis. The second section discusses the FCWS analysis.

5.1 LKAS Analysis

The following procedure was used to analyze the Chevrolet Silverado, the Chevrolet Equinox, the GMC Sierra, the GMC Yukon, and the Cadillac Escalade. The analysis was organized by which vehicle had the largest number of fleet vehicles built to the smallest number of fleet vehicles built for the five vehicles tested for the LKAS safety feature by using GoodCarBadCar (2021). For the LKAS analysis section, the hypothesis was a one-tailed test because it was assumed that there was no increase in fatal crashes after the installation of the LKAS safety feature, and the area of interest was if there was a reduction in fatal crashes.

5.1.1 Chevrolet Silverado 3rd Generation (2014 - 2018) Analysis

For the Chevrolet Silverado 3rd generation, LKAS was equipped in the calendar year 2016. By using GoodCarBad Car (2021) it was found that from 2014 – 2015 there were 1,610,713 Chevrolet Silverados built, and from 2016 – 2018 there were 2,321,921 Chevrolet Silverados built. It was assumed that every fatal crash for the Chevrolet Silverado 3rd generation totaled the Chevrolet Silverado and was not in a drivable condition. This means that every Chevrolet Silverado which was involved in a fatal run-off-road crash was removed from the drivable fleet after the crash for this analysis.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of LKAS) ≥ μ (fatal crash rate before installation of LKAS)
- H_1: μ (fatal crash rate after installation of LKAS) < μ (fatal crash rate before installation of LKAS)

Table 9. 2 × 2 Contingency Data Reduction Table for Chevrolet Silverado

Group	**Run-off-Road Fatal Crashes Involving Chevrolet Silverados as First Vehicle**		
	Yes	**No**	**Total**
After LKAS (2016 – 2018)	142	1,746,179	**1,746,321**
Before LKAS (2014 – 2015)	186	1,610,527	**1,610,713**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- $\text{Odds of run} - \text{off} - \text{road crashes before LKAS installation} = \frac{186}{1{,}610{,}527} = \ 1.155 \ \times 10^{-4}$

2- $\text{Odds of run} - \text{off} - \text{road crashes after LKAS installation} = \frac{142}{1{,}746{,}179} = \ 8.132 \ \times 10^{-5}$

3- $\text{Sample Odds Ratio } (\emptyset) = \frac{\text{Odds of run–off–road crashes after LKAS installation}}{\text{Odds of run–off–road crashes before LKAS installation}}$

$$= \frac{8.132 \ \times 10^{-5}}{1.155 \ \times 10^{-4}} = \ 0.704$$

The odds ratio of the Chevrolet Silverado being in a fatal run-off-road crash after the installation of the LKAS was 0.704 times than before the installation of LKAS.

$$4\text{- Upper 95\% CI} = e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{186}\right)+\left(\frac{1}{1,610,527}\right)+\left(\frac{1}{142}\right)+\left(\frac{1}{1,746,179}\right)}} = 0.88$$

$$5\text{- Lower 95\% CI} = e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{186}\right)+\left(\frac{1}{1,610,527}\right)+\left(\frac{1}{142}\right)+\left(\frac{1}{1,746,179}\right)}} = 0.57$$

$$6\text{- Standard error of the log odds ratio} = \sqrt{\left(\frac{1}{a}\right)+\left(\frac{1}{b}\right)+\left(\frac{1}{c}\right)+\left(\frac{1}{d}\right)} = 0.111$$

$$7\text{- Standard normal deviate } (z-\text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 3.148$$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$$= 0.000823$$

At the 0.05 level of significance, it can be stated that there was a statistically significant reduction in run-off-road fatal crashes for the three-year period after the LKAS installation for the Chevrolet Silverado.

5.1.2 Chevrolet Equinox 2nd Generation (2010 - 2017) Analysis

For the Chevrolet Equinox 2nd generation, LKAS was equipped in the calendar year 2016. In addition, by using GoodCarBad Car (2021) it was found that from 2010 – 2015 there were 1,337,658 Chevrolet Equinoxes built, and from 2016 – 2017 there were 532,653 Chevrolet Equinoxes built. It was assumed that every fatal crash for the Chevrolet Equinox 2nd generation totaled the Chevrolet Equinox and was not in a drivable condition.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of LKAS) ≥ μ (fatal crash rate before installation of LKAS)
- H_1: μ (fatal crash rate after installation of LKAS) < μ (fatal crash rate before installation of LKAS)

Table 10. 2 × 2 Contingency Data Reduction Table for Chevrolet Equinox

Group	**Run-off-Road Fatal Crashes Involving Chevrolet Equinoxes as First Vehicle**		
	Yes	**No**	**Total**
After LKAS (2016 - 2017)	24	532,629	**532,653**
Before LKAS (2010 – 2015)	98	1,337,560	**1,337,658**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- Odds of run − off − road crashes before LKAS installation $= \frac{98}{1{,}337{,}560} = 7.327 \times 10^{-5}$

2- Odds of run − off − road crashes after LKAS installation $= \frac{24}{532{,}629} = 4.505 \times 10^{-5}$

3- Sample Odds Ratio $(\emptyset) = \frac{4.505 \times 10^{-5}}{7.327 \times 10^{-5}} = 0.615$

The odds of the Chevrolet Equinox being in a fatal run-off-road crash after the installation of the LKAS was 0.615 times than before the installation of LKAS.

4- Upper 95% CI $= e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{98}\right)+\left(\frac{1}{1,337,560}\right)+\left(\frac{1}{24}\right)+\left(\frac{1}{532,629}\right)}} = 0.96$

5- Lower 95% CI $= e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{98}\right)+\left(\frac{1}{1,337,560}\right)+\left(\frac{1}{24}\right)+\left(\frac{1}{532,629}\right)}} = 0.39$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{98}\right)+\left(\frac{1}{1,337,560}\right)+\left(\frac{1}{24}\right)+\left(\frac{1}{532,629}\right)} = 0.228$

7- Standard normal deviate $(z-\text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 2.134$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$= 0.0164$

At the 0.05 level of significance, it can be stated that there was a statistically significant reduction in run-off-road fatal crashes for the two-year after period the LKAS installation for the Chevrolet Equinox.

5.1.3 GMC Sierra 4th Generation (2014 - 2018) Analysis

For the GMC Sierra 4th generation, LKAS was equipped in the calendar year 2016. In addition, by using GoodCarBad Car (2021) it was found that from 2014 – 2015 there were 620,361 GMC Sierras built, and from 2016 – 2018 there were 891,502 GMC Sierras built. It was assumed that every fatal crash for the GMC Sierra 4th generation totaled the GMC Sierra and was not in a drivable condition.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of LKAS) ≥ μ (fatal crash rate before installation of LKAS)

- H_1: μ (fatal crash rate after installation of LKAS) < μ (fatal crash rate before installation of LKAS)

Table 11. 2 × 2 Contingency Data Reduction Table for GMC Sierra

Group	Run-off-Road Fatal Crashes Involving GMC Sierras as First Vehicle		
	Yes	**No**	**Total**
After LKAS (2016 – 2018)	63	891,439	**891,502**
Before LKAS (2014 – 2015)	73	620,288	**620,361**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- $\text{Odds of run} - \text{off} - \text{road crashes before LKAS installation} = \frac{73}{620{,}288} = 1.177 \times 10^{-4}$

2- $\text{Odds of run} - \text{off} - \text{road crashes after LKAS installation} = \frac{63}{891{,}439} = 7.067 \times 10^{-5}$

3- $\text{Sample Odds Ratio } (\emptyset) = \frac{7.067 \times 10^{-5}}{1.177 \times 10^{-4}} = 0.601$

The odds of the GMC Sierra being in a fatal run-off-road crash after the installation of the LKAS was 0.601 times than before the installation of LKAS.

4- $\text{Upper 95\% CI} = e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{73}\right)+\left(\frac{1}{620{,}288}\right)+\left(\frac{1}{63}\right)+\left(\frac{1}{891{,}439}\right)}} = 0.84$

5- $\text{Lower 95\% CI} = e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{73}\right)+\left(\frac{1}{620{,}288}\right)+\left(\frac{1}{63}\right)+\left(\frac{1}{891{,}439}\right)}} = 0.43$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{73}\right) + \left(\frac{1}{620,288}\right) + \left(\frac{1}{63}\right) + \left(\frac{1}{891,439}\right)} = 0.18$

7- Standard normal deviate $(\text{z} - \text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 2.97$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$= 0.00151$

At the 0.05 level of significance, it can be stated that there was a statistically significant reduction in run-off-road fatal crashes for the three-year after period the LKAS installation for the GMC Sierra.

5.1.4 GMC Yukon 4th Generation (2015 - 2020) Analysis

For the GMC Yukon 4th generation, LKAS was equipped in the calendar year 2016. In addition, by using GoodCarBad Car (2021) it was found that in 2015 there were 84,301 GMC Yukons built, and from 2016 – 2019 there were 251,980 GMC Yukons built. It was assumed that every fatal crash for the GMC Yukon 4th generation totaled the GMC Yukon and was not in a drivable condition.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of LKAS) ≥ μ (fatal crash rate before installation of LKAS)
- H_1: μ (fatal crash rate after installation of LKAS) < μ (fatal crash rate before installation of LKAS)

Table 12. 2 × 2 Contingency Data Reduction Table for GMC Yukon

Group	Run-off-Road Fatal Crashes Involving GMC Yukons as First Vehicle		
	Yes	**No**	**Total**
After LKAS (2016 - 2019)	4	251,976	**251,980**
Before LKAS (2015)	3	84,298	**84,301**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- Odds of run − off − road crashes before LKAS installation $= \frac{3}{84,298} = 3.559 \times 10^{-5}$

2- Odds of run − off − road crashes after LKAS installation $= \frac{4}{251,976} = 1.587 \times 10^{-5}$

3- Sample Odds Ratio $(\emptyset) = \frac{1.587 \times 10^{-5}}{3.559 \times 10^{-5}} = 0.446$

The odds of the GMC Yukon being in a fatal run-off-road crash after the installation of the LKAS was 0.446 times than before the installation of LKAS.

4- Upper 95% CI $= e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{3}\right)+\left(\frac{1}{84,298}\right)+\left(\frac{1}{4}\right)+\left(\frac{1}{251,976}\right)}} = 1.993$

5- Lower 95% CI $= e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{3}\right)+\left(\frac{1}{84,298}\right)+\left(\frac{1}{4}\right)+\left(\frac{1}{251,976}\right)}} = 0.0998$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{3}\right)+\left(\frac{1}{84,298}\right)+\left(\frac{1}{4}\right)+\left(\frac{1}{251,976}\right)} = 0.7638$

7- Standard normal deviate $(\text{z} - \text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 1.057$

9- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$$= 0.1452$$

At the 0.05 level of significance, it can be stated that there was no statistically significant reduction in run-off-road fatal crashes for the four-year after period the LKAS installation for the GMC Yukon.

5.1.5 Cadillac Escalade 4th Generation (2015 - 2020) Analysis

For the Cadillac Escalade 4th generation, LKAS was equipped in the calendar year 2016. In addition, by using GoodCarBad Car (2021) it was found that in 2015 there were 40,712 Cadillac Escalades built, and from 2016 – 2019 there were 118,054 Cadillac Escalades built. It was assumed that every fatal crash for the Cadillac Escalade 4th generation totaled the Cadillac Escalade and was not in a drivable condition.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of LKAS) ≥ μ (fatal crash rate before installation of LKAS)
- H_1: μ (fatal crash rate after installation of LKAS) < μ (fatal crash rate before installation of LKAS)

Table 13. 2 × 2 Contingency Data Reduction Table for Cadillac Escalade

Group	Run-off-Road Fatal Crashes Involving Cadillac Escalades as First Vehicle		
	Yes	**No**	**Total**
After LKAS (2016 – 2019)	10	118,044	**118,054**
Before LKAS (2015)	3	40,709	**40,712**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- Odds of run − off − road crashes before LKAS installation $= \frac{3}{40{,}709} = 7.37 \times 10^{-5}$

2- Odds of run − off − road crashes after LKAS installation $= \frac{10}{118{,}044} = 8.471 \times 10^{-5}$

3- Sample Odds Ratio $(\emptyset) = \frac{8.471 \times 10^{-5}}{7.37 \times 10^{-5}} = 1.149$

The odds of the Cadillac Escalade being in a fatal run-off-road crash after the installation of the LKAS was 1.149 times than before the installation of LKAS.

4- Upper 95% CI $= e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{3}\right)+\left(\frac{1}{40{,}709}\right)+\left(\frac{1}{10}\right)+\left(\frac{1}{118{,}044}\right)}} = 4.18$

5- Lower 95% CI $= e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{3}\right)+\left(\frac{1}{40{,}709}\right)+\left(\frac{1}{10}\right)+\left(\frac{1}{118{,}044}\right)}} = 0.32$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{3}\right)+\left(\frac{1}{40{,}709}\right)+\left(\frac{1}{10}\right)+\left(\frac{1}{118{,}044}\right)} = 0.658$

7- Standard normal deviate $(\text{z} - \text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 0.211$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$$= 0.0832$$

At the 0.05 level of significance, it can be stated that there was no statistically significant reduction in run-off-road fatal crashes for the four-year after period the LKAS installation for the Cadillac Escalade.

5.2 FCWS Analysis

The following procedure was used to analyze the Chevrolet Equinox, the GMC Terrain, the Chevrolet Traverse, The GMC Acadia, and the Buick Enclave. The analysis was organized by which vehicle had the largest number of fleet vehicles built to the smallest number of fleet vehicles built for the five vehicles tested for the FCWS safety feature by using GoodCarBadCar (2021). For the FCWS analysis section, the hypothesis was a one-tailed test because it was assumed that there was no increase in fatal crashes after the installation of the FCWS safety feature, and the area of interest was if there was a reduction in fatal crashes.

5.2.1 Chevrolet Equinox 2nd Generation (2010 - 2017) Analysis

For the Chevrolet Equinox 2nd generation, the FCWS was equipped in the calendar year 2014. In addition, by using GoodCarBad Car (2021) it was found that from 2010 – 2013 there were 904,065 Chevrolet Equinoxes built, and from 2014 – 2017 there were 1,052,394 Chevrolet Equinoxes built. It was assumed that every fatal crash for the Chevrolet Equinox 2nd generation totaled the Chevrolet Equinox and is not in a drivable condition.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of FCWS) ≥ μ (fatal crash rate before installation of FCWS)
- H_1: μ (fatal crash rate after installation of FCWS) < μ (fatal crash rate before installation of FCWS)

Table 14. 2 × 2 Contingency Data Reduction Table for Chevrolet Equinox

Group	**Rear-End Fatal Crashes Involving Chevrolet Equinoxes as First Vehicle**		
	Yes	**No**	**Total**
After LKAS (2014 – 2017)	18	1,052,376	**1,052,394**
Before LKAS (2010 – 2013)	19	904,046	**904,065**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- Odds of rear − end crashes before FCWS installation $= \frac{19}{904{,}046} = \ 2.102 \ \times 10^{-5}$

2- Odds of rear − end crashes after FCWS installation $= \frac{18}{1{,}052{,}376} = \ \ 1.71 \ \times 10^{-5}$

3- Sample Odds Ratio $(\emptyset) = \frac{1.71 \times 10^{-5}}{2.102 \times 10^{-5}} = \ \ 0.814$

The odds of the Chevrolet Equinox being in a fatal rear-end crash after the installation of the FCWS was 0.814 times than before the installation of FCWS.

4- Upper 95% CI $= e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{19}\right)+\left(\frac{1}{904,046}\right)+\left(\frac{1}{18}\right)+\left(\frac{1}{1,052,376}\right)}} = 1.551$

5- Lower 95% CI $= e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{19}\right)+\left(\frac{1}{904,046}\right)+\left(\frac{1}{18}\right)+\left(\frac{1}{1,052,376}\right)}} = 0.427$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{19}\right)+\left(\frac{1}{904,046}\right)+\left(\frac{1}{18}\right)+\left(\frac{1}{1,052,376}\right)} = 0.329$

7- Standard normal deviate $(z-\text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 0.63$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$= 0.2656$

At the 0.05 level of significance, it can be stated that there was no statistically significant reduction in rear-end fatal crashes for the four-year after period the FCWS installation for the Chevrolet Equinox.

5.2.2 GMC Terrain 1st Generation (2009 – 2017) Analysis

For the GMC Terrain 1st generation, FCWS was equipped in the calendar year 2013. In addition, by using GoodCarBad Car (2021) it was found that from 2009 – 2012 there were 362,228 GMC Terrains built, and from 2013 – 2017 there were 606,193 GMC Terrains built. It was assumed that every fatal crash for the GMC Terrain 1st generation totaled the GMC Terrain and was not in a drivable condition.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of FCWS) ≥ μ (fatal crash rate before installation of FCWS)

- H_1: μ (fatal crash rate after installation of FCWS) < μ (fatal crash rate before installation of FCWS)

Table 15. 2 × 2 Contingency Data Reduction Table for GMC Terrain

Group	Rear-End Fatal Crashes Involving GMC Terrains as First Vehicle		
	Yes	**No**	**Total**
After LKAS (2013 – 2017)	4	606,189	**606,193**
Before LKAS (2009 – 2012)	12	362,216	**362,228**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- Odds of rear − end crashes before LKAS installation $= \frac{12}{362{,}216} = 3.313 \times 10^{-5}$

2- Odds of rear − end crashes after LKAS installation $= \frac{4}{606{,}189} = 6.598 \times 10^{-6}$

3- Sample Odds Ratio $(\emptyset) = \frac{6.598 \times 10^{-6}}{3.313 \times 10^{-5}} = \ 0.199$

The odds of the GMC Terrain being in a fatal rear-end crash after the installation of the FCWS was 0.199 times than before the installation of FCWS.

4- Upper 95% CI $= \ e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{12}\right)+\left(\frac{1}{362{,}216}\right)+\left(\frac{1}{4}\right)+\left(\frac{1}{606{,}189}\right)}} = \ 0.618$

5- Lower 95% CI $= \ e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{12}\right)+\left(\frac{1}{362{,}216}\right)+\left(\frac{1}{4}\right)+\left(\frac{1}{606{,}189}\right)}} = 0.064$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{12}\right) + \left(\frac{1}{362,216}\right) + \left(\frac{1}{4}\right) + \left(\frac{1}{606,189}\right)} = 0.577$

7- Standard normal deviate $(\text{z} - \text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 2.79$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$= 0.00259$

At the 0.05 level of significance, it can be stated that there was a statistically significant reduction in rear-end fatal crashes for the five-year after a period of the FCWS installation for the GMC Terrain.

5.2.3 Chevrolet Traverse 1st Generation (2009 – 2019) Analysis

For the Chevrolet Traverse 1st generation, FCWS was equipped in the calendar year 2014. In addition, by using GoodCarBad Car (2021) it was found that from 2009 – 2013 there were 494,988 Chevrolet Traverses built, and from 2014 – 2019 there were 464,095 Chevrolet Traverses built. It was assumed that every fatal crash for the Chevrolet Traverse 1st generation totaled the Chevrolet Traverse and was not in a drivable condition.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of FCWS) ≥ μ (fatal crash rate before installation of FCWS)
- H_1: μ (fatal crash rate after installation of FCWS) < μ (fatal crash rate before installation of FCWS)

Table 16. 2 × 2 Contingency Data Reduction Table for Chevrolet Traverse

Group	Rear-End Fatal Crashes Involving Chevrolet Traverses as First Vehicle		
	Yes	**No**	**Total**
After LKAS (2014 – 2019)	9	464,086	**464,095**
Before LKAS (2009 – 2013)	11	494,977	**494,988**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- Odds of rear − end crashes before FCWS installation $= \frac{11}{494,977} = \ 2.222 \times 10^{-5}$

2- Odds of rear − end crashes after FCWS installation $= \frac{9}{464,086} = \ 1.94 \times 10^{-5}$

3- Sample Odds Ratio $(\emptyset) = \frac{1.94 \times 10^{-5}}{2.222 \times 10^{-5}} = \ 0.873$

The odds of the Chevrolet Traverse being in a fatal rear-end crash after the installation of the FCWS was 0.873 times than before the installation of FCWS.

4- Upper 95% CI $= \ e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{11}\right)+\left(\frac{1}{494,977}\right)+\left(\frac{1}{9}\right)+\left(\frac{1}{464,086}\right)}} = \ 2.106$

5- Lower 95% CI $= \ e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{11}\right)+\left(\frac{1}{494,977}\right)+\left(\frac{1}{9}\right)+\left(\frac{1}{464,086}\right)}} = 0.362$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{11}\right) + \left(\frac{1}{494,977}\right) + \left(\frac{1}{9}\right) + \left(\frac{1}{464,086}\right)} = 0.45$

7- Standard normal deviate $(\text{z} - \text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 0.303$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$$= 0.381$$

At the 0.05 level of significance, it can be stated that there was no statistically significant reduction in rear-end fatal crashes for the six-year after a period of the FCWS installation for the Chevrolet Traverse.

5.2.4 GMC Acadia 1st Generation (2007 – 2016) Analysis

For the GMC Acadia 1st generation, FCWS was equipped in the calendar year 2014. In addition, by using GoodCarBad Car (2021) it was found that from 2007 – 2013 there were 515,311 GMC Acadias built, and from 2014 – 2016 there were 268,831 GMC Acadias built. It was assumed that every fatal crash for the GMC Acadia 1st generation totaled the GMC Acadia and is not in a drivable condition.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of FCWS) ≥ μ (fatal crash rate before installation of FCWS)
- H_1: μ (fatal crash rate after installation of FCWS) < μ (fatal crash rate before installation of FCWS)

Table 17. 2 × 2 Contingency Data Reduction Table for GMC Acadia

Group	Rear-End Fatal Crashes Involving GMC Acadias as First Vehicle		
	Yes	**No**	**Total**
After LKAS (2014 – 2016)	5	268,826	**268,831**
Before LKAS (2007 – 2013)	15	515,296	**515,311**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- Odds of rear − end crashes before FCWS installation $= \frac{15}{515{,}296} = \ 2.911 \times 10^{-5}$

2- Odds of rear − end crashes after FCWS installation $= \frac{5}{268{,}826} = \ \ 1.86 \times 10^{-5}$

3- Sample Odds Ratio $(\emptyset) = \frac{1.86 \times 10^{-5}}{2.911 \times 10^{-5}} = \ 0.638$

The odds of the GMC Acadia being in a fatal rear-end crash after the installation of the FCWS was 0.638 times less than before the installation of FCWS.

4- Upper 95% CI $= \ e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{15}\right)+\left(\frac{1}{515{,}296}\right)+\left(\frac{1}{5}\right)+\left(\frac{1}{268{,}826}\right)}} = \ 1.758$

5- Lower 95% CI $= \ e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{15}\right)+\left(\frac{1}{515{,}296}\right)+\left(\frac{1}{5}\right)+\left(\frac{1}{268{,}826}\right)}} = 0.232$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{15}\right) + \left(\frac{1}{515{,}296}\right) + \left(\frac{1}{5}\right) + \left(\frac{1}{268{,}826}\right)} = 0.516$

7- Standard normal deviate $(\text{z} - \text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 0.87$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$$= 0.193$$

At the 0.05 level of significance, it can be stated that there was no statistically significant reduction in rear-end fatal crashes for the three-year after period the FCWS installation for the GMC Acadia.

5.2.5 Buick Enclave 1st Generation (2008 - 2017) Analysis

For the Buick Enclave 1st generation, FCWS was equipped in the calendar year 2014. In addition, by using GoodCarBad Car (2021) it was found that from 2008 – 2013 there were 323,078 Buick Enclaves built, and from 2014 – 2017 there were 224,973 Buick Enclaves built. It was assumed that every fatal crash for the Buick Enclave 1st generation totaled the Buick Enclave and was not in a drivable condition.

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of FCWS) ≥ μ (fatal crash rate before installation of FCWS)
- H_1: μ (fatal crash rate after installation of FCWS) < μ (fatal crash rate before installation of FCWS)

Table 18. 2 × 2 Contingency Data Reduction Table for Buick Enclave

Group	Rear-End Fatal Crashes Involving Buick Enclave's as First Vehicle		
	Yes	**No**	**Total**
After LKAS (2014 – 2017)	0	224,972	**224,973**
Before LKAS (2008 – 2013)	10	323,068	**323,078**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- Odds of rear − end crashes before FCWS installation $= \frac{10}{323{,}068} = 3.095 \times 10^{-5}$

2- Odds of rear − end crashes after FCWS installation $= \frac{0}{224{,}972} = 0$

3- Sample Odds Ratio $(\emptyset) = \frac{0}{3.095 \times 10^{-5}} = undifined$

4- Upper 95% CI $= e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{10}\right)+\left(\frac{1}{323{,}068}\right)+\left(\frac{1}{1}\right)+\left(\frac{1}{224{,}972}\right)}} = undifined$

5- Lower 95% CI $= e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{10}\right)+\left(\frac{1}{323{,}068}\right)+\left(\frac{1}{1}\right)+\left(\frac{1}{224{,}972}\right)}} = undifined$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{10}\right)+\left(\frac{1}{323{,}068}\right)+\left(\frac{1}{1}\right)+\left(\frac{1}{224{,}972}\right)} = undifined$

7- Standard normal deviate $(z - value) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = undifined$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$$= undifined$$

Because there were zero fatal crashes the after a period for the Buick Enclave. It was not possible to calculate an odds ratio due to the logarithmic nature of the odds ratio, the number zero will result in an undefined answer, so while there was a 100 percent reduction in fatal crashes, it was not possible to show that reduction in odds ratios.

5.3 LKAS Findings

- Chevrolet Silverado: results were statistically significant, and it was found that after installation of LKAS, there was a reduction in run-off-road fatal crashes.
- Chevrolet Equinox: results were statistically significant, and it was found that after installation of LKAS, there was a reduction in run-off-road fatal crashes.
- GMC Sierra: results were statistically significant, and it was found that after installation of LKAS, there was a reduction in run-off-road fatal crashes.
- GMC Yukon: results were not statistically significant after the installation of the LKAS.
- Cadillac Escalade: results were not statistically significant after the installation of the LKAS.

5.4 FCWS Findings

- Chevrolet Equinox: results were not statistically significant after the installation of the FCWS.
- GMC Terrain: results were statistically significant, and it was found that after installation of LKAS, there was a reduction in fatal crashes.
- Chevrolet Traverse: results were not statistically significant after the installation of the FCWS.

- GMC Acadia: results were not statistically significant after the installation of the FCWS.
- Buick Enclave: results were undefined

Table 19. Results Summary for LKAS and FCWS Analysis

Safety Feature	Vehicle	Odds Ratio	P-Value	Significance*
LKAS	Chevrolet Silverado	0.704	0.000823	Yes
	Chevrolet Equinox	0.615	0.0164	Yes
	GMC Sierra	0.601	0.00151	Yes
	GMC Yukon	0.446	0.1452	No
	Cadillac Escalade	1.149	0.0832	No
FCWS	Chevrolet Equinox	0.814	0.2656	No
	GMC Terrain	0.199	0.00259	Yes
	Chevrolet Traverse	0.873	0.381	No
	GMC Acadia	0.638	0.193	No
	Buick Enclave	Undefined	Undefined	Undefined

*Level of significance = 0.05, one-tailed test

Interpretation of the odds ratios shown in Table 19 is necessary to complete the last step of the data analysis. For example, in order to calculate the precent and total run-off-road fatal crashes reduction for the Chevrolet Silverado, the following values were calculated.

To calculate estimated run-off-road fatal crashes reduction for Chevroelt Silverado:

$a. (Sample\ odds\ ratio)\ \times\ (number\ of\ road\ fatal\ crashes\ after\ the\ installation\ of\ LKAS)$

$$= 0.704\ \times 186 = 130$$

$b. (number\ of\ road\ fatal\ crashes\ after\ the\ installation\ of\ LKAS) - 130 = 186 - 130 = 56$

This indicates that there were 56 run-off-road fatal crash reduction after installation of LKAS

Converting the odds ratio to percentage:

$a.\ Percentage = (1 - sample\ odds\ ratio) \times 100 = (1 - 0.704) \times 100 = 29.6\%$

$b.\ Percentage\ Error = (standard\ Error\ of\ the\ log\ odds\ ratio \times 1.96) \times 100$

$$= (0.111 \times 1.96) \times 100 = 21.7\ \%$$

This indicates that the Chevrolet Silverado was associated with a (29.6 ± 21.7) % reduction in run-off-road fatal crashes after the installation of LKAS.

The percent and total crash reduction for the rest of the vehicles' make, model, and year are shown in Table 20.

Table 20. Crash Rate and Percentage Reduction for LKAS and FCWS Statistically Significant Results

Safety Feature	Vehicle	Estimated Crash Reduction	Percent Reduction
LKAS	Chevrolet Silverado	56 crashes	(29.6 ± 21.7) %
	Chevrolet Equinox	38 crashes	(38.5 ± 44.6) %
	GMC Sierra	30 crashes	(39.9 ± 35.28) %
FCWS	GMC Terrain	10 crashes	(80.1 ± 113.09) %

The possibility of a percent reduction exceeding 100 percent realistically means that there were no crashes, so any indication showing a reduction of more than 100 percent should be ignored. Therefore, the possible percent reduction for the GMC Terrain - although calculated to be (80.1 ± 113.09) percent - should be practically interpreted as the range from a 100 percent reduction to an increase of 33.09 percent.

The next chapter discusses the conclusion of this research and recommendations for future research.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

In this chapter, a discussion on the research summary, conclusion, and research limitations are presented, as well as the researcher's contribution to this research. Finally, recommendations for future research are presented.

Research Summary

This study started with searching for in-vehicle safety features that would have the potential to show a difference in fatal crash rates with which to conduct an analysis. First, an extensive search was conducted to determine what in-vehicle safety features were available for the most-sold vehicles in the U.S for the calendar year 2021. Then, these systems were ranked as to which in-vehicle safety features had the potential to show a difference in fatal crash rates (the LKAS and FCWS). Of the systems considered, the LKAS and FCWS were selected for further analysis. Second, the evaluation focused on the most-sold vehicles in the U.S. that had safety features added mid-generation, which could allow access to enough data on which to conduct the analysis. Finally, the appropriate data were requested from the NHTSA for analysis.

Conclusion

The LKAS and FCWS are important in-vehicle safety features that have the potential of reducing the fatal crash rate. The data analysis was conducted based on Evans' previous study on antilock brakes and the risk of front and rear impact in two-vehicle crashes. The data analysis indicated that the LKAS safety feature was associated with a statistically significant reduction in run-off-road crashes for the Chevrolet Silverado, the Chevrolet Equinox, and the GMC Sierra model vehicles. Furthermore, the data analysis also indicated that the FCWS safety feature was

associated with a statistically significant reduction in rear-end crashes for the GMC Terrain and the Buick Enclave model vehicles.

The odds ratio showed when examining the LKAS safety feature for the Chevrolet Silverado, the Chevrolet Equinox, the GMC Yukon, the GMC Sierra, and the Cadillac Escalade model vehicles, that four of the five vehicle models examined resulted in reductions in run-off-road fatal crashes; the GMC Yukon was not statistically significant in reducing run-off-road fatal crashes.

On the other hand, the odds ratio showed when examining the FCWS safety feature for the Chevrolet Equinox, the Chevrolet Traverse, the Buick Enclave, the GMC Acadia, and the GMC Terrain model vehicles, that four of the five vehicles examined resulted in a reduction in rear-end crashes; the Chevrolet Equinox, the Chevrolet Traverse, and the GMC Acadia were not statistically significant in reducing run-off-road fatal crashes. In addition, the GMC Terrain results were undefined.

Limitations and Researcher Contributions

This research had several limitations:

- The introduction of the LKAS and the FCWS safety features occurred only on nine vehicles' make, model, and year as part of a mid-generation change. Other existing safety features may have been enhanced in the same model year (or subsequent year in the same generation), which may have contributed to any identified crash reduction. This research assumed this did not happen, or that any contributions were neglected.
- The second limitation of this research was data availability. NHTSA did not have the calendar year 2020 and the 2021 fatal crash record available for certain vehicles

examined in this research (GMC Yukon and Cadillac Escalade), which limited the analysis. If the 2020 and the 2021 fatal crash data were available, it could have the potential to change the outcome of this research for several vehicle models due to an expanded "after" dataset for analysis.

- The third limitation was assuming that every possible fatal crash was of a type that these systems had a potential on which to have mitigating influence. For example, if a crash occurred on a gravel road, it is unlikely that the LKAS safety feature would function due to the camera not detecting any lane markings. However, it was assumed that all crashes occurred where the systems were functioning properly.

Future Research Efforts

There are several approaches for extending this research in order to better understand the relationship between in-vehicle safety features and fatal crashes.

- This research tested two safety features, which are the LKAS and the FCWS. Expanding this research to include more vehicle fleet years and other confounding factors such as weather conditions could be an opportunity for future research.
- This research focused only on passenger vehicles. Future research could focus on whether the LKAS, FCWS, or other in-vehicle safety systems have an impact on reducing fatal crashes for heavy vehicles.
- A future opportunity to conduct similar research would be using State Department of Transportation Data to conduct a similar analysis on other severity types of crashes.

CHAPTER 7. REFERENCES

GoodCarBadCar Automotive Sales Data & Statistics. 2021. https://www.goodcarbadcar.net/. Accessed [3 Mar. 2022].

Traffic Safety Facts 2003: A Compilation of Motor Vehicle Crash Data from the Fatality Analysis Reporting System and the General Estimates System 2005. Available: https://rosap.ntl.bts.gov/view/dot/5581. Accessed [5 Jul. 2022].

AGRESTI, A. 2007. *An Introduction to Categorical Data Analysis, 2nd edition by A.* USA, Malden, USA: Blackwell Publishing.

BENSON, A., TEFFT, B. C., SVANCARA, A. M., AND HORREY, W. J. 2018. Potential Reduction in Crashes, Injuries and Deaths from Large-Scale Deployment of Advanced Driver Assistance Systems. https://aaafoundation.org/potential-reduction-in-crashes-injuries-and-deaths-from-large-scale-deployment-of-advanced-driver-assistance-systems/. Accessed [12 Jun. 2022].

CHEN, Y., QUDDUS, M. A., AND WANG, X. 2018. Impact of combined alignments on lane departure: A simulator study for mountainous freeways. *Transportation Research Part C-emerging Technologies,* 86**,** 346-359. https://www.sciencedirect.com/science/article/abs/pii/S0968090X17303212. Accessed [7 Mar. 2022].

CICCHINO, J. B. 2017. Effectiveness of forward collision warning and autonomous emergency braking systems in reducing front-to-rear crash rates. *Accid Anal Prev,* 99**,** 142-152. https://pubmed.ncbi.nlm.nih.gov/27898367/. Accessed [20 Jul. 2022].

CLARK, D. E. & CUSHING, B. M. 2004. Rural and urban traffic fatalities, vehicle miles, and population density. *Accid Anal Prev,* 36**,** 967-972. https://pubmed.ncbi.nlm.nih.gov/15350874/. Accessed [15 Jun. 2022].

EICHELBERGER, A. H. & MCCARTT, A. T. 2016. Toyota drivers' experiences with Dynamic Radar Cruise Control, Pre-Collision System, and Lane-Keeping Assist. *Journal of Safety Research,* 56**,** 67-73. https://www.sciencedirect.com/science/article/abs/pii/S0022437515001061. Accessed [6 Jan. 2022].

EVANS, L. 2014. *Traffic Safety,* Michigan, Science Serving Society. Publisher. Science Serving Society (August 30, 2004)

EVANS, L., AND GERRISH, P. H. 1996. Antilock brakes and risk of front and rear impact in two-vehicle crashes. *Accid Anal Prev,* 28**,** 315-323. Accessed [10 Dec. 2021].

FHWA. 2021. *USDOT Releases New Data Showing That Road Fatalities Spiked in First Half of 2021*. Washington, DC. https://www.nhtsa.gov/press-releases/usdot-releases-new-data-showing-road-fatalities-spiked-first-half-2021. Accessed [10 May 2022].

FRANCIS, T. 2021. What is lane-keeping assist?. https://www.autoexpress.co.uk/tips-advice/356028/what-lane-keeping-assist. Accessed [20 Jul. 2022].

GIBSON, M. 2022. *What You Need to Know About the Autonomous Emergency Brake (AEB)?* https://autojusticeattorney.com/what-you-need-to-know-about-aeb/. Accessed [20 Jul. 2022].

INSIDER, M. 2020. *What Is ADAS?* https://www.aptiv.com/en/insights/article/what-is-adas. Accessed [5 May 2022].

JERMAKIAN, J. S. 2011. Crash avoidance potential of four passenger vehicle technologies. *Accident Analysis & Prevention,* 43**,** 732-740. Available: https://pubmed.ncbi.nlm.nih.gov/21376861/. Accessed [23 Apr. 2022].

NAROTE, S. P., BHUJBAL, P. N., NAROTE, A. S., AND DHANE, D. M. 2018. A review of recent advances in lane detection and departure warning system. *Pattern Recognition,* 73**,** 216-234. Available: https://www.semanticscholar.org/paper/A-review-of-recent-advances-in-lane-detection-and-Narote Bhujbal/a3aeaf6bbd9fdd218a6332939f0ff6cada9e074e#paper-header. Accessed [12 Feb. 2022].

OTTLEY, S. 2019. *What is lane keeping assist?* https://www.drive.com.au/news/what-is-lane-keeping-assist/. Accessed [5 Feb. 2022].

ROMANO, R., MAGGI, D., HIROSE, T., BROADHEAD, Z., AND CARSTEN, O. 2021. Impact of lane keeping assist system camera misalignment on driver behavior. *Journal of Intelligent Transportation Systems,* 25**,** 157-169.

SEYEDI, M., KOLOUSHANI, M., JUNG, S., AND VANLI, A. 2021. Safety Assessment and a Parametric Study of Forward Collision-Avoidance Assist Based on Real-World Crash

Simulations. *Journal of Advanced Transportation,* 2021**,** Available: https://www.hindawi.com/journals/jat/2021/4430730/ Accessed [19 Mar. 2022].

SINGH, S. P. D. 2003. *Driver attributes and rear-end crash involvement propensity*, Washington, D.C. U.S. Dept. of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, Advanced Research and Analysis. https://crashstats.nhtsa.dot.gov/Api/Public/Publication/809540. Accessed [11 Mar. 2022].

SZUMILAS, M. 2010. Explaining odds ratios. *J Can Acad Child Adolesc Psychiatry,* 19**,** 227-9. https://pubmed.ncbi.nlm.nih.gov/20842279/. Accessed [12 Jul. 2022].

TAN, H., ZHAO, F., HAO, H., AND LIU, Z. 2020. Estimate of safety impact of lane keeping assistant system on fatalities and injuries reduction for China: Scenarios through 2030. *Traffic Injury Prevention,* 21**,** 156-162. https://pubmed.ncbi.nlm.nih.gov/32023126/. Accessed [10 May 2022].

UNITED STATES. FEDERAL MOTOR CARRIER SAFETY, FMCSA & ART 2009. *Analysis of benefits and costs of forward collision warning systems for the trucking industry*, Washington, DC : U.S. Dept. of Transportation, Federal Motor Carrier Safety Administration. https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/Research-and-Technology-Funding-Report-FINAL-May-2009.pdf. Accessed [20 Jul. 2022].

WANG, X., ZHU, M., CHEN, M., AND TREMONT, P. 2016. Drivers' rear end collision avoidance behaviors under different levels of situational urgency. *Transportation research. Part C, Emerging technologies,* 71**,** 419-433.

https://hero.epa.gov/hero/index.cfm/reference/details/reference_id/7119556. Accessed [11 Jan. 2022].

WANG, Y., LIANG, L., AND EVANS, L. 2017. Fatal crashes involving large numbers of vehicles and weather. *J Safety Res,* 63**,** 1-7. Available: https://www.researchgate.net/publication/319201646_Fatal_crashes_involving_large_numbers_of_vehicles_and_weather. Accessed [11 Jan. 2022].

ZHU, M., WANG, X., AND HU, J. 2020. Impact on car following behavior of a forward collision warning system with headway monitoring. *Transportation Research. Part C, Emerging Technologies,* 111**,** 226-244. https://www.researchgate.net/publication/338974548_Impact_on_car_following_behavior_of_a_forward_collision_warning_system_with_headway_monitoring. Accessed [21 Jul. 2022].

APPENDIX A

A.1 (Chevrolet Silverado Analysis Example – Second Assumption)

The second assumption stated in Chapter 4, that none of the vehicles were damaged enough to be totaled and should be included in the analysis is presented below.

For the Chevrolet Silverado 3rd generation, LKAS was equipped in the calendar year 2016. In addition, by using GoodCarBad Car (2021) it was found that from 2014 – 2015 there were 1,610,713 Chevrolet Silverados built, and from 2016 – 2018 there were 2,321,921 Chevrolet Silverados built. It was assumed that none of the vehicles were damaged enough to be totaled and should be included in the analysis. So, as provided by NHTSA, there were 569 run-off-road non-fatal crashes for the Chevrolet Silverado from (2014 – 2015), and 259 run-off-road non-fatal crashes for the Chevrolet Silverado from (2016 – 2018).

Hypothesis: One-Tailed Test

- H_0: μ (fatal crash rate after installation of LKAS) ≥ μ (fatal crash rate before installation of LKAS)
- H_1: μ (fatal crash rate after installation of LKAS) < μ (fatal crash rate before installation of LKAS)

Table 21. 2 × 2 Contingency Data Reduction Table for Chevrolet Silverado

Group	Run-off-Road Fatal Crashes Involving Chevrolet Silverados as First Vehicle		
	Yes	**No**	**Total**
After LKAS (2016 – 2018)	142	1,746,179 + 259 = 1,746,438	**1,746,580**
Before LKAS (2014 – 2015)	186	1,610,527 + 569 = 1,612,243	**1,611,282**

After conducting the 2 × 2 contingency table, the following values were calculated:

1- Odds of run − off − road crashes before LKAS installation $= \frac{186}{1{,}612{,}243} = \ 1.11 \times 10^{-4}$

2- Odds of run of road crashes after LKAS installation $= \frac{142}{1{,}746{,}438} = \ 8.1 \times 10^{-5}$

3- Sample Odds Ratio $(\emptyset) = \frac{\text{Odds of run−off−road crashes after LKAS installation}}{\text{Odds of run−off−road crashes before LKAS installation}}$

$$= \frac{8.1 \times 10^{-5}}{1.11 \times 10^{-4}} = \ 0.704$$

The odds of the Chevrolet Silverado being in a fatal run-off-road crash after the installation of the LKAS was 0.704 times than before the installation of LKAS.

4- Upper 95% CI $= \ e^{\ln(Sample\ odds\ ratio)+1.96\sqrt{\left(\frac{1}{186}\right)+\left(\frac{1}{1{,}610{,}527}\right)+\left(\frac{1}{142}\right)+\left(\frac{1}{1{,}746{,}179}\right)}} = \ 0.88$

5- Lower 95% CI $= \ e^{\ln(Sample\ odds\ ratio)-1.96\sqrt{\left(\frac{1}{186}\right)+\left(\frac{1}{1{,}610{,}527}\right)+\left(\frac{1}{142}\right)+\left(\frac{1}{1{,}746{,}179}\right)}} = 0.57$

6- Standard error of the log odds ratio $= \sqrt{\left(\frac{1}{a}\right) + \left(\frac{1}{b}\right) + \left(\frac{1}{c}\right) + \left(\frac{1}{d}\right)} = 0.111$

7- Standard normal deviate $(\text{z} - \text{value}) = \frac{\ln(\text{Sample Odds Ratio})}{\text{Standard error}} = 3.148$

8- Finally, calculating the p-value by using a one-tailed hypothesis for a 0.05 significance level

$= 0.000823$

At the 0.05 level of significance, it can be stated that there was a statistically significant reduction in run-off-road fatal crashes for the three-year after period the LKAS installation for the Chevrolet Silverado.

APPENDIX B

B.1 (Chevrolet Silverado Data Collection)

Table 22. Chevrolet Silverado Data Collection for LKAS

Crash Year	Case Number	Vehicle Number	Make	Model	Model	Ran-Off-Road	Number of Subject Vehicles Involved
2013	10310	1	CHEVROLET	SILVERADO	2013	No	1
2013	50404	1	CHEVROLET	SILVERADO	2013	No	1
2013	60666	1	CHEVROLET	SILVERADO	2013	No	1
2013	60786	1	CHEVROLET	SILVERADO	2013	No	1
2013	62349	1	CHEVROLET	SILVERADO	2013	No	1
2013	62486	1	CHEVROLET	SILVERADO	2013	No	1
2013	80288	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	122079	1	CHEVROLET	SILVERADO	2013	No	1
2013	130870	1	CHEVROLET	SILVERADO	2013	No	1
2013	200292	1	CHEVROLET	SILVERADO	2013	No	1
2013	200312	1	CHEVROLET	SILVERADO	2013	No	1
2013	210464	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	220350	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	220519	1	CHEVROLET	SILVERADO	2013	No	1
2013	230113	1	CHEVROLET	SILVERADO	2013	No	1
2013	250113	1	CHEVROLET	SILVERADO	2013	No	1
2013	260755	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	290099	1	CHEVROLET	SILVERADO	2013	No	1
2013	290656	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	290672	1	CHEVROLET	SILVERADO	2013	No	1
2013	361101	1	CHEVROLET	SILVERADO	2013	No	1
2013	370999	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	380004	1	CHEVROLET	SILVERADO	2013	No	1
2013	400355	1	CHEVROLET	SILVERADO	2013	No	1
2013	400520	1	CHEVROLET	SILVERADO	2013	No	1
2013	420970	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	470816	1	CHEVROLET	SILVERADO	2014	Yes	1
2013	481731	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	481769	1	CHEVROLET	SILVERADO	2013	No	1
2013	482226	1	CHEVROLET	SILVERADO	2013	Yes	1

2013	482260	1	CHEVROLET	SILVERADO	2013	No	1
2013	482336	1	CHEVROLET	SILVERADO	2013	Yes	1
2013	482893	1	CHEVROLET	SILVERADO	2014	Yes	1
2013	530104	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	10482	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	10734	1	CHEVROLET	SILVERADO	2013	No	1
2014	40427	1	CHEVROLET	SILVERADO	2013	No	1
2014	40570	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	50058	1	CHEVROLET	SILVERADO	2013	No	1
2014	50402	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	60091	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	60222	1	CHEVROLET	SILVERADO	2014	No	1
2014	61366	1	CHEVROLET	SILVERADO	2014	No	1
2014	61606	1	CHEVROLET	SILVERADO	2013	No	1
2014	62090	1	CHEVROLET	SILVERADO	2013	No	1
2014	62510	1	CHEVROLET	SILVERADO	2013	No	1
2014	62798	1	CHEVROLET	SILVERADO	2013	No	1
2014	62858	1	CHEVROLET	SILVERADO	2014	No	1
2014	121232	1	CHEVROLET	SILVERADO	2013	No	1
2014	121416	1	CHEVROLET	SILVERADO	2013	No	1
2014	121747	1	CHEVROLET	SILVERADO	2013	No	1
2014	121844	1	CHEVROLET	SILVERADO	2014	No	1
2014	122025	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	130516	1	CHEVROLET	SILVERADO	2015	No	1
2014	130892	1	CHEVROLET	SILVERADO	2013	No	1
2014	170266	1	CHEVROLET	SILVERADO	2013	No	1
2014	180068	1	CHEVROLET	SILVERADO	2013	No	1
2014	190011	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	200096	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	220278	1	CHEVROLET	SILVERADO	2014	No	1
2014	220367	1	CHEVROLET	SILVERADO	2013	No	1
2014	260083	1	CHEVROLET	SILVERADO	2013	No	1
2014	260289	1	CHEVROLET	SILVERADO	2013	No	1
2014	260356	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	260709	1	CHEVROLET	SILVERADO	2014	No	1
2014	280062	1	CHEVROLET	SILVERADO	2013	No	1
2014	280445	1	CHEVROLET	SILVERADO	2013	No	1
2014	290100	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	300149	1	CHEVROLET	SILVERADO	2013	No	1

2014	300158	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	350120	1	CHEVROLET	SILVERADO	2013	No	1
2014	360373	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	360849	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	360869	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	360891	1	CHEVROLET	SILVERADO	2013	No	1
2014	370398	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	370554	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	371025	1	CHEVROLET	SILVERADO	2013	No	1
2014	371153	1	CHEVROLET	SILVERADO	2013	No	1
2014	380014	1	CHEVROLET	SILVERADO	2013	No	1
2014	380120	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	390888	1	CHEVROLET	SILVERADO	2014	No	1
2014	400150	1	CHEVROLET	SILVERADO	2013	No	1
2014	400369	1	CHEVROLET	SILVERADO	2013	No	1
2014	400460	1	CHEVROLET	SILVERADO	2014	No	1
2014	420724	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	421054	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	450112	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	450195	1	CHEVROLET	SILVERADO	2013	No	1
2014	470019	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	480657	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	481137	1	CHEVROLET	SILVERADO	2013	No	1
2014	481382	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	481733	1	CHEVROLET	SILVERADO	2015	No	1
2014	481759	1	CHEVROLET	SILVERADO	2014	No	1
2014	481940	1	CHEVROLET	SILVERADO	2014	No	1
2014	482044	1	CHEVROLET	SILVERADO	2014	No	1
2014	482048	1	CHEVROLET	SILVERADO	2014	No	1
2014	482125	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	482186	1	CHEVROLET	SILVERADO	2013	No	1
2014	482246	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	482341	1	CHEVROLET	SILVERADO	2014	No	1
2014	482420	1	CHEVROLET	SILVERADO	2014	No	1
2014	482432	1	CHEVROLET	SILVERADO	2014	No	1
2014	482657	1	CHEVROLET	SILVERADO	2013	Yes	1
2014	482731	1	CHEVROLET	SILVERADO	2014	Yes	1
2014	482940	1	CHEVROLET	SILVERADO	2014	No	1
2014	482958	1	CHEVROLET	SILVERADO	2013	No	1

2014	482988	1	CHEVROLET	SILVERADO	2013	No	1
2014	490225	1	CHEVROLET	SILVERADO	2013	No	1
2014	510617	1	CHEVROLET	SILVERADO	2013	No	1
2014	540131	1	CHEVROLET	SILVERADO	2014	No	1
2015	10030	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	10079	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	10394	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	10478	1	CHEVROLET	SILVERADO	2014	No	1
2015	10643	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	10716	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	50282	1	CHEVROLET	SILVERADO	2014	No	1
2015	50394	1	CHEVROLET	SILVERADO	2015	No	1
2015	50438	1	CHEVROLET	SILVERADO	2015	No	1
2015	60662	1	CHEVROLET	SILVERADO	2015	Yes	1
2015	60831	1	CHEVROLET	SILVERADO	2014	No	1
2015	61020	1	CHEVROLET	SILVERADO	2014	No	1
2015	61160	1	CHEVROLET	SILVERADO	2013	No	1
2015	61220	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	61462	1	CHEVROLET	SILVERADO	2013	No	1
2015	61515	1	CHEVROLET	SILVERADO	2014	No	1
2015	61599	1	CHEVROLET	SILVERADO	2015	No	1
2015	61914	1	CHEVROLET	SILVERADO	2015	No	1
2015	62201	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	62284	1	CHEVROLET	SILVERADO	2014	No	1
2015	62332	1	CHEVROLET	SILVERADO	2015	No	1
2015	62433	1	CHEVROLET	SILVERADO	2014	No	1
2015	62905	1	CHEVROLET	SILVERADO	2015	No	1
2015	63064	1	CHEVROLET	SILVERADO	2015	No	1
2015	90133	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	90222	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	120404	1	CHEVROLET	SILVERADO	2013	No	1
2015	121070	1	CHEVROLET	SILVERADO	2014	No	1
2015	121505	1	CHEVROLET	SILVERADO	2013	No	1
2015	121665	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	122075	1	CHEVROLET	SILVERADO	2015	No	1
2015	122392	1	CHEVROLET	SILVERADO	2013	No	1
2015	130587	1	CHEVROLET	SILVERADO	2013	No	1
2015	130662	1	CHEVROLET	SILVERADO	2014	No	1
2015	130720	1	CHEVROLET	SILVERADO	2013	No	1

2015	160056	1	CHEVROLET	SILVERADO	2014	No	1
2015	170686	1	CHEVROLET	SILVERADO	2014	No	1
2015	180190	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	180423	1	CHEVROLET	SILVERADO	2013	No	1
2015	180440	1	CHEVROLET	SILVERADO	2014	No	1
2015	190044	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	190067	1	CHEVROLET	SILVERADO	2013	No	1
2015	190250	1	CHEVROLET	SILVERADO	2015	No	1
2015	200095	1	CHEVROLET	SILVERADO	2015	No	2
2015	210091	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	210110	1	CHEVROLET	SILVERADO	2015	Yes	1
2015	210562	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	210591	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	220234	1	CHEVROLET	SILVERADO	2014	No	1
2015	220296	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	220367	1	CHEVROLET	SILVERADO	2014	No	1
2015	220412	1	CHEVROLET	SILVERADO	2013	No	1
2015	220591	1	CHEVROLET	SILVERADO	2014	No	1
2015	230134	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	240120	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	240138	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	240195	1	CHEVROLET	SILVERADO	2014	No	1
2015	250081	1	CHEVROLET	SILVERADO	2013	No	1
2015	250152	1	CHEVROLET	SILVERADO	2013	No	1
2015	260308	1	CHEVROLET	SILVERADO	2015	No	1
2015	260404	1	CHEVROLET	SILVERADO	2015	No	1
2015	260511	1	CHEVROLET	SILVERADO	2014	No	1
2015	260850	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	270042	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	280309	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	280573	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	290174	1	CHEVROLET	SILVERADO	2013	No	1
2015	290591	1	CHEVROLET	SILVERADO	2013	No	1
2015	300147	1	CHEVROLET	SILVERADO	2014	No	1
2015	300188	1	CHEVROLET	SILVERADO	2014	No	1
2015	310002	1	CHEVROLET	SILVERADO	2015	Yes	1
2015	340256	1	CHEVROLET	SILVERADO	2014	No	1
2015	360302	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	360514	1	CHEVROLET	SILVERADO	2014	Yes	1

2015	360966	1	CHEVROLET	SILVERADO	2014	No	1
2015	360978	1	CHEVROLET	SILVERADO	2015	No	1
2015	370369	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	380044	1	CHEVROLET	SILVERADO	2014	No	1
2015	380115	1	CHEVROLET	SILVERADO	2015	No	1
2015	390101	1	CHEVROLET	SILVERADO	2013	No	1
2015	390300	1	CHEVROLET	SILVERADO	2014	No	1
2015	390602	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	390792	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	390914	1	CHEVROLET	SILVERADO	2013	No	1
2015	400133	1	CHEVROLET	SILVERADO	2014	No	1
2015	400181	1	CHEVROLET	SILVERADO	2013	No	1
2015	400201	1	CHEVROLET	SILVERADO	2014	No	1
2015	400240	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	400467	1	CHEVROLET	SILVERADO	2013	No	1
2015	400495	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	400573	1	CHEVROLET	SILVERADO	2015	No	1
2015	420005	1	CHEVROLET	SILVERADO	2013	No	1
2015	420792	1	CHEVROLET	SILVERADO	2015	Yes	1
2015	421059	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	450224	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	450903	1	CHEVROLET	SILVERADO	2015	Yes	1
2015	470242	1	CHEVROLET	SILVERADO	2013	No	1
2015	470476	1	CHEVROLET	SILVERADO	2015	No	1
2015	470634	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	480136	1	CHEVROLET	SILVERADO	2014	No	1
2015	480174	1	CHEVROLET	SILVERADO	2013	No	1
2015	480468	1	CHEVROLET	SILVERADO	2014	No	1
2015	480549	1	CHEVROLET	SILVERADO	2014	No	1
2015	480687	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	480867	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	480880	1	CHEVROLET	SILVERADO	2015	No	1
2015	480916	1	CHEVROLET	SILVERADO	2015	No	1
2015	481037	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	481118	1	CHEVROLET	SILVERADO	2014	No	1
2015	481273	1	CHEVROLET	SILVERADO	2013	No	1
2015	481360	1	CHEVROLET	SILVERADO	2014	No	1
2015	481632	1	CHEVROLET	SILVERADO	2013	No	1
2015	481649	1	CHEVROLET	SILVERADO	2013	Yes	1

2015	481738	1	CHEVROLET	SILVERADO	2013	No	1
2015	481782	1	CHEVROLET	SILVERADO	2015	No	1
2015	481925	1	CHEVROLET	SILVERADO	2015	No	1
2015	481940	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	482005	1	CHEVROLET	SILVERADO	2015	No	1
2015	482039	1	CHEVROLET	SILVERADO	2014	No	1
2015	482078	1	CHEVROLET	SILVERADO	2015	Yes	1
2015	482115	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	482263	1	CHEVROLET	SILVERADO	2015	No	2
2015	482338	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	482414	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	482596	1	CHEVROLET	SILVERADO	2015	Yes	1
2015	482739	1	CHEVROLET	SILVERADO	2015	Yes	1
2015	482828	1	CHEVROLET	SILVERADO	2015	Yes	1
2015	482846	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	483018	1	CHEVROLET	SILVERADO	2014	Yes	1
2015	483160	1	CHEVROLET	SILVERADO	2015	No	1
2015	483188	1	CHEVROLET	SILVERADO	2013	No	1
2015	490258	1	CHEVROLET	SILVERADO	2013	No	1
2015	500037	1	CHEVROLET	SILVERADO	2013	No	1
2015	510070	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	510407	1	CHEVROLET	SILVERADO	2013	No	1
2015	510428	1	CHEVROLET	SILVERADO	2014	No	1
2015	510631	1	CHEVROLET	SILVERADO	2013	No	1
2015	510699	1	CHEVROLET	SILVERADO	2013	Yes	1
2015	530518	1	CHEVROLET	SILVERADO	2015	No	1
2016	10414	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	40010	1	CHEVROLET	SILVERADO	2015	No	1
2016	40094	1	CHEVROLET	SILVERADO	2015	No	1
2016	40181	1	CHEVROLET	SILVERADO	2014	No	1
2016	40199	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	40312	1	CHEVROLET	SILVERADO	2016	No	1
2016	50077	1	CHEVROLET	SILVERADO	2015	No	1
2016	50281	1	CHEVROLET	SILVERADO	2015	No	1
2016	50381	1	CHEVROLET	SILVERADO	2015	No	1
2016	60127	1	CHEVROLET	SILVERADO	2014	No	1
2016	60697	1	CHEVROLET	SILVERADO	2015	No	1
2016	60851	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	60978	1	CHEVROLET	SILVERADO	2015	Yes	1

2016	61058	1	CHEVROLET	SILVERADO	2015	No	1
2016	62023	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	62096	1	CHEVROLET	SILVERADO	2014	No	1
2016	62113	1	CHEVROLET	SILVERADO	2014	No	2
2016	62215	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	62812	1	CHEVROLET	SILVERADO	2016	No	1
2016	63188	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	63313	1	CHEVROLET	SILVERADO	2015	No	1
2016	63319	1	CHEVROLET	SILVERADO	2013	No	1
2016	63584	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	80083	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	80484	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	90134	1	CHEVROLET	SILVERADO	2015	No	1
2016	90172	1	CHEVROLET	SILVERADO	2013	No	1
2016	90285	1	CHEVROLET	SILVERADO	2013	No	1
2016	120406	1	CHEVROLET	SILVERADO	2014	No	1
2016	120409	1	CHEVROLET	SILVERADO	2014	No	1
2016	120430	1	CHEVROLET	SILVERADO	2013	No	1
2016	120500	1	CHEVROLET	SILVERADO	2015	No	1
2016	120504	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	120678	1	CHEVROLET	SILVERADO	2015	No	1
2016	121108	1	CHEVROLET	SILVERADO	2013	No	1
2016	121228	1	CHEVROLET	SILVERADO	2016	No	1
2016	121320	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	121583	1	CHEVROLET	SILVERADO	2013	No	1
2016	122176	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	131215	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	131289	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	150022	1	CHEVROLET	SILVERADO	2016	No	1
2016	170035	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	170470	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	170660	1	CHEVROLET	SILVERADO	2015	No	1
2016	170852	1	CHEVROLET	SILVERADO	2016	No	1
2016	170984	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	171058	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	180211	1	CHEVROLET	SILVERADO	2013	No	1
2016	180293	1	CHEVROLET	SILVERADO	2015	No	1
2016	180548	1	CHEVROLET	SILVERADO	2015	No	1
2016	180622	1	CHEVROLET	SILVERADO	2016	No	1

2016	190109	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	190150	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	190216	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	200040	1	CHEVROLET	SILVERADO	2015	No	1
2016	200224	1	CHEVROLET	SILVERADO	2013	No	1
2016	200362	1	CHEVROLET	SILVERADO	2015	No	1
2016	210456	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	210631	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	220055	1	CHEVROLET	SILVERADO	2015	No	1
2016	220087	1	CHEVROLET	SILVERADO	2015	No	1
2016	220203	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	220247	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	220303	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	220351	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	240039	1	CHEVROLET	SILVERADO	2015	No	1
2016	250198	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	260096	1	CHEVROLET	SILVERADO	2015	No	1
2016	260207	1	CHEVROLET	SILVERADO	2015	No	1
2016	260375	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	260410	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	260531	1	CHEVROLET	SILVERADO	2014	No	1
2016	260655	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	260807	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	260851	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	260970	1	CHEVROLET	SILVERADO	2013	No	1
2016	270360	1	CHEVROLET	SILVERADO	2013	No	1
2016	280158	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	280240	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	290012	1	CHEVROLET	SILVERADO	2014	No	1
2016	290041	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	290268	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	290562	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	290639	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	290749	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	300003	1	CHEVROLET	SILVERADO	2013	No	1
2016	300171	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	310037	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	310056	1	CHEVROLET	SILVERADO	2014	No	1
2016	320235	1	CHEVROLET	SILVERADO	2014	No	1

2016	350168	1	CHEVROLET	SILVERADO	2014	No	1
2016	360246	1	CHEVROLET	SILVERADO	2014	No	1
2016	360323	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	370358	1	CHEVROLET	SILVERADO	2013	No	1
2016	370469	1	CHEVROLET	SILVERADO	2014	No	1
2016	370532	1	CHEVROLET	SILVERADO	2015	No	1
2016	370548	1	CHEVROLET	SILVERADO	2016	No	1
2016	370838	1	CHEVROLET	SILVERADO	2015	No	1
2016	371344	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	380022	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	380083	1	CHEVROLET	SILVERADO	2016	No	1
2016	380093	1	CHEVROLET	SILVERADO	2016	No	1
2016	390016	1	CHEVROLET	SILVERADO	2014	No	1
2016	390345	1	CHEVROLET	SILVERADO	2016	No	1
2016	390368	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	390591	1	CHEVROLET	SILVERADO	2014	No	1
2016	390966	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	400079	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	400204	1	CHEVROLET	SILVERADO	2015	No	1
2016	400410	1	CHEVROLET	SILVERADO	2013	No	1
2016	400450	1	CHEVROLET	SILVERADO	2015	No	1
2016	400620	1	CHEVROLET	SILVERADO	2015	No	1
2016	410023	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	410185	1	CHEVROLET	SILVERADO	2013	No	1
2016	420330	1	CHEVROLET	SILVERADO	2014	No	1
2016	420500	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	420573	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	450240	1	CHEVROLET	SILVERADO	2013	No	1
2016	450270	1	CHEVROLET	SILVERADO	2013	No	1
2016	450636	1	CHEVROLET	SILVERADO	2015	No	1
2016	450647	1	CHEVROLET	SILVERADO	2014	No	1
2016	470260	1	CHEVROLET	SILVERADO	2014	No	1
2016	470360	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	470567	1	CHEVROLET	SILVERADO	2014	No	1
2016	470585	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	470930	1	CHEVROLET	SILVERADO	2013	No	1
2016	470963	1	CHEVROLET	SILVERADO	2013	No	1
2016	480063	1	CHEVROLET	SILVERADO	2015	No	1
2016	480111	1	CHEVROLET	SILVERADO	2015	No	1

2016	480130	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	480141	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	480294	1	CHEVROLET	SILVERADO	2014	No	1
2016	480299	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	480432	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	480598	1	CHEVROLET	SILVERADO	2014	No	1
2016	480671	1	CHEVROLET	SILVERADO	2013	No	1
2016	480674	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	481189	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	481222	1	CHEVROLET	SILVERADO	2014	No	1
2016	481301	1	CHEVROLET	SILVERADO	2014	No	1
2016	481360	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	481455	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	481627	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	481737	1	CHEVROLET	SILVERADO	2014	No	1
2016	481847	1	CHEVROLET	SILVERADO	2014	No	1
2016	482339	1	CHEVROLET	SILVERADO	2015	No	1
2016	482419	1	CHEVROLET	SILVERADO	2015	No	1
2016	482755	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	482846	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	482852	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	482998	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	483019	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	483040	1	CHEVROLET	SILVERADO	2016	No	1
2016	483091	1	CHEVROLET	SILVERADO	2016	No	1
2016	483159	1	CHEVROLET	SILVERADO	2013	No	1
2016	483175	1	CHEVROLET	SILVERADO	2016	Yes	1
2016	483200	1	CHEVROLET	SILVERADO	2013	No	1
2016	483223	1	CHEVROLET	SILVERADO	2014	Yes	1
2016	483225	1	CHEVROLET	SILVERADO	2015	Yes	1
2016	483253	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	483418	1	CHEVROLET	SILVERADO	2015	No	1
2016	483441	1	CHEVROLET	SILVERADO	2014	No	1
2016	530068	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	540014	1	CHEVROLET	SILVERADO	2013	No	1
2016	540023	1	CHEVROLET	SILVERADO	2013	Yes	1
2016	540041	1	CHEVROLET	SILVERADO	2013	No	1
2016	550058	1	CHEVROLET	SILVERADO	2014	No	1
2016	550534	1	CHEVROLET	SILVERADO	2014	No	1

2017	10153	1	CHEVROLET	SILVERADO	2013	No	1
2017	10266	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	10304	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	10658	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	10696	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	10862	1	CHEVROLET	SILVERADO	2016	No	1
2017	20033	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	40025	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	40778	1	CHEVROLET	SILVERADO	2016	No	1
2017	40821	1	CHEVROLET	SILVERADO	2014	No	1
2017	40839	1	CHEVROLET	SILVERADO	2013	No	1
2017	50009	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	50212	1	CHEVROLET	SILVERADO	2015	No	1
2017	50215	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	50316	1	CHEVROLET	SILVERADO	2017	No	1
2017	60655	1	CHEVROLET	SILVERADO	2015	No	1
2017	60717	1	CHEVROLET	SILVERADO	2016	No	1
2017	61392	1	CHEVROLET	SILVERADO	2016	No	1
2017	61445	1	CHEVROLET	SILVERADO	2014	No	1
2017	61514	1	CHEVROLET	SILVERADO	2014	No	1
2017	61534	1	CHEVROLET	SILVERADO	2013	No	1
2017	61549	1	CHEVROLET	SILVERADO	2014	No	1
2017	61803	1	CHEVROLET	SILVERADO	2016	No	1
2017	62205	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	62230	1	CHEVROLET	SILVERADO	2017	No	1
2017	62323	1	CHEVROLET	SILVERADO	2017	Yes	1
2017	62963	1	CHEVROLET	SILVERADO	2015	No	1
2017	62969	1	CHEVROLET	SILVERADO	2016	No	1
2017	62977	1	CHEVROLET	SILVERADO	2015	No	1
2017	63117	1	CHEVROLET	SILVERADO	2014	No	1
2017	63397	1	CHEVROLET	SILVERADO	2013	No	1
2017	80228	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	80400	1	CHEVROLET	SILVERADO	2013	No	1
2017	80597	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	90040	1	CHEVROLET	SILVERADO	2013	No	1
2017	90100	1	CHEVROLET	SILVERADO	2015	No	1
2017	120014	1	CHEVROLET	SILVERADO	2015	No	1
2017	120409	1	CHEVROLET	SILVERADO	2014	No	1
2017	120465	1	CHEVROLET	SILVERADO	2017	Yes	1

2017	120563	1	CHEVROLET	SILVERADO	2017	No	1
2017	120632	1	CHEVROLET	SILVERADO	2017	No	1
2017	120684	1	CHEVROLET	SILVERADO	2013	No	1
2017	120984	1	CHEVROLET	SILVERADO	2015	No	1
2017	121043	1	CHEVROLET	SILVERADO	2017	Yes	1
2017	121563	1	CHEVROLET	SILVERADO	2013	No	1
2017	121644	1	CHEVROLET	SILVERADO	2013	No	1
2017	121817	1	CHEVROLET	SILVERADO	2016	No	1
2017	121882	1	CHEVROLET	SILVERADO	2017	Yes	1
2017	122049	1	CHEVROLET	SILVERADO	2014	No	1
2017	122403	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	122458	1	CHEVROLET	SILVERADO	2015	No	1
2017	122556	1	CHEVROLET	SILVERADO	2015	No	1
2017	122574	1	CHEVROLET	SILVERADO	2015	No	1
2017	122713	1	CHEVROLET	SILVERADO	2017	No	1
2017	123056	1	CHEVROLET	SILVERADO	2013	No	2
2017	130273	1	CHEVROLET	SILVERADO	2015	No	1
2017	130699	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	130783	1	CHEVROLET	SILVERADO	2014	No	1
2017	131335	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	150092	1	CHEVROLET	SILVERADO	2015	No	1
2017	160217	1	CHEVROLET	SILVERADO	2016	No	1
2017	170104	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	170256	1	CHEVROLET	SILVERADO	2015	No	1
2017	170467	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	170470	1	CHEVROLET	SILVERADO	2015	No	1
2017	170980	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	180028	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	180379	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	180408	1	CHEVROLET	SILVERADO	2015	No	1
2017	180540	1	CHEVROLET	SILVERADO	2013	No	1
2017	180844	1	CHEVROLET	SILVERADO	2015	No	1
2017	190027	1	CHEVROLET	SILVERADO	2014	No	1
2017	190042	1	CHEVROLET	SILVERADO	2015	No	1
2017	200335	1	CHEVROLET	SILVERADO	2017	Yes	1
2017	200398	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	210084	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	210175	1	CHEVROLET	SILVERADO	2017	No	1
2017	210356	1	CHEVROLET	SILVERADO	2013	Yes	1

2017	210647	1	CHEVROLET	SILVERADO	2013	No	1
2017	220153	1	CHEVROLET	SILVERADO	2013	No	1
2017	220200	1	CHEVROLET	SILVERADO	2013	No	1
2017	220283	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	220417	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	220464	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	220645	1	CHEVROLET	SILVERADO	2016	No	1
2017	220661	1	CHEVROLET	SILVERADO	2016	No	1
2017	230043	1	CHEVROLET	SILVERADO	2013	No	1
2017	230073	1	CHEVROLET	SILVERADO	2016	No	1
2017	230085	1	CHEVROLET	SILVERADO	2013	Yes	2
2017	240308	1	CHEVROLET	SILVERADO	2014	No	1
2017	240487	1	CHEVROLET	SILVERADO	2018	No	1
2017	260082	1	CHEVROLET	SILVERADO	2015	No	1
2017	260147	1	CHEVROLET	SILVERADO	2015	No	1
2017	260558	1	CHEVROLET	SILVERADO	2017	No	1
2017	260736	1	CHEVROLET	SILVERADO	2015	No	1
2017	270065	1	CHEVROLET	SILVERADO	2017	No	1
2017	270114	1	CHEVROLET	SILVERADO	2016	No	1
2017	270159	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	270176	1	CHEVROLET	SILVERADO	2017	No	1
2017	270196	1	CHEVROLET	SILVERADO	2017	No	1
2017	280073	1	CHEVROLET	SILVERADO	2013	No	1
2017	280385	1	CHEVROLET	SILVERADO	2017	No	1
2017	290049	1	CHEVROLET	SILVERADO	2016	No	1
2017	290069	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	290117	1	CHEVROLET	SILVERADO	2015	No	1
2017	290237	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	290464	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	290627	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	290639	1	CHEVROLET	SILVERADO	2013	No	1
2017	310153	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	310159	1	CHEVROLET	SILVERADO	2017	No	1
2017	330037	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	330074	1	CHEVROLET	SILVERADO	2017	No	1
2017	330097	1	CHEVROLET	SILVERADO	2015	No	1
2017	340593	1	CHEVROLET	SILVERADO	2015	No	1
2017	350067	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	350097	1	CHEVROLET	SILVERADO	2014	No	1

2017	360201	1	CHEVROLET	SILVERADO	2015	No	1
2017	360227	1	CHEVROLET	SILVERADO	2015	No	1
2017	360547	1	CHEVROLET	SILVERADO	2014	No	1
2017	360606	1	CHEVROLET	SILVERADO	2014	No	1
2017	360780	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	360826	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	370643	1	CHEVROLET	SILVERADO	2015	No	1
2017	370711	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	370770	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	370816	1	CHEVROLET	SILVERADO	2017	Yes	1
2017	370871	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	370975	1	CHEVROLET	SILVERADO	2013	No	1
2017	371042	1	CHEVROLET	SILVERADO	2013	No	1
2017	371251	1	CHEVROLET	SILVERADO	2014	No	1
2017	380021	1	CHEVROLET	SILVERADO	2013	No	1
2017	380053	1	CHEVROLET	SILVERADO	2014	No	1
2017	390059	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	390531	1	CHEVROLET	SILVERADO	2015	No	1
2017	390844	1	CHEVROLET	SILVERADO	2014	No	1
2017	390892	1	CHEVROLET	SILVERADO	2017	No	1
2017	400046	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	400065	1	CHEVROLET	SILVERADO	2013	No	1
2017	400118	1	CHEVROLET	SILVERADO	2015	No	1
2017	400135	1	CHEVROLET	SILVERADO	2015	No	1
2017	400141	1	CHEVROLET	SILVERADO	2013	No	1
2017	400145	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	400186	1	CHEVROLET	SILVERADO	2013	No	1
2017	400199	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	400213	1	CHEVROLET	SILVERADO	2015	No	1
2017	400236	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	400240	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	400305	1	CHEVROLET	SILVERADO	2014	No	1
2017	400322	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	400410	1	CHEVROLET	SILVERADO	2015	No	1
2017	400496	1	CHEVROLET	SILVERADO	2015	No	1
2017	400548	1	CHEVROLET	SILVERADO	2017	No	1
2017	400553	1	CHEVROLET	SILVERADO	2014	No	1
2017	420181	1	CHEVROLET	SILVERADO	2014	No	1
2017	420262	1	CHEVROLET	SILVERADO	2013	Yes	1

2017	420305	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	420395	1	CHEVROLET	SILVERADO	2015	No	1
2017	420820	1	CHEVROLET	SILVERADO	2015	No	1
2017	420874	1	CHEVROLET	SILVERADO	2017	Yes	1
2017	420990	1	CHEVROLET	SILVERADO	2016	No	1
2017	440024	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	450067	1	CHEVROLET	SILVERADO	2014	No	1
2017	450160	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	450266	1	CHEVROLET	SILVERADO	2013	No	1
2017	450377	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	450476	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	450642	1	CHEVROLET	SILVERADO	2017	Yes	1
2017	470117	1	CHEVROLET	SILVERADO	2015	No	1
2017	470451	1	CHEVROLET	SILVERADO	2016	No	1
2017	480063	1	CHEVROLET	SILVERADO	2015	No	1
2017	480317	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	480371	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	480394	1	CHEVROLET	SILVERADO	2016	Yes	1
2017	480428	1	CHEVROLET	SILVERADO	2015	No	1
2017	480451	1	CHEVROLET	SILVERADO	2013	No	1
2017	480561	1	CHEVROLET	SILVERADO	2014	No	1
2017	480843	1	CHEVROLET	SILVERADO	2013	No	1
2017	480932	1	CHEVROLET	SILVERADO	2015	No	1
2017	481013	1	CHEVROLET	SILVERADO	2015	No	1
2017	481109	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	481327	1	CHEVROLET	SILVERADO	2016	No	1
2017	481479	1	CHEVROLET	SILVERADO	2013	No	1
2017	481526	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	481703	1	CHEVROLET	SILVERADO	2014	No	1
2017	481799	1	CHEVROLET	SILVERADO	2014	No	1
2017	481843	1	CHEVROLET	SILVERADO	2016	No	1
2017	481875	1	CHEVROLET	SILVERADO	2015	No	1
2017	481889	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	481969	1	CHEVROLET	SILVERADO	2015	No	1
2017	481974	1	CHEVROLET	SILVERADO	2013	No	1
2017	481975	1	CHEVROLET	SILVERADO	2014	No	1
2017	482065	1	CHEVROLET	SILVERADO	2017	No	1
2017	482231	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	482248	1	CHEVROLET	SILVERADO	2014	No	1

2017	482251	1	CHEVROLET	SILVERADO	2017	Yes	1
2017	482382	1	CHEVROLET	SILVERADO	2013	No	1
2017	482680	1	CHEVROLET	SILVERADO	2015	No	1
2017	482790	1	CHEVROLET	SILVERADO	2017	Yes	1
2017	482997	1	CHEVROLET	SILVERADO	2013	No	1
2017	483198	1	CHEVROLET	SILVERADO	2013	No	1
2017	483200	1	CHEVROLET	SILVERADO	2015	No	1
2017	483393	1	CHEVROLET	SILVERADO	2016	No	1
2017	483413	1	CHEVROLET	SILVERADO	2013	No	1
2017	490021	1	CHEVROLET	SILVERADO	2015	No	1
2017	500050	1	CHEVROLET	SILVERADO	2015	No	1
2017	530006	1	CHEVROLET	SILVERADO	2015	No	1
2017	540010	1	CHEVROLET	SILVERADO	2013	No	1
2017	540235	1	CHEVROLET	SILVERADO	2014	Yes	1
2017	540268	1	CHEVROLET	SILVERADO	2015	Yes	1
2017	550400	1	CHEVROLET	SILVERADO	2013	Yes	1
2017	550443	1	CHEVROLET	SILVERADO	2014	No	1
2017	550463	1	CHEVROLET	SILVERADO	2016	No	1
2017	550468	1	CHEVROLET	SILVERADO	2017	No	1
2017	550500	1	CHEVROLET	SILVERADO	2015	No	1
2017	560085	1	CHEVROLET	SILVERADO	2013	No	1
2018	10007	1	CHEVROLET	SILVERADO	2014	No	1
2018	10088	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	10229	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	10243	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	10251	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	10351	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	10416	1	CHEVROLET	SILVERADO	2017	No	1
2018	10573	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	10687	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	10716	1	CHEVROLET	SILVERADO	2014	No	1
2018	10814	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	40287	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	40360	1	CHEVROLET	SILVERADO	2018	No	1
2018	40672	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	40741	1	CHEVROLET	SILVERADO	2016	No	1
2018	50055	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	50408	1	CHEVROLET	SILVERADO	2015	No	1
2018	50437	1	CHEVROLET	SILVERADO	2014	Yes	1

2018	60743	1	CHEVROLET	SILVERADO	2013	No	1
2018	60861	1	CHEVROLET	SILVERADO	2015	No	1
2018	61011	1	CHEVROLET	SILVERADO	2016	No	1
2018	61266	1	CHEVROLET	SILVERADO	2017	No	1
2018	61275	1	CHEVROLET	SILVERADO	2014	No	1
2018	61348	1	CHEVROLET	SILVERADO	2015	No	1
2018	61355	1	CHEVROLET	SILVERADO	2017	No	1
2018	61899	1	CHEVROLET	SILVERADO	2015	No	1
2018	62557	1	CHEVROLET	SILVERADO	2017	No	1
2018	62598	1	CHEVROLET	SILVERADO	2014	No	1
2018	62711	1	CHEVROLET	SILVERADO	2018	No	1
2018	62771	1	CHEVROLET	SILVERADO	2014	No	1
2018	62801	1	CHEVROLET	SILVERADO	2017	No	1
2018	62844	1	CHEVROLET	SILVERADO	2016	No	1
2018	62878	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	62911	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	63008	1	CHEVROLET	SILVERADO	2016	No	1
2018	80468	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	80590	1	CHEVROLET	SILVERADO	2014	No	1
2018	90119	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	90177	1	CHEVROLET	SILVERADO	2017	No	1
2018	100082	1	CHEVROLET	SILVERADO	2017	No	1
2018	100086	1	CHEVROLET	SILVERADO	2018	No	1
2018	100100	1	CHEVROLET	SILVERADO	2015	No	1
2018	120042	1	CHEVROLET	SILVERADO	2014	No	1
2018	120054	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	120368	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	120385	1	CHEVROLET	SILVERADO	2015	No	1
2018	120494	1	CHEVROLET	SILVERADO	2014	No	2
2018	120504	1	CHEVROLET	SILVERADO	2016	No	1
2018	120588	1	CHEVROLET	SILVERADO	2018	No	1
2018	120628	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	120661	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	121306	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	121314	1	CHEVROLET	SILVERADO	2018	No	1
2018	121593	1	CHEVROLET	SILVERADO	2013	No	1
2018	121978	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	122322	1	CHEVROLET	SILVERADO	2014	No	1
2018	122393	1	CHEVROLET	SILVERADO	2016	No	1

2018	122644	1	CHEVROLET	SILVERADO	2014	No	1
2018	122663	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	122765	1	CHEVROLET	SILVERADO	2018	No	1
2018	122882	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	122945	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	122952	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	122971	1	CHEVROLET	SILVERADO	2015	No	1
2018	122981	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	122992	1	CHEVROLET	SILVERADO	2014	No	1
2018	130254	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	130307	1	CHEVROLET	SILVERADO	2015	No	1
2018	130415	1	CHEVROLET	SILVERADO	2013	No	1
2018	130656	1	CHEVROLET	SILVERADO	2014	No	1
2018	130669	1	CHEVROLET	SILVERADO	2014	No	1
2018	160215	1	CHEVROLET	SILVERADO	2018	No	1
2018	170059	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	170621	1	CHEVROLET	SILVERADO	2014	No	1
2018	170851	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	180025	1	CHEVROLET	SILVERADO	2015	No	1
2018	180149	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	180167	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	180329	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	180448	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	180580	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	180786	1	CHEVROLET	SILVERADO	2015	No	1
2018	190239	1	CHEVROLET	SILVERADO	2015	No	1
2018	200098	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	200133	1	CHEVROLET	SILVERADO	2018	No	1
2018	200153	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	200197	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	200205	1	CHEVROLET	SILVERADO	2013	No	1
2018	200289	1	CHEVROLET	SILVERADO	2017	No	1
2018	200379	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	210104	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	210195	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	210253	1	CHEVROLET	SILVERADO	2017	No	1
2018	210621	1	CHEVROLET	SILVERADO	2014	No	1
2018	210668	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	220097	1	CHEVROLET	SILVERADO	2017	No	1

2018	220191	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	220214	1	CHEVROLET	SILVERADO	2014	No	1
2018	220322	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	220351	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	220419	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	220427	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	220431	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	220444	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	220521	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	220569	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	220660	1	CHEVROLET	SILVERADO	2013	No	1
2018	220676	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	220685	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	220716	1	CHEVROLET	SILVERADO	2015	No	1
2018	240001	1	CHEVROLET	SILVERADO	2015	No	1
2018	240005	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	240287	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	250083	1	CHEVROLET	SILVERADO	2014	No	1
2018	250201	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	250258	1	CHEVROLET	SILVERADO	2017	No	1
2018	250287	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	260144	1	CHEVROLET	SILVERADO	2018	No	1
2018	260211	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	260318	1	CHEVROLET	SILVERADO	2018	No	1
2018	260384	1	CHEVROLET	SILVERADO	2013	No	1
2018	260526	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	260541	1	CHEVROLET	SILVERADO	2017	No	1
2018	260548	1	CHEVROLET	SILVERADO	2016	No	1
2018	260565	1	CHEVROLET	SILVERADO	2014	No	1
2018	260799	1	CHEVROLET	SILVERADO	2015	No	1
2018	260837	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	270179	1	CHEVROLET	SILVERADO	2014	No	1
2018	270211	1	CHEVROLET	SILVERADO	2015	No	1
2018	270325	1	CHEVROLET	SILVERADO	2014	No	1
2018	280312	1	CHEVROLET	SILVERADO	2017	No	1
2018	280461	1	CHEVROLET	SILVERADO	2015	No	1
2018	280467	1	CHEVROLET	SILVERADO	2013	No	1
2018	290405	1	CHEVROLET	SILVERADO	2014	No	1
2018	310035	1	CHEVROLET	SILVERADO	2016	No	1

2018	310100	1	CHEVROLET	SILVERADO	2015	No	1
2018	310161	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	330070	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	330078	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	340181	1	CHEVROLET	SILVERADO	2016	No	1
2018	340291	1	CHEVROLET	SILVERADO	2017	No	1
2018	350034	1	CHEVROLET	SILVERADO	2015	No	1
2018	350065	1	CHEVROLET	SILVERADO	2014	No	1
2018	350168	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	360088	1	CHEVROLET	SILVERADO	2017	No	1
2018	360152	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	360298	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	360510	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	360673	1	CHEVROLET	SILVERADO	2016	No	1
2018	360796	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	360880	1	CHEVROLET	SILVERADO	2013	No	1
2018	370110	1	CHEVROLET	SILVERADO	2014	No	1
2018	370131	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	370171	1	CHEVROLET	SILVERADO	2018	No	1
2018	370188	1	CHEVROLET	SILVERADO	2016	No	1
2018	370408	1	CHEVROLET	SILVERADO	2016	No	1
2018	370583	1	CHEVROLET	SILVERADO	2014	No	1
2018	371069	1	CHEVROLET	SILVERADO	2013	No	1
2018	371175	1	CHEVROLET	SILVERADO	2017	No	1
2018	371189	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	380020	1	CHEVROLET	SILVERADO	2016	No	1
2018	380043	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	380072	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	390198	1	CHEVROLET	SILVERADO	2014	No	1
2018	390247	1	CHEVROLET	SILVERADO	2015	No	1
2018	390283	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	390518	1	CHEVROLET	SILVERADO	2017	No	1
2018	390970	1	CHEVROLET	SILVERADO	2014	No	1
2018	400208	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	400243	1	CHEVROLET	SILVERADO	2016	No	1
2018	400280	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	400293	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	400412	1	CHEVROLET	SILVERADO	2017	No	1
2018	400477	1	CHEVROLET	SILVERADO	2013	No	1

2018	400504	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	400512	1	CHEVROLET	SILVERADO	2015	No	1
2018	400514	1	CHEVROLET	SILVERADO	2015	No	1
2018	400549	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	400566	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	420230	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	420234	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	420526	1	CHEVROLET	SILVERADO	2013	No	1
2018	420546	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	420647	1	CHEVROLET	SILVERADO	2014	No	1
2018	421019	1	CHEVROLET	SILVERADO	2014	No	1
2018	421097	1	CHEVROLET	SILVERADO	2014	No	1
2018	440008	1	CHEVROLET	SILVERADO	2017	No	1
2018	450042	1	CHEVROLET	SILVERADO	2015	No	1
2018	450525	1	CHEVROLET	SILVERADO	2015	No	1
2018	450736	1	CHEVROLET	SILVERADO	2017	No	1
2018	450939	1	CHEVROLET	SILVERADO	2016	No	1
2018	470058	1	CHEVROLET	SILVERADO	2016	No	1
2018	470138	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	470168	1	CHEVROLET	SILVERADO	2015	No	1
2018	470174	1	CHEVROLET	SILVERADO	2014	No	1
2018	470249	1	CHEVROLET	SILVERADO	2017	No	1
2018	480036	1	CHEVROLET	SILVERADO	2013	No	1
2018	480037	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	480059	1	CHEVROLET	SILVERADO	2014	No	1
2018	480148	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	480274	1	CHEVROLET	SILVERADO	2015	No	1
2018	480315	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	480357	1	CHEVROLET	SILVERADO	2013	No	1
2018	480376	1	CHEVROLET	SILVERADO	2017	No	1
2018	480415	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	480829	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	480946	1	CHEVROLET	SILVERADO	2016	Yes	1
2018	481057	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	481133	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	481202	1	CHEVROLET	SILVERADO	2013	No	1
2018	481215	1	CHEVROLET	SILVERADO	2013	No	1
2018	481267	1	CHEVROLET	SILVERADO	2018	No	1
2018	481342	1	CHEVROLET	SILVERADO	2018	Yes	1

2018	481343	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	481441	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	481563	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	481586	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	481632	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	481749	1	CHEVROLET	SILVERADO	2014	No	1
2018	481846	1	CHEVROLET	SILVERADO	2017	No	1
2018	481860	1	CHEVROLET	SILVERADO	2017	No	1
2018	481935	1	CHEVROLET	SILVERADO	2014	No	1
2018	481946	1	CHEVROLET	SILVERADO	2013	No	1
2018	481981	1	CHEVROLET	SILVERADO	2013	No	1
2018	482168	1	CHEVROLET	SILVERADO	2016	No	1
2018	482351	1	CHEVROLET	SILVERADO	2016	No	1
2018	482356	1	CHEVROLET	SILVERADO	2014	No	1
2018	482369	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	482561	1	CHEVROLET	SILVERADO	2015	No	1
2018	482576	1	CHEVROLET	SILVERADO	2013	No	1
2018	482592	1	CHEVROLET	SILVERADO	2013	No	1
2018	482623	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	482642	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	482687	1	CHEVROLET	SILVERADO	2016	No	1
2018	482706	1	CHEVROLET	SILVERADO	2015	Yes	2
2018	482707	1	CHEVROLET	SILVERADO	2016	No	1
2018	482759	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	482794	1	CHEVROLET	SILVERADO	2018	Yes	1
2018	482866	1	CHEVROLET	SILVERADO	2018	No	1
2018	483057	1	CHEVROLET	SILVERADO	2017	No	1
2018	483088	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	483226	1	CHEVROLET	SILVERADO	2017	Yes	1
2018	483269	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	483323	1	CHEVROLET	SILVERADO	2014	Yes	1
2018	490245	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	510025	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	510530	1	CHEVROLET	SILVERADO	2015	Yes	1
2018	510576	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	510603	1	CHEVROLET	SILVERADO	2016	No	1
2018	510746	1	CHEVROLET	SILVERADO	2013	Yes	1
2018	530221	1	CHEVROLET	SILVERADO	2015	No	1
2018	540100	1	CHEVROLET	SILVERADO	2016	Yes	1

2018	540135	1	CHEVROLET	SILVERADO	2013	No	1
2018	550024	1	CHEVROLET	SILVERADO	2013	No	1
2018	550430	1	CHEVROLET	SILVERADO	2017	No	1
2018	560009	1	CHEVROLET	SILVERADO	2015	No	1
2019	10046	1	CHEVROLET	SILVERADO	2016	No	1
2019	10098	1	CHEVROLET	SILVERADO	2015	No	1
2019	10171	1	CHEVROLET	SILVERADO	2014	No	1
2019	10265	1	CHEVROLET	SILVERADO	2017	No	1
2019	10314	1	CHEVROLET	SILVERADO	2015	No	1
2019	10682	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	10755	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	10771	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	10859	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	40043	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	40085	1	CHEVROLET	SILVERADO	2015	No	1
2019	40104	1	CHEVROLET	SILVERADO	2015	No	1
2019	40232	1	CHEVROLET	SILVERADO	2013	No	1
2019	40507	1	CHEVROLET	SILVERADO	2016	No	1
2019	40616	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	40737	1	CHEVROLET	SILVERADO	2015	No	1
2019	40758	1	CHEVROLET	SILVERADO	2015	No	1
2019	40894	1	CHEVROLET	SILVERADO	2015	No	1
2019	50037	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	50217	1	CHEVROLET	SILVERADO	2017	No	1
2019	50432	1	CHEVROLET	SILVERADO	2018	No	1
2019	50458	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	50491	1	CHEVROLET	SILVERADO	2017	No	1
2019	60064	1	CHEVROLET	SILVERADO	2014	No	1
2019	60194	1	CHEVROLET	SILVERADO	2017	No	1
2019	60693	1	CHEVROLET	SILVERADO	2013	No	1
2019	61044	1	CHEVROLET	SILVERADO	2016	No	1
2019	61166	1	CHEVROLET	SILVERADO	2018	No	1
2019	61177	1	CHEVROLET	SILVERADO	2014	No	1
2019	61553	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	61694	1	CHEVROLET	SILVERADO	2014	No	1
2019	61773	1	CHEVROLET	SILVERADO	2018	No	1
2019	62044	1	CHEVROLET	SILVERADO	2018	No	1
2019	62477	1	CHEVROLET	SILVERADO	2015	No	1
2019	62531	1	CHEVROLET	SILVERADO	2016	No	1

2019	63015	1	CHEVROLET	SILVERADO	2015	No	1
2019	63069	1	CHEVROLET	SILVERADO	2015	No	1
2019	63102	1	CHEVROLET	SILVERADO	2019	No	1
2019	63216	1	CHEVROLET	SILVERADO	2018	No	1
2019	63292	1	CHEVROLET	SILVERADO	2014	No	1
2019	63375	1	CHEVROLET	SILVERADO	2014	No	1
2019	80177	1	CHEVROLET	SILVERADO	2014	No	1
2019	80328	1	CHEVROLET	SILVERADO	2017	No	1
2019	90208	1	CHEVROLET	SILVERADO	2013	No	1
2019	90211	1	CHEVROLET	SILVERADO	2014	No	1
2019	120154	1	CHEVROLET	SILVERADO	2019	No	1
2019	120376	1	CHEVROLET	SILVERADO	2014	No	1
2019	120416	1	CHEVROLET	SILVERADO	2013	No	1
2019	120523	1	CHEVROLET	SILVERADO	2014	No	1
2019	120615	1	CHEVROLET	SILVERADO	2018	No	1
2019	120657	1	CHEVROLET	SILVERADO	2019	No	1
2019	120692	1	CHEVROLET	SILVERADO	2014	No	1
2019	120737	1	CHEVROLET	SILVERADO	2016	No	1
2019	120809	1	CHEVROLET	SILVERADO	2017	No	1
2019	120890	1	CHEVROLET	SILVERADO	2015	No	1
2019	120898	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	120948	1	CHEVROLET	SILVERADO	2015	No	1
2019	121321	1	CHEVROLET	SILVERADO	2017	No	1
2019	121485	1	CHEVROLET	SILVERADO	2015	No	1
2019	121530	1	CHEVROLET	SILVERADO	2013	No	1
2019	121669	1	CHEVROLET	SILVERADO	2016	No	1
2019	121868	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	122086	1	CHEVROLET	SILVERADO	2016	No	1
2019	122211	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	122251	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	122458	1	CHEVROLET	SILVERADO	2016	No	1
2019	122845	1	CHEVROLET	SILVERADO	2017	No	1
2019	122870	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	122885	1	CHEVROLET	SILVERADO	2015	No	1
2019	123038	1	CHEVROLET	SILVERADO	2016	No	1
2019	130066	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	130125	1	CHEVROLET	SILVERADO	2016	No	1
2019	130146	1	CHEVROLET	SILVERADO	2013	No	1
2019	130356	1	CHEVROLET	SILVERADO	2016	No	1

2019	130498	1	CHEVROLET	SILVERADO	2017	No	1
2019	130612	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	130876	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	130929	1	CHEVROLET	SILVERADO	2016	No	1
2019	131125	1	CHEVROLET	SILVERADO	2014	No	1
2019	131211	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	150099	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	160139	1	CHEVROLET	SILVERADO	2019	No	1
2019	170152	1	CHEVROLET	SILVERADO	2014	No	1
2019	170198	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	170458	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	170879	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	170919	1	CHEVROLET	SILVERADO	2015	No	1
2019	170933	1	CHEVROLET	SILVERADO	2015	No	1
2019	180405	1	CHEVROLET	SILVERADO	2015	No	1
2019	180548	1	CHEVROLET	SILVERADO	2014	No	1
2019	180690	1	CHEVROLET	SILVERADO	2013	No	1
2019	190267	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	190306	1	CHEVROLET	SILVERADO	2019	Yes	1
2019	200070	1	CHEVROLET	SILVERADO	2016	No	1
2019	200141	1	CHEVROLET	SILVERADO	2019	No	1
2019	200158	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	200172	1	CHEVROLET	SILVERADO	2016	No	1
2019	200187	1	CHEVROLET	SILVERADO	2016	No	1
2019	200222	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	210008	1	CHEVROLET	SILVERADO	2015	No	1
2019	210076	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	210323	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	210380	1	CHEVROLET	SILVERADO	2017	No	1
2019	210424	1	CHEVROLET	SILVERADO	2018	No	1
2019	210501	1	CHEVROLET	SILVERADO	2013	No	1
2019	210611	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	220018	1	CHEVROLET	SILVERADO	2014	No	1
2019	220059	1	CHEVROLET	SILVERADO	2013	Yes	2
2019	220072	1	CHEVROLET	SILVERADO	2015	No	1
2019	220131	1	CHEVROLET	SILVERADO	2015	No	1
2019	220157	1	CHEVROLET	SILVERADO	2015	No	1
2019	220290	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	220331	1	CHEVROLET	SILVERADO	2016	No	1

2019	220379	1	CHEVROLET	SILVERADO	2019	No	1
2019	220395	1	CHEVROLET	SILVERADO	2017	No	1
2019	220412	1	CHEVROLET	SILVERADO	2015	No	1
2019	220420	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	220425	1	CHEVROLET	SILVERADO	2017	No	1
2019	220521	1	CHEVROLET	SILVERADO	2019	Yes	1
2019	220536	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	220682	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	230007	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	230045	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	230110	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	230133	1	CHEVROLET	SILVERADO	2016	No	1
2019	240043	1	CHEVROLET	SILVERADO	2013	No	1
2019	240214	1	CHEVROLET	SILVERADO	2014	No	1
2019	240405	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	240481	1	CHEVROLET	SILVERADO	2014	No	1
2019	250179	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	250296	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	260010	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	260280	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	260299	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	260375	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	260471	1	CHEVROLET	SILVERADO	2017	No	1
2019	260504	1	CHEVROLET	SILVERADO	2018	No	1
2019	260533	1	CHEVROLET	SILVERADO	2018	No	1
2019	260620	1	CHEVROLET	SILVERADO	2018	No	1
2019	260633	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	260645	1	CHEVROLET	SILVERADO	2013	No	1
2019	260697	1	CHEVROLET	SILVERADO	2018	No	1
2019	260755	1	CHEVROLET	SILVERADO	2019	No	1
2019	260830	1	CHEVROLET	SILVERADO	2016	No	1
2019	270072	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	270127	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	270315	1	CHEVROLET	SILVERADO	2015	No	1
2019	270322	1	CHEVROLET	SILVERADO	2018	No	1
2019	270324	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	280006	1	CHEVROLET	SILVERADO	2016	No	1
2019	280128	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	280147	1	CHEVROLET	SILVERADO	2018	No	1

2019	280302	1	CHEVROLET	SILVERADO	2016	No	1
2019	280307	1	CHEVROLET	SILVERADO	2014	No	1
2019	280338	1	CHEVROLET	SILVERADO	2018	No	1
2019	280369	1	CHEVROLET	SILVERADO	2018	No	1
2019	280434	1	CHEVROLET	SILVERADO	2014	No	1
2019	280491	1	CHEVROLET	SILVERADO	2017	No	1
2019	290065	1	CHEVROLET	SILVERADO	2018	No	1
2019	290087	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	290235	1	CHEVROLET	SILVERADO	2015	No	1
2019	290472	1	CHEVROLET	SILVERADO	2019	No	1
2019	290524	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	290559	1	CHEVROLET	SILVERADO	2013	No	1
2019	290829	1	CHEVROLET	SILVERADO	2013	No	1
2019	300070	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	310127	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	310130	1	CHEVROLET	SILVERADO	2014	No	1
2019	340339	1	CHEVROLET	SILVERADO	2014	No	1
2019	350045	1	CHEVROLET	SILVERADO	2017	No	1
2019	350133	1	CHEVROLET	SILVERADO	2018	No	1
2019	350140	1	CHEVROLET	SILVERADO	2018	No	1
2019	350176	1	CHEVROLET	SILVERADO	2018	No	1
2019	350177	1	CHEVROLET	SILVERADO	2019	Yes	1
2019	350206	1	CHEVROLET	SILVERADO	2013	No	1
2019	350235	1	CHEVROLET	SILVERADO	2018	No	1
2019	360198	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	360247	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	360255	1	CHEVROLET	SILVERADO	2014	No	1
2019	360367	1	CHEVROLET	SILVERADO	2017	No	1
2019	360422	1	CHEVROLET	SILVERADO	2017	No	1
2019	360566	1	CHEVROLET	SILVERADO	2015	No	1
2019	360576	1	CHEVROLET	SILVERADO	2014	No	1
2019	360698	1	CHEVROLET	SILVERADO	2015	No	1
2019	360893	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	360900	1	CHEVROLET	SILVERADO	2019	Yes	1
2019	370385	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	370543	1	CHEVROLET	SILVERADO	2014	No	1
2019	370564	1	CHEVROLET	SILVERADO	2017	No	1
2019	371246	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	371289	1	CHEVROLET	SILVERADO	2013	Yes	1

2019	371352	1	CHEVROLET	SILVERADO	2015	No	1
2019	380001	1	CHEVROLET	SILVERADO	2013	No	1
2019	380049	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	390107	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	390142	1	CHEVROLET	SILVERADO	2015	No	1
2019	390146	1	CHEVROLET	SILVERADO	2017	No	1
2019	390341	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	390367	1	CHEVROLET	SILVERADO	2013	No	1
2019	390400	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	390475	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	390533	1	CHEVROLET	SILVERADO	2019	No	1
2019	390666	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	390703	1	CHEVROLET	SILVERADO	2019	No	1
2019	390722	1	CHEVROLET	SILVERADO	2019	No	1
2019	391043	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	400150	1	CHEVROLET	SILVERADO	2014	No	1
2019	400153	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	400155	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	400247	1	CHEVROLET	SILVERADO	2014	No	1
2019	400251	1	CHEVROLET	SILVERADO	2018	Yes	2
2019	400268	1	CHEVROLET	SILVERADO	2019	No	1
2019	400281	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	400304	1	CHEVROLET	SILVERADO	2014	No	1
2019	400320	1	CHEVROLET	SILVERADO	2018	No	1
2019	400425	1	CHEVROLET	SILVERADO	2013	No	1
2019	400449	1	CHEVROLET	SILVERADO	2018	No	1
2019	400460	1	CHEVROLET	SILVERADO	2013	No	1
2019	400474	1	CHEVROLET	SILVERADO	2014	No	1
2019	400476	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	400482	1	CHEVROLET	SILVERADO	2013	No	1
2019	410022	1	CHEVROLET	SILVERADO	2013	No	1
2019	420348	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	420436	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	420457	1	CHEVROLET	SILVERADO	2017	No	1
2019	420521	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	420553	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	420615	1	CHEVROLET	SILVERADO	2016	No	1
2019	420640	1	CHEVROLET	SILVERADO	2018	No	1
2019	420728	1	CHEVROLET	SILVERADO	2013	Yes	1

2019	420733	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	420736	1	CHEVROLET	SILVERADO	2016	No	1
2019	420777	1	CHEVROLET	SILVERADO	2018	No	1
2019	420795	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	450072	1	CHEVROLET	SILVERADO	2017	No	1
2019	450208	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	450250	1	CHEVROLET	SILVERADO	2014	No	1
2019	450529	1	CHEVROLET	SILVERADO	2014	No	1
2019	450546	1	CHEVROLET	SILVERADO	2015	No	1
2019	450628	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	450679	1	CHEVROLET	SILVERADO	2018	No	1
2019	450853	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	460072	1	CHEVROLET	SILVERADO	2014	No	1
2019	470025	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	470096	1	CHEVROLET	SILVERADO	2017	No	1
2019	470118	1	CHEVROLET	SILVERADO	2016	No	1
2019	470341	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	470492	1	CHEVROLET	SILVERADO	2015	No	1
2019	470589	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	470674	1	CHEVROLET	SILVERADO	2016	No	1
2019	470900	1	CHEVROLET	SILVERADO	2019	No	1
2019	470990	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	480098	1	CHEVROLET	SILVERADO	2015	No	1
2019	480124	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	480207	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	480210	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	480216	1	CHEVROLET	SILVERADO	2016	No	1
2019	480249	1	CHEVROLET	SILVERADO	2018	No	1
2019	480397	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	480447	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	480571	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	480768	1	CHEVROLET	SILVERADO	2018	No	1
2019	480859	1	CHEVROLET	SILVERADO	2019	No	1
2019	480942	1	CHEVROLET	SILVERADO	2015	No	1
2019	481087	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	481109	1	CHEVROLET	SILVERADO	2018	No	1
2019	481132	1	CHEVROLET	SILVERADO	2017	No	1
2019	481182	1	CHEVROLET	SILVERADO	2016	No	1
2019	481214	1	CHEVROLET	SILVERADO	2013	No	1

2019	481224	1	CHEVROLET	SILVERADO	2015	No	1
2019	481303	1	CHEVROLET	SILVERADO	2015	No	1
2019	481341	1	CHEVROLET	SILVERADO	2015	No	1
2019	481365	1	CHEVROLET	SILVERADO	2018	No	1
2019	481410	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	481447	1	CHEVROLET	SILVERADO	2015	No	1
2019	481501	1	CHEVROLET	SILVERADO	2014	No	1
2019	481611	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	481682	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	481710	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	481747	1	CHEVROLET	SILVERADO	2015	No	1
2019	481813	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	481850	1	CHEVROLET	SILVERADO	2016	No	1
2019	481978	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	482067	1	CHEVROLET	SILVERADO	2019	Yes	1
2019	482090	1	CHEVROLET	SILVERADO	2019	Yes	1
2019	482135	1	CHEVROLET	SILVERADO	2017	No	1
2019	482282	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	482318	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	482340	1	CHEVROLET	SILVERADO	2013	Yes	2
2019	482443	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	482549	1	CHEVROLET	SILVERADO	2018	No	1
2019	482566	1	CHEVROLET	SILVERADO	2013	No	1
2019	482577	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	482581	1	CHEVROLET	SILVERADO	2014	No	1
2019	482598	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	482732	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	482744	1	CHEVROLET	SILVERADO	2015	No	1
2019	482809	1	CHEVROLET	SILVERADO	2017	No	1
2019	482879	1	CHEVROLET	SILVERADO	2014	No	1
2019	482895	1	CHEVROLET	SILVERADO	2016	No	1
2019	482896	1	CHEVROLET	SILVERADO	2015	No	1
2019	482964	1	CHEVROLET	SILVERADO	2018	No	1
2019	482969	1	CHEVROLET	SILVERADO	2018	No	1
2019	482979	1	CHEVROLET	SILVERADO	2015	No	1
2019	482980	1	CHEVROLET	SILVERADO	2014	No	1
2019	483078	1	CHEVROLET	SILVERADO	2017	No	1
2019	483082	1	CHEVROLET	SILVERADO	2014	No	1
2019	483096	1	CHEVROLET	SILVERADO	2013	No	1

2019	483104	1	CHEVROLET	SILVERADO	2017	No	1
2019	483201	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	483215	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	483247	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	483291	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	483366	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	490033	1	CHEVROLET	SILVERADO	2014	No	1
2019	500009	1	CHEVROLET	SILVERADO	2018	Yes	1
2019	500010	1	CHEVROLET	SILVERADO	2014	No	1
2019	510150	1	CHEVROLET	SILVERADO	2016	No	1
2019	510217	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	510272	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	510488	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	510493	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	510558	1	CHEVROLET	SILVERADO	2015	Yes	1
2019	510661	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	510724	1	CHEVROLET	SILVERADO	2016	No	1
2019	510745	1	CHEVROLET	SILVERADO	2015	No	1
2019	510748	1	CHEVROLET	SILVERADO	2016	No	1
2019	530307	1	CHEVROLET	SILVERADO	2017	No	1
2019	530376	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	530452	1	CHEVROLET	SILVERADO	2019	Yes	1
2019	540201	1	CHEVROLET	SILVERADO	2013	No	1
2019	540228	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	550038	1	CHEVROLET	SILVERADO	2015	No	1
2019	550059	1	CHEVROLET	SILVERADO	2016	Yes	1
2019	550108	1	CHEVROLET	SILVERADO	2014	Yes	1
2019	550166	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	550205	1	CHEVROLET	SILVERADO	2015	No	1
2019	550255	1	CHEVROLET	SILVERADO	2018	No	1
2019	550309	1	CHEVROLET	SILVERADO	2014	No	1
2019	550347	1	CHEVROLET	SILVERADO	2017	Yes	1
2019	550392	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	550478	1	CHEVROLET	SILVERADO	2013	Yes	1
2019	560109	1	CHEVROLET	SILVERADO	2014	Yes	1

APPENDIX C

C.1 (Chevrolet Equinox Data Collection)

Table 23. Chevrolet Equinox Data Collection for LKAS

Crash Year	Vehicle Number	Make	Model	Model Year	Ran-Off-Road	Number of Subject Vehicles Involved
2010	1	CHEVROLET	EQUINOX	2009	No	1
2010	1	CHEVROLET	EQUINOX	2009	No	1
2010	1	CHEVROLET	EQUINOX	2009	No	1
2010	1	CHEVROLET	EQUINOX	2009	Yes	1
2010	1	CHEVROLET	EQUINOX	2010	No	1
2010	1	CHEVROLET	EQUINOX	2010	No	1
2010	1	CHEVROLET	EQUINOX	2010	No	1
2010	1	CHEVROLET	EQUINOX	2010	No	1
2010	1	CHEVROLET	EQUINOX	2010	No	1
2010	1	CHEVROLET	EQUINOX	2010	No	1
2010	1	CHEVROLET	EQUINOX	2010	No	1
2010	1	CHEVROLET	EQUINOX	2010	No	1
2010	1	CHEVROLET	EQUINOX	2011	Yes	1
2011	1	CHEVROLET	EQUINOX	2009	No	1
2011	1	CHEVROLET	EQUINOX	2009	No	1
2011	1	CHEVROLET	EQUINOX	2009	Yes	1
2011	1	CHEVROLET	EQUINOX	2010	No	1
2011	1	CHEVROLET	EQUINOX	2010	No	1
2011	1	CHEVROLET	EQUINOX	2010	No	1
2011	1	CHEVROLET	EQUINOX	2011	No	1
2011	1	CHEVROLET	EQUINOX	2011	No	1
2011	1	CHEVROLET	EQUINOX	2011	Yes	1
2011	1	CHEVROLET	EQUINOX	2011	No	1
2011	1	CHEVROLET	EQUINOX	2011	No	1
2011	1	CHEVROLET	EQUINOX	2011	Yes	1
2011	1	CHEVROLET	EQUINOX	2012	Yes	1
2012	1	CHEVROLET	EQUINOX	2009	Yes	1
2012	1	CHEVROLET	EQUINOX	2009	Yes	1
2012	1	CHEVROLET	EQUINOX	2010	Yes	1
2012	1	CHEVROLET	EQUINOX	2010	Yes	1

2012	1	CHEVROLET	EQUINOX	2010	No	1
2012	1	CHEVROLET	EQUINOX	2010	No	1
2012	1	CHEVROLET	EQUINOX	2010	No	1
2012	1	CHEVROLET	EQUINOX	2010	No	1
2012	1	CHEVROLET	EQUINOX	2011	Yes	1
2012	1	CHEVROLET	EQUINOX	2011	No	1
2012	1	CHEVROLET	EQUINOX	2011	No	1
2012	1	CHEVROLET	EQUINOX	2011	No	1
2012	1	CHEVROLET	EQUINOX	2011	No	1
2012	1	CHEVROLET	EQUINOX	2011	No	1
2012	1	CHEVROLET	EQUINOX	2011	Yes	1
2012	1	CHEVROLET	EQUINOX	2012	Yes	1
2012	1	CHEVROLET	EQUINOX	2012	No	1
2012	1	CHEVROLET	EQUINOX	2012	Yes	1
2012	1	CHEVROLET	EQUINOX	2012	No	1
2012	1	CHEVROLET	EQUINOX	2012	No	1
2012	1	CHEVROLET	EQUINOX	2012	Yes	1
2012	1	CHEVROLET	EQUINOX	2012	Yes	1
2012	1	CHEVROLET	EQUINOX	2012	Yes	1
2012	1	CHEVROLET	EQUINOX	2012	No	1
2012	1	CHEVROLET	EQUINOX	2012	Yes	1
2012	1	CHEVROLET	EQUINOX	2012	Yes	1
2012	1	CHEVROLET	EQUINOX	2012	No	1
2012	1	CHEVROLET	EQUINOX	2012	No	1
2012	1	CHEVROLET	EQUINOX	2013	Yes	1
2013	1	CHEVROLET	EQUINOX	2009	Yes	1
2013	1	CHEVROLET	EQUINOX	2010	No	1
2013	1	CHEVROLET	EQUINOX	2010	No	1
2013	1	CHEVROLET	EQUINOX	2010	No	1
2013	1	CHEVROLET	EQUINOX	2010	Yes	1
2013	1	CHEVROLET	EQUINOX	2010	Yes	1
2013	1	CHEVROLET	EQUINOX	2010	No	1
2013	1	CHEVROLET	EQUINOX	2010	Yes	1
2013	1	CHEVROLET	EQUINOX	2010	No	1
2013	1	CHEVROLET	EQUINOX	2011	No	1
2013	1	CHEVROLET	EQUINOX	2011	No	1
2013	1	CHEVROLET	EQUINOX	2011	No	1
2013	1	CHEVROLET	EQUINOX	2011	Yes	1
2013	1	CHEVROLET	EQUINOX	2012	Yes	1

2013	1	CHEVROLET	EQUINOX	2012	Yes	1
2013	1	CHEVROLET	EQUINOX	2012	Yes	1
2013	1	CHEVROLET	EQUINOX	2012	No	1
2013	1	CHEVROLET	EQUINOX	2012	No	1
2013	1	CHEVROLET	EQUINOX	2012	Yes	1
2013	1	CHEVROLET	EQUINOX	2012	No	1
2013	1	CHEVROLET	EQUINOX	2012	Yes	1
2013	1	CHEVROLET	EQUINOX	2012	Yes	1
2013	1	CHEVROLET	EQUINOX	2012	Yes	1
2013	1	CHEVROLET	EQUINOX	2012	No	1
2013	1	CHEVROLET	EQUINOX	2012	No	1
2013	1	CHEVROLET	EQUINOX	2012	Yes	1
2013	1	CHEVROLET	EQUINOX	2012	Yes	1
2013	1	CHEVROLET	EQUINOX	2012	No	1
2013	1	CHEVROLET	EQUINOX	2013	Yes	1
2013	1	CHEVROLET	EQUINOX	2013	No	1
2013	1	CHEVROLET	EQUINOX	2013	No	1
2013	1	CHEVROLET	EQUINOX	2013	No	1
2013	1	CHEVROLET	EQUINOX	2013	Yes	1
2013	1	CHEVROLET	EQUINOX	2013	No	1
2013	1	CHEVROLET	EQUINOX	2013	Yes	1
2013	1	CHEVROLET	EQUINOX	2013	Yes	1
2013	1	CHEVROLET	EQUINOX	2013	No	1
2013	1	CHEVROLET	EQUINOX	2013	No	1
2013	1	CHEVROLET	EQUINOX	2013	No	1
2013	1	CHEVROLET	EQUINOX	2013	Yes	1
2014	1	CHEVROLET	EQUINOX	2009	No	1
2014	1	CHEVROLET	EQUINOX	2009	No	1
2014	1	CHEVROLET	EQUINOX	2009	Yes	1
2014	1	CHEVROLET	EQUINOX	2009	No	1
2014	1	CHEVROLET	EQUINOX	2009	Yes	1
2014	1	CHEVROLET	EQUINOX	2009	No	1
2014	1	CHEVROLET	EQUINOX	2010	No	1
2014	1	CHEVROLET	EQUINOX	2010	Yes	1
2014	1	CHEVROLET	EQUINOX	2010	No	1
2014	1	CHEVROLET	EQUINOX	2010	Yes	1
2014	1	CHEVROLET	EQUINOX	2011	Yes	1
2014	1	CHEVROLET	EQUINOX	2011	No	1
2014	1	CHEVROLET	EQUINOX	2011	Yes	1

2014	1	CHEVROLET	EQUINOX	2011	No	1
2014	1	CHEVROLET	EQUINOX	2011	No	1
2014	1	CHEVROLET	EQUINOX	2011	No	1
2014	1	CHEVROLET	EQUINOX	2011	No	1
2014	1	CHEVROLET	EQUINOX	2011	No	1
2014	1	CHEVROLET	EQUINOX	2011	Yes	1
2014	1	CHEVROLET	EQUINOX	2011	No	1
2014	1	CHEVROLET	EQUINOX	2011	Yes	1
2014	1	CHEVROLET	EQUINOX	2012	No	1
2014	1	CHEVROLET	EQUINOX	2012	No	1
2014	1	CHEVROLET	EQUINOX	2012	Yes	1
2014	1	CHEVROLET	EQUINOX	2012	No	1
2014	1	CHEVROLET	EQUINOX	2012	Yes	1
2014	1	CHEVROLET	EQUINOX	2012	No	1
2014	1	CHEVROLET	EQUINOX	2012	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	Yes	1
2014	1	CHEVROLET	EQUINOX	2013	Yes	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	Yes	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	Yes	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	No	1
2014	1	CHEVROLET	EQUINOX	2013	Yes	1
2014	1	CHEVROLET	EQUINOX	2014	No	1
2014	1	CHEVROLET	EQUINOX	2014	No	1
2014	1	CHEVROLET	EQUINOX	2014	Yes	1
2014	1	CHEVROLET	EQUINOX	2014	No	1
2014	1	CHEVROLET	EQUINOX	2014	No	1

2014	1	CHEVROLET	EQUINOX	2014	No	1
2015	1	CHEVROLET	EQUINOX	2010	No	1
2015	1	CHEVROLET	EQUINOX	2010	No	1
2015	1	CHEVROLET	EQUINOX	2010	No	1
2015	1	CHEVROLET	EQUINOX	2010	No	1
2015	1	CHEVROLET	EQUINOX	2010	Yes	1
2015	1	CHEVROLET	EQUINOX	2010	No	1
2015	1	CHEVROLET	EQUINOX	2011	No	1
2015	1	CHEVROLET	EQUINOX	2011	Yes	1
2015	1	CHEVROLET	EQUINOX	2011	No	1
2015	1	CHEVROLET	EQUINOX	2011	No	1
2015	1	CHEVROLET	EQUINOX	2011	No	1
2015	1	CHEVROLET	EQUINOX	2011	No	1
2015	1	CHEVROLET	EQUINOX	2011	No	1
2015	1	CHEVROLET	EQUINOX	2012	No	1
2015	1	CHEVROLET	EQUINOX	2012	Yes	1
2015	1	CHEVROLET	EQUINOX	2012	No	1
2015	1	CHEVROLET	EQUINOX	2012	Yes	1
2015	1	CHEVROLET	EQUINOX	2012	No	1
2015	1	CHEVROLET	EQUINOX	2012	No	1
2015	1	CHEVROLET	EQUINOX	2012	Yes	1
2015	1	CHEVROLET	EQUINOX	2012	No	1
2015	1	CHEVROLET	EQUINOX	2012	Yes	1
2015	1	CHEVROLET	EQUINOX	2012	No	1
2015	1	CHEVROLET	EQUINOX	2012	Yes	1
2015	1	CHEVROLET	EQUINOX	2012	No	1
2015	1	CHEVROLET	EQUINOX	2012	No	1
2015	1	CHEVROLET	EQUINOX	2012	No	1
2015	1	CHEVROLET	EQUINOX	2013	No	1
2015	1	CHEVROLET	EQUINOX	2013	No	1
2015	1	CHEVROLET	EQUINOX	2013	Yes	1
2015	1	CHEVROLET	EQUINOX	2013	Yes	1
2015	1	CHEVROLET	EQUINOX	2013	No	1
2015	1	CHEVROLET	EQUINOX	2013	Yes	1
2015	1	CHEVROLET	EQUINOX	2013	No	1
2015	1	CHEVROLET	EQUINOX	2013	No	1
2015	1	CHEVROLET	EQUINOX	2013	Yes	1
2015	1	CHEVROLET	EQUINOX	2013	No	1
2015	1	CHEVROLET	EQUINOX	2013	No	1

2015	1	CHEVROLET	EQUINOX	2014	No	1
2015	1	CHEVROLET	EQUINOX	2014	No	1
2015	1	CHEVROLET	EQUINOX	2014	No	1
2015	1	CHEVROLET	EQUINOX	2014	Yes	1
2015	1	CHEVROLET	EQUINOX	2014	No	1
2015	1	CHEVROLET	EQUINOX	2014	Yes	1
2015	1	CHEVROLET	EQUINOX	2014	Yes	1
2015	1	CHEVROLET	EQUINOX	2015	No	1
2015	1	CHEVROLET	EQUINOX	2015	No	1
2015	1	CHEVROLET	EQUINOX	2015	No	1
2015	1	CHEVROLET	EQUINOX	2015	No	1
2015	1	CHEVROLET	EQUINOX	2015	No	1
2015	1	CHEVROLET	EQUINOX	2015	Yes	1
2015	1	CHEVROLET	EQUINOX	2015	No	1
2015	1	CHEVROLET	EQUINOX	2015	No	1
2015	1	CHEVROLET	EQUINOX	2015	No	1
2015	1	CHEVROLET	EQUINOX	2015	Yes	1
2015	1	CHEVROLET	EQUINOX	2015	Yes	1
2015	1	CHEVROLET	EQUINOX	2015	Yes	1
2015	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2009	Yes	1
2016	1	CHEVROLET	EQUINOX	2009	No	1
2016	1	CHEVROLET	EQUINOX	2009	Yes	1
2016	1	CHEVROLET	EQUINOX	2009	Yes	1
2016	1	CHEVROLET	EQUINOX	2010	Yes	1
2016	1	CHEVROLET	EQUINOX	2010	No	1
2016	1	CHEVROLET	EQUINOX	2010	Yes	1
2016	1	CHEVROLET	EQUINOX	2010	No	1
2016	1	CHEVROLET	EQUINOX	2010	Yes	1
2016	1	CHEVROLET	EQUINOX	2010	No	1
2016	1	CHEVROLET	EQUINOX	2010	Yes	1
2016	1	CHEVROLET	EQUINOX	2010	No	1
2016	1	CHEVROLET	EQUINOX	2010	Yes	1
2016	1	CHEVROLET	EQUINOX	2010	No	1
2016	1	CHEVROLET	EQUINOX	2010	Yes	1
2016	1	CHEVROLET	EQUINOX	2011	Yes	1
2016	1	CHEVROLET	EQUINOX	2011	No	1
2016	1	CHEVROLET	EQUINOX	2011	No	1
2016	1	CHEVROLET	EQUINOX	2011	No	1

2016	1	CHEVROLET	EQUINOX	2011	No	1
2016	1	CHEVROLET	EQUINOX	2011	Yes	1
2016	1	CHEVROLET	EQUINOX	2011	No	1
2016	1	CHEVROLET	EQUINOX	2011	Yes	1
2016	1	CHEVROLET	EQUINOX	2011	No	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	Yes	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	Yes	1
2016	1	CHEVROLET	EQUINOX	2012	Yes	1
2016	1	CHEVROLET	EQUINOX	2012	Yes	1
2016	1	CHEVROLET	EQUINOX	2012	Yes	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	Yes	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	Yes	1
2016	1	CHEVROLET	EQUINOX	2012	No	1
2016	1	CHEVROLET	EQUINOX	2012	Yes	1
2016	1	CHEVROLET	EQUINOX	2013	Yes	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	Yes	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2013	No	1
2016	1	CHEVROLET	EQUINOX	2014	No	1

2016	1	CHEVROLET	EQUINOX	2014	No	1
2016	1	CHEVROLET	EQUINOX	2014	Yes	1
2016	1	CHEVROLET	EQUINOX	2014	Yes	1
2016	1	CHEVROLET	EQUINOX	2014	No	1
2016	1	CHEVROLET	EQUINOX	2014	Yes	1
2016	1	CHEVROLET	EQUINOX	2014	Yes	1
2016	1	CHEVROLET	EQUINOX	2014	No	1
2016	1	CHEVROLET	EQUINOX	2014	No	1
2016	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2015	Yes	1
2016	1	CHEVROLET	EQUINOX	2015	Yes	1
2016	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2015	Yes	1
2016	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2015	Yes	1
2016	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2015	Yes	1
2016	1	CHEVROLET	EQUINOX	2015	Yes	1
2016	1	CHEVROLET	EQUINOX	2015	No	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2016	Yes	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2016	Yes	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2016	No	1
2016	1	CHEVROLET	EQUINOX	2017	Yes	1
2017	1	CHEVROLET	EQUINOX	2009	No	1
2017	1	CHEVROLET	EQUINOX	2009	Yes	1
2017	1	CHEVROLET	EQUINOX	2009	Yes	1

2017	1	CHEVROLET	EQUINOX	2010	No	1
2017	1	CHEVROLET	EQUINOX	2010	No	1
2017	1	CHEVROLET	EQUINOX	2010	No	1
2017	1	CHEVROLET	EQUINOX	2010	No	1
2017	1	CHEVROLET	EQUINOX	2011	No	1
2017	1	CHEVROLET	EQUINOX	2011	No	1
2017	1	CHEVROLET	EQUINOX	2011	No	1
2017	1	CHEVROLET	EQUINOX	2011	Yes	1
2017	1	CHEVROLET	EQUINOX	2011	Yes	1
2017	1	CHEVROLET	EQUINOX	2011	No	1
2017	1	CHEVROLET	EQUINOX	2011	No	1
2017	1	CHEVROLET	EQUINOX	2011	No	1
2017	1	CHEVROLET	EQUINOX	2011	No	1
2017	1	CHEVROLET	EQUINOX	2012	No	1
2017	1	CHEVROLET	EQUINOX	2012	No	1
2017	1	CHEVROLET	EQUINOX	2012	No	1
2017	1	CHEVROLET	EQUINOX	2012	No	1
2017	1	CHEVROLET	EQUINOX	2012	No	1
2017	1	CHEVROLET	EQUINOX	2012	No	1
2017	1	CHEVROLET	EQUINOX	2012	No	1
2017	1	CHEVROLET	EQUINOX	2012	Yes	1
2017	1	CHEVROLET	EQUINOX	2012	No	1
2017	1	CHEVROLET	EQUINOX	2012	Yes	1
2017	1	CHEVROLET	EQUINOX	2012	Yes	1
2017	1	CHEVROLET	EQUINOX	2012	Yes	1
2017	1	CHEVROLET	EQUINOX	2012	Yes	1
2017	1	CHEVROLET	EQUINOX	2012	No	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	No	1
2017	1	CHEVROLET	EQUINOX	2013	No	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	No	1
2017	1	CHEVROLET	EQUINOX	2013	No	1

2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	No	1
2017	1	CHEVROLET	EQUINOX	2013	No	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2013	Yes	1
2017	1	CHEVROLET	EQUINOX	2014	No	1
2017	1	CHEVROLET	EQUINOX	2014	No	1
2017	1	CHEVROLET	EQUINOX	2014	Yes	1
2017	1	CHEVROLET	EQUINOX	2014	Yes	1
2017	1	CHEVROLET	EQUINOX	2014	Yes	1
2017	1	CHEVROLET	EQUINOX	2014	No	1
2017	1	CHEVROLET	EQUINOX	2014	Yes	1
2017	1	CHEVROLET	EQUINOX	2014	Yes	1
2017	1	CHEVROLET	EQUINOX	2014	No	1
2017	1	CHEVROLET	EQUINOX	2014	No	1
2017	1	CHEVROLET	EQUINOX	2014	Yes	1
2017	1	CHEVROLET	EQUINOX	2014	No	1
2017	1	CHEVROLET	EQUINOX	2014	Yes	1
2017	1	CHEVROLET	EQUINOX	2014	Yes	1
2017	1	CHEVROLET	EQUINOX	2014	No	1
2017	1	CHEVROLET	EQUINOX	2015	Yes	1
2017	1	CHEVROLET	EQUINOX	2015	Yes	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	Yes	1
2017	1	CHEVROLET	EQUINOX	2015	Yes	1
2017	1	CHEVROLET	EQUINOX	2015	Yes	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	Yes	1
2017	1	CHEVROLET	EQUINOX	2015	Yes	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	Yes	1
2017	1	CHEVROLET	EQUINOX	2015	No	1
2017	1	CHEVROLET	EQUINOX	2015	No	1

2017	1	CHEVROLET	EQUINOX	2016	No	1
2017	1	CHEVROLET	EQUINOX	2016	No	1
2017	1	CHEVROLET	EQUINOX	2016	No	1
2017	1	CHEVROLET	EQUINOX	2016	No	1
2017	1	CHEVROLET	EQUINOX	2016	No	1
2017	1	CHEVROLET	EQUINOX	2016	No	1
2017	1	CHEVROLET	EQUINOX	2016	No	1
2017	1	CHEVROLET	EQUINOX	2016	No	1
2017	1	CHEVROLET	EQUINOX	2016	No	1
2017	1	CHEVROLET	EQUINOX	2016	No	2
2017	1	CHEVROLET	EQUINOX	2017	No	1
2017	1	CHEVROLET	EQUINOX	2017	No	1
2017	1	CHEVROLET	EQUINOX	2017	Yes	1
2017	1	CHEVROLET	EQUINOX	2018	Yes	1
2017	1	CHEVROLET	EQUINOX	2018	Yes	1
2017	1	CHEVROLET	EQUINOX	2018	No	1
2017	1	CHEVROLET	EQUINOX	2018	No	1
2017	1	CHEVROLET	EQUINOX	2018	No	1
2017	1	CHEVROLET	EQUINOX	2018	Yes	1
2017	1	CHEVROLET	EQUINOX	2018	No	1
2017	1	CHEVROLET	EQUINOX	2018	Yes	1
2017	1	CHEVROLET	EQUINOX	2018	Yes	1
2018	1	CHEVROLET	EQUINOX	2009	Yes	1
2018	1	CHEVROLET	EQUINOX	2010	No	1
2018	1	CHEVROLET	EQUINOX	2010	No	1
2018	1	CHEVROLET	EQUINOX	2010	No	1
2018	1	CHEVROLET	EQUINOX	2010	Yes	1
2018	1	CHEVROLET	EQUINOX	2010	Yes	1
2018	1	CHEVROLET	EQUINOX	2010	No	1
2018	1	CHEVROLET	EQUINOX	2011	No	1
2018	1	CHEVROLET	EQUINOX	2011	Yes	1
2018	1	CHEVROLET	EQUINOX	2011	Yes	1
2018	1	CHEVROLET	EQUINOX	2011	No	1
2018	1	CHEVROLET	EQUINOX	2011	No	1
2018	1	CHEVROLET	EQUINOX	2011	Yes	1
2018	1	CHEVROLET	EQUINOX	2011	Yes	1
2018	1	CHEVROLET	EQUINOX	2011	No	1
2018	1	CHEVROLET	EQUINOX	2011	Yes	1
2018	1	CHEVROLET	EQUINOX	2011	No	1

2018	1	CHEVROLET	EQUINOX	2011	No	1
2018	1	CHEVROLET	EQUINOX	2011	Yes	1
2018	1	CHEVROLET	EQUINOX	2011	Yes	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	Yes	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	Yes	1
2018	1	CHEVROLET	EQUINOX	2012	Yes	2
2018	1	CHEVROLET	EQUINOX	2012	Yes	1
2018	1	CHEVROLET	EQUINOX	2012	Yes	1
2018	1	CHEVROLET	EQUINOX	2012	Yes	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	Yes	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	Yes	1
2018	1	CHEVROLET	EQUINOX	2012	Yes	1
2018	1	CHEVROLET	EQUINOX	2012	No	1
2018	1	CHEVROLET	EQUINOX	2012	Yes	1
2018	1	CHEVROLET	EQUINOX	2013	Yes	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2013	Yes	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2013	Yes	1
2018	1	CHEVROLET	EQUINOX	2013	Yes	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2013	No	1

2018	1	CHEVROLET	EQUINOX	2013	Yes	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2013	No	1
2018	1	CHEVROLET	EQUINOX	2014	No	1
2018	1	CHEVROLET	EQUINOX	2014	No	1
2018	1	CHEVROLET	EQUINOX	2014	No	1
2018	1	CHEVROLET	EQUINOX	2014	No	1
2018	1	CHEVROLET	EQUINOX	2014	Yes	1
2018	1	CHEVROLET	EQUINOX	2014	Yes	1
2018	1	CHEVROLET	EQUINOX	2014	Yes	1
2018	1	CHEVROLET	EQUINOX	2014	No	1
2018	1	CHEVROLET	EQUINOX	2014	No	1
2018	1	CHEVROLET	EQUINOX	2014	Yes	1
2018	1	CHEVROLET	EQUINOX	2014	Yes	1
2018	1	CHEVROLET	EQUINOX	2014	No	1
2018	1	CHEVROLET	EQUINOX	2015	Yes	1
2018	1	CHEVROLET	EQUINOX	2015	No	1
2018	1	CHEVROLET	EQUINOX	2015	Yes	1
2018	1	CHEVROLET	EQUINOX	2015	Yes	1
2018	1	CHEVROLET	EQUINOX	2015	No	1
2018	1	CHEVROLET	EQUINOX	2015	No	1
2018	1	CHEVROLET	EQUINOX	2015	No	1
2018	1	CHEVROLET	EQUINOX	2015	Yes	1
2018	1	CHEVROLET	EQUINOX	2015	No	1
2018	1	CHEVROLET	EQUINOX	2015	Yes	1
2018	1	CHEVROLET	EQUINOX	2015	No	1
2018	1	CHEVROLET	EQUINOX	2015	Yes	1
2018	1	CHEVROLET	EQUINOX	2015	Yes	1
2018	1	CHEVROLET	EQUINOX	2015	Yes	1
2018	1	CHEVROLET	EQUINOX	2015	Yes	1
2018	1	CHEVROLET	EQUINOX	2016	No	1
2018	1	CHEVROLET	EQUINOX	2016	No	1
2018	1	CHEVROLET	EQUINOX	2016	No	1
2018	1	CHEVROLET	EQUINOX	2016	No	1
2018	1	CHEVROLET	EQUINOX	2016	Yes	1
2018	1	CHEVROLET	EQUINOX	2016	Yes	1
2018	1	CHEVROLET	EQUINOX	2016	No	1
2018	1	CHEVROLET	EQUINOX	2016	No	1

2018	1	CHEVROLET	EQUINOX	2016	No	1
2018	1	CHEVROLET	EQUINOX	2016	No	1
2018	1	CHEVROLET	EQUINOX	2016	No	1
2018	1	CHEVROLET	EQUINOX	2017	No	1
2018	1	CHEVROLET	EQUINOX	2017	Yes	1
2018	1	CHEVROLET	EQUINOX	2017	No	1
2018	1	CHEVROLET	EQUINOX	2017	Yes	1
2018	1	CHEVROLET	EQUINOX	2017	Yes	1
2018	1	CHEVROLET	EQUINOX	2017	Yes	1
2018	1	CHEVROLET	EQUINOX	2017	No	1
2018	1	CHEVROLET	EQUINOX	2017	No	1
2018	1	CHEVROLET	EQUINOX	2017	No	1
2018	1	CHEVROLET	EQUINOX	2017	No	1
2018	1	CHEVROLET	EQUINOX	2018	No	1
2018	1	CHEVROLET	EQUINOX	2018	Yes	1
2018	1	CHEVROLET	EQUINOX	2018	No	1
2018	1	CHEVROLET	EQUINOX	2018	No	1
2018	1	CHEVROLET	EQUINOX	2018	No	1
2018	1	CHEVROLET	EQUINOX	2018	Yes	1
2018	1	CHEVROLET	EQUINOX	2018	No	1
2018	1	CHEVROLET	EQUINOX	2018	No	1
2018	1	CHEVROLET	EQUINOX	2018	Yes	1
2018	1	CHEVROLET	EQUINOX	2018	Yes	1
2018	1	CHEVROLET	EQUINOX	2018	No	1
2018	1	CHEVROLET	EQUINOX	2018	Yes	1
2018	1	CHEVROLET	EQUINOX	2018	Yes	1
2018	1	CHEVROLET	EQUINOX	2018	Yes	1
2018	1	CHEVROLET	EQUINOX	2018	Yes	1
2018	1	CHEVROLET	EQUINOX	2018	No	1
2019	1	CHEVROLET	EQUINOX	2009	No	1
2019	1	CHEVROLET	EQUINOX	2009	No	1
2019	1	CHEVROLET	EQUINOX	2010	Yes	1
2019	1	CHEVROLET	EQUINOX	2010	Yes	1
2019	1	CHEVROLET	EQUINOX	2010	No	1
2019	1	CHEVROLET	EQUINOX	2010	Yes	1
2019	1	CHEVROLET	EQUINOX	2010	No	1
2019	1	CHEVROLET	EQUINOX	2010	No	1
2019	1	CHEVROLET	EQUINOX	2010	Yes	1
2019	1	CHEVROLET	EQUINOX	2010	Yes	1

2019	1	CHEVROLET	EQUINOX	2011	No	1
2019	1	CHEVROLET	EQUINOX	2011	Yes	1
2019	1	CHEVROLET	EQUINOX	2011	Yes	1
2019	1	CHEVROLET	EQUINOX	2011	No	1
2019	1	CHEVROLET	EQUINOX	2011	Yes	1
2019	1	CHEVROLET	EQUINOX	2011	No	1
2019	1	CHEVROLET	EQUINOX	2011	Yes	1
2019	1	CHEVROLET	EQUINOX	2011	No	1
2019	1	CHEVROLET	EQUINOX	2011	Yes	1
2019	1	CHEVROLET	EQUINOX	2011	Yes	1
2019	1	CHEVROLET	EQUINOX	2011	No	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	Yes	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	Yes	1
2019	1	CHEVROLET	EQUINOX	2012	Yes	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	No	1
2019	1	CHEVROLET	EQUINOX	2012	Yes	1
2019	1	CHEVROLET	EQUINOX	2012	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	No	1

2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	No	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2013	Yes	1
2019	1	CHEVROLET	EQUINOX	2014	Yes	1
2019	1	CHEVROLET	EQUINOX	2014	No	1
2019	1	CHEVROLET	EQUINOX	2014	Yes	1
2019	1	CHEVROLET	EQUINOX	2014	No	1
2019	1	CHEVROLET	EQUINOX	2014	Yes	1
2019	1	CHEVROLET	EQUINOX	2014	No	1
2019	1	CHEVROLET	EQUINOX	2014	No	1
2019	1	CHEVROLET	EQUINOX	2014	No	1
2019	1	CHEVROLET	EQUINOX	2014	No	1
2019	1	CHEVROLET	EQUINOX	2014	No	1
2019	1	CHEVROLET	EQUINOX	2014	No	1
2019	1	CHEVROLET	EQUINOX	2014	Yes	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	Yes	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	Yes	1
2019	1	CHEVROLET	EQUINOX	2015	Yes	1
2019	1	CHEVROLET	EQUINOX	2015	Yes	1
2019	1	CHEVROLET	EQUINOX	2015	Yes	1
2019	1	CHEVROLET	EQUINOX	2015	Yes	1
2019	1	CHEVROLET	EQUINOX	2015	No	1

2019	1	CHEVROLET	EQUINOX	2015	Yes	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	Yes	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2015	No	1
2019	1	CHEVROLET	EQUINOX	2016	No	1
2019	1	CHEVROLET	EQUINOX	2016	No	1
2019	1	CHEVROLET	EQUINOX	2016	Yes	1
2019	1	CHEVROLET	EQUINOX	2016	No	1
2019	1	CHEVROLET	EQUINOX	2016	No	1
2019	1	CHEVROLET	EQUINOX	2016	No	1
2019	1	CHEVROLET	EQUINOX	2016	No	1
2019	1	CHEVROLET	EQUINOX	2016	No	1
2019	1	CHEVROLET	EQUINOX	2016	Yes	1
2019	1	CHEVROLET	EQUINOX	2016	No	1
2019	1	CHEVROLET	EQUINOX	2016	Yes	1
2019	1	CHEVROLET	EQUINOX	2016	No	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1

2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2017	Yes	1
2019	1	CHEVROLET	EQUINOX	2017	No	1
2019	1	CHEVROLET	EQUINOX	2018	Yes	1
2019	1	CHEVROLET	EQUINOX	2018	No	1
2019	1	CHEVROLET	EQUINOX	2018	No	1
2019	1	CHEVROLET	EQUINOX	2018	Yes	1
2019	1	CHEVROLET	EQUINOX	2018	Yes	1
2019	1	CHEVROLET	EQUINOX	2018	No	1
2019	1	CHEVROLET	EQUINOX	2018	No	1
2019	1	CHEVROLET	EQUINOX	2018	Yes	1
2019	1	CHEVROLET	EQUINOX	2018	No	1
2019	1	CHEVROLET	EQUINOX	2018	Yes	1
2019	1	CHEVROLET	EQUINOX	2018	Yes	1
2019	1	CHEVROLET	EQUINOX	2018	Yes	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	Yes	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	Yes	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	Yes	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	No	1
2019	1	CHEVROLET	EQUINOX	2019	No	1

APPENDIX D

D.1 (Chevrolet Equinox Data Collection)

Table 24. Chevrolet Equinox Data Collection for FCWS

Crash Year/Vehicle Model Year		Number
2011	2009	1
	Total	1
2013	2010	1
	2011	1
	2013	1
	Total	3
2014	2009	1
	2011	1
	2014	1
	Total	3
2015	2011	1
	2013	1
	2014	1
	2015	3
	Total	6
2016	2010	1
	2012	1
	2015	2
	Total	4
2017	2010	1
	2011	1
	2013	1
	2015	2
	2016	2
	Total	7
2018	2010	1
	2012	1
	2015	2
	2016	1

	2017	1
	2018	3
	Total	9
2019	2010	1
	2011	1
	2013	2
	2014	1
	2015	1
	2017	1
	2018	1
	Total	8
2009-2019	2009	2
	2010	5
	2011	5
	2012	2
	2013	5
	2014	3
	2015	10
	2016	3
	2017	2
	2018	4
	Total	41

APPENDIX E

E.1 (Chevrolet Traverse Data Collection)

Table 25. Chevrolet Traverse Data Collection for FCWS

Crash Year/Vehicle Model Year		Number
2010	2009	1
	Total	1
2011	2010	1
	2012	1
	Total	2
2013	2013	1
	Total	1
2014	2014	1
	Total	1
2015	2014	1
	2015	1
	Total	2
2016	2011	1
	2012	1
	2015	2
	2016	1
	Total	5
2017	2010	2
	2012	1
	2016	1
	Total	4
2018	2011	2
	2017	1
	Total	3
2019	2016	1
	2019	1
	Total	2
2008-2019	2009	1
	2010	3
	2011	3
	2012	3
	2013	1

	2014	2
	2015	3
	2016	3
	2017	1
	2019	1
	Total	21

APPENDIX F

F.1 (Buick Enclave Data Collection)

Table 26. Buick Enclave Data Collection for FCWS

Crash Year/Vehicle Model Year		Number
2012	2008	1
	Total	1
2013	2008	1
	2012	1
	Total	2
2014	2008	1
	2012	1
	Total	2
2017	2008	1
	Total	1
2019	2008	1
	2011	1
	2012	2
	Total	4
2007-2019	2008	5
	2011	1
	2012	4
	Total	10

APPENDIX G

G.1 (GMC Acadia Data Collection)

Table 27. GMC Acadia Data Collection for FCWS

Crash Year/Vehicle Model Year		Number
2009	2007	1
	Total	1
2011	2008	1
	2011	1
	Total	2
2013	2010	1
	2013	1
	Total	2
2014	2010	1
	Total	1
2015	2014	2
	Total	2
2016	2008	1
	2011	2
	Total	3
2017	2007	1
	2008	1
	2009	1
	2014	1
	2017	1
	Total	5
2018	2007	1
	2011	2
	2016	1
	Total	4
2019	2014	1
	2019	1
	Total	2
2006-2019	2007	3
	2008	3
	2009	1
	2010	2

	2011	5
	2013	1
	2014	4
	2016	1
	2017	1
	2019	1
	Total	22

APPENDIX H

H.1 (GMC Yukon Data Collection)

Table 28. GMC Yukon Data Collection for LKAS

Crash Year	Case Number	Vehicle Number	Make	Model	Model Year	Ran-Off-Road	Number of Subject Vehicles Involved
2014	121158	1	GMC	YUKON	2014	No	1
2014	220337	1	GMC	YUKON	2014	Yes	1
2015	510168	1	GMC	YUKON	2014	No	1
2015	50251	1	GMC	YUKON	2015	No	1
2015	62139	1	GMC	YUKON	2015	No	1
2015	200116	1	GMC	YUKON	2015	No	1
2015	360626	1	GMC	YUKON	2015	No	1
2015	360745	1	GMC	YUKON	2015	No	1
2015	361024	1	GMC	YUKON	2015	No	1
2015	480314	1	GMC	YUKON	2015	No	1
2015	122662	1	GMC	YUKON	2016	No	1
2016	260315	1	GMC	YUKON	2014	No	1
2016	10032	1	GMC	YUKON	2015	No	1
2016	160065	1	GMC	YUKON	2015	Yes	1
2016	480434	1	GMC	YUKON	2015	No	1
2016	490039	1	GMC	YUKON	2015	No	1
2016	61746	1	GMC	YUKON	2016	Yes	1
2016	61800	1	GMC	YUKON	2016	Yes	1
2016	210575	1	GMC	YUKON	2016	No	1
2016	360271	1	GMC	YUKON	2016	No	1
2016	400582	1	GMC	YUKON	2016	Yes	1
2017	120492	1	GMC	YUKON	2014	Yes	1
2017	290286	1	GMC	YUKON	2014	No	1
2017	400284	1	GMC	YUKON	2014	No	1
2017	62694	1	GMC	YUKON	2015	No	1
2017	50263	1	GMC	YUKON	2016	Yes	1
2017	60210	1	GMC	YUKON	2016	No	1
2017	61909	1	GMC	YUKON	2016	No	1
2017	63112	1	GMC	YUKON	2016	No	1
2017	121070	1	GMC	YUKON	2016	No	1

2017	370213	1	GMC	YUKON	2016	Yes	1
2017	371007	1	GMC	YUKON	2016	No	1
2017	450283	1	GMC	YUKON	2016	Yes	1
2017	482429	1	GMC	YUKON	2016	No	1
2017	122717	1	GMC	YUKON	2017	No	1
2017	131278	1	GMC	YUKON	2017	No	1
2017	260910	1	GMC	YUKON	2017	No	1
2018	200116	1	GMC	YUKON	2015	No	1
2018	350061	1	GMC	YUKON	2015	No	1
2018	510735	1	GMC	YUKON	2015	No	1
2018	50015	1	GMC	YUKON	2016	Yes	1
2018	220025	1	GMC	YUKON	2016	No	1
2018	220102	1	GMC	YUKON	2016	No	1
2018	220449	1	GMC	YUKON	2016	No	1
2018	260707	1	GMC	YUKON	2016	No	1
2018	360679	1	GMC	YUKON	2016	No	1
2018	400273	1	GMC	YUKON	2016	Yes	1
2018	420128	1	GMC	YUKON	2016	No	1
2018	470899	1	GMC	YUKON	2016	No	1
2018	480818	1	GMC	YUKON	2016	No	1
2018	50455	1	GMC	YUKON	2017	No	1
2018	250117	1	GMC	YUKON	2017	No	1
2018	280278	1	GMC	YUKON	2017	No	1
2018	470778	1	GMC	YUKON	2017	Yes	1
2018	240093	1	GMC	YUKON	2018	No	1
2019	50454	1	GMC	YUKON	2014	No	1
2019	61930	1	GMC	YUKON	2014	Yes	1
2019	10007	1	GMC	YUKON	2015	Yes	1
2019	280418	1	GMC	YUKON	2015	Yes	1
2019	360497	1	GMC	YUKON	2015	No	1
2019	360562	1	GMC	YUKON	2015	Yes	1
2019	482437	1	GMC	YUKON	2015	No	1
2019	360267	1	GMC	YUKON	2016	No	1
2019	482392	1	GMC	YUKON	2016	No	1
2019	210312	1	GMC	YUKON	2017	No	1
2019	120715	1	GMC	YUKON	2018	No	1
2019	240414	1	GMC	YUKON	2018	No	1
2019	510116	1	GMC	YUKON	2018	No	1
2019	510449	1	GMC	YUKON	2018	Yes	1

2019	150046	1	GMC	YUKON	2019	Yes	1
2019	200210	1	GMC	YUKON	2019	No	1

APPENDIX I

I.1 (GMC Sierra Data Collection)

Table 29. GMC Sierra Data Collection for LKAS

Crash Year	Case Number	Make	Model	Model Year	Ran-Off-Road	Number of Subject Vehicles Involved
2013	50423	GMC	SIERRA	2013	No	1
2013	120872	GMC	SIERRA	2013	No	1
2013	160185	GMC	SIERRA	2013	No	1
2013	170861	GMC	SIERRA	2013	No	1
2013	220262	GMC	SIERRA	2013	No	1
2013	220590	GMC	SIERRA	2013	No	1
2013	220596	GMC	SIERRA	2014	No	1
2013	260176	GMC	SIERRA	2013	No	1
2013	290431	GMC	SIERRA	2013	No	1
2013	340463	GMC	SIERRA	2013	No	1
2013	350181	GMC	SIERRA	2013	No	1
2013	380054	GMC	SIERRA	2013	No	1
2013	481070	GMC	SIERRA	2013	No	1
2013	481596	GMC	SIERRA	2013	Yes	1
2013	481993	GMC	SIERRA	2013	No	1
2013	482054	GMC	SIERRA	2013	No	1
2013	482111	GMC	SIERRA	2013	No	1
2013	482372	GMC	SIERRA	2013	No	1
2014	20048	GMC	SIERRA	2014	No	1
2014	40674	GMC	SIERRA	2014	No	1
2014	50202	GMC	SIERRA	2013	Yes	1
2014	50300	GMC	SIERRA	2013	Yes	1
2014	50361	GMC	SIERRA	2014	Yes	1
2014	50422	GMC	SIERRA	2014	No	1
2014	61416	GMC	SIERRA	2014	No	1
2014	62610	GMC	SIERRA	2015	No	1
2014	80331	GMC	SIERRA	2013	No	1
2014	120440	GMC	SIERRA	2014	No	1
2014	122199	GMC	SIERRA	2015	No	1
2014	130991	GMC	SIERRA	2014	Yes	1
2014	160094	GMC	SIERRA	2013	No	1
2014	180561	GMC	SIERRA	2014	No	1
2014	190271	GMC	SIERRA	2014	No	1

2014	210424	GMC	SIERRA	2014	Yes	1
2014	280050	GMC	SIERRA	2013	No	1
2014	280078	GMC	SIERRA	2013	No	1
2014	290162	GMC	SIERRA	2014	Yes	1
2014	290578	GMC	SIERRA	2013	No	1
2014	310117	GMC	SIERRA	2014	No	1
2014	340118	GMC	SIERRA	2013	No	1
2014	350023	GMC	SIERRA	2014	No	1
2014	400284	GMC	SIERRA	2014	Yes	1
2014	400303	GMC	SIERRA	2013	No	1
2014	400392	GMC	SIERRA	2014	No	1
2014	400444	GMC	SIERRA	2013	Yes	1
2014	410021	GMC	SIERRA	2014	No	1
2014	420890	GMC	SIERRA	2013	No	1
2014	460083	GMC	SIERRA	2014	No	1
2014	470300	GMC	SIERRA	2013	No	1
2014	481358	GMC	SIERRA	2015	Yes	1
2014	483029	GMC	SIERRA	2013	No	1
2014	540196	GMC	SIERRA	2015	No	1
2015	40530	GMC	SIERRA	2015	Yes	1
2015	40737	GMC	SIERRA	2014	No	1
2015	50202	GMC	SIERRA	2013	No	1
2015	50285	GMC	SIERRA	2013	Yes	1
2015	60218	GMC	SIERRA	2013	No	1
2015	60727	GMC	SIERRA	2013	Yes	1
2015	61045	GMC	SIERRA	2015	No	1
2015	61059	GMC	SIERRA	2015	Yes	1
2015	61206	GMC	SIERRA	2015	No	1
2015	61376	GMC	SIERRA	2013	Yes	1
2015	61818	GMC	SIERRA	2014	No	1
2015	62828	GMC	SIERRA	2014	No	1
2015	62879	GMC	SIERRA	2015	No	1
2015	80227	GMC	SIERRA	2013	No	1
2015	120190	GMC	SIERRA	2014	No	1
2015	120368	GMC	SIERRA	2015	No	1
2015	120912	GMC	SIERRA	2014	No	1
2015	121163	GMC	SIERRA	2014	No	1
2015	121886	GMC	SIERRA	2015	No	1
2015	122465	GMC	SIERRA	2013	No	1
2015	122624	GMC	SIERRA	2015	No	1
2015	122734	GMC	SIERRA	2013	Yes	1
2015	130152	GMC	SIERRA	2014	No	1
2015	130310	GMC	SIERRA	2014	No	1
2015	130480	GMC	SIERRA	2014	No	1
2015	130760	GMC	SIERRA	2015	No	1

2015	131120	GMC	SIERRA	2015	No	1
2015	131163	GMC	SIERRA	2013	No	1
2015	170859	GMC	SIERRA	2015	No	1
2015	180530	GMC	SIERRA	2015	No	1
2015	180595	GMC	SIERRA	2013	No	1
2015	210666	GMC	SIERRA	2014	No	1
2015	220134	GMC	SIERRA	2013	Yes	1
2015	220497	GMC	SIERRA	2015	No	1
2015	220596	GMC	SIERRA	2014	No	1
2015	230018	GMC	SIERRA	2015	No	1
2015	230104	GMC	SIERRA	2013	Yes	1
2015	250030	GMC	SIERRA	2014	No	1
2015	250226	GMC	SIERRA	2015	Yes	1
2015	260528	GMC	SIERRA	2014	No	1
2015	260808	GMC	SIERRA	2014	No	1
2015	260886	GMC	SIERRA	2015	No	1
2015	270105	GMC	SIERRA	2014	No	1
2015	280384	GMC	SIERRA	2014	Yes	1
2015	290354	GMC	SIERRA	2014	No	1
2015	290371	GMC	SIERRA	2014	No	1
2015	290768	GMC	SIERRA	2015	Yes	1
2015	330041	GMC	SIERRA	2015	No	1
2015	340529	GMC	SIERRA	2014	No	1
2015	390082	GMC	SIERRA	2015	Yes	1
2015	400025	GMC	SIERRA	2014	No	1
2015	400245	GMC	SIERRA	2013	Yes	1
2015	420073	GMC	SIERRA	2014	No	1
2015	420101	GMC	SIERRA	2015	Yes	1
2015	420185	GMC	SIERRA	2013	No	1
2015	420204	GMC	SIERRA	2014	No	1
2015	450003	GMC	SIERRA	2014	No	1
2015	450771	GMC	SIERRA	2014	No	1
2015	450834	GMC	SIERRA	2014	No	1
2015	460058	GMC	SIERRA	2013	No	1
2015	470653	GMC	SIERRA	2014	No	1
2015	470764	GMC	SIERRA	2014	No	1
2015	480185	GMC	SIERRA	2013	No	1
2015	480620	GMC	SIERRA	2014	No	1
2015	480667	GMC	SIERRA	2013	Yes	1
2015	480670	GMC	SIERRA	2014	No	1
2015	480785	GMC	SIERRA	2015	No	1
2015	480953	GMC	SIERRA	2014	No	1
2015	481497	GMC	SIERRA	2013	No	1
2015	481733	GMC	SIERRA	2014	No	1
2015	482527	GMC	SIERRA	2014	Yes	1

2015	482533	GMC	SIERRA	2014	Yes	1
2015	482577	GMC	SIERRA	2014	No	1
2015	483046	GMC	SIERRA	2015	Yes	1
2015	483093	GMC	SIERRA	2013	No	1
2015	483198	GMC	SIERRA	2014	No	1
2015	490021	GMC	SIERRA	2013	Yes	1
2015	490169	GMC	SIERRA	2015	No	1
2015	490203	GMC	SIERRA	2015	No	1
2015	510012	GMC	SIERRA	2014	No	1
2015	530467	GMC	SIERRA	2015	No	1
2015	550204	GMC	SIERRA	2015	No	1
2015	550266	GMC	SIERRA	2015	No	1
2016	10196	GMC	SIERRA	2013	Yes	1
2016	10417	GMC	SIERRA	2014	No	1
2016	10454	GMC	SIERRA	2014	No	1
2016	10568	GMC	SIERRA	2013	No	1
2016	10688	GMC	SIERRA	2015	Yes	1
2016	10831	GMC	SIERRA	2014	No	1
2016	20070	GMC	SIERRA	2015	No	1
2016	40373	GMC	SIERRA	2015	No	1
2016	40399	GMC	SIERRA	2013	No	1
2016	40528	GMC	SIERRA	2015	No	1
2016	50025	GMC	SIERRA	2014	No	1
2016	50080	GMC	SIERRA	2015	No	1
2016	50103	GMC	SIERRA	2013	Yes	2
2016	50103	GMC	SIERRA	2013	No	2
2016	50301	GMC	SIERRA	2014	No	1
2016	50309	GMC	SIERRA	2015	No	1
2016	50310	GMC	SIERRA	2015	No	1
2016	50345	GMC	SIERRA	2016	Yes	1
2016	50355	GMC	SIERRA	2015	Yes	1
2016	50508	GMC	SIERRA	2013	Yes	1
2016	60773	GMC	SIERRA	2015	No	1
2016	61466	GMC	SIERRA	2016	No	1
2016	61468	GMC	SIERRA	2016	No	1
2016	61860	GMC	SIERRA	2015	No	1
2016	62319	GMC	SIERRA	2013	No	1
2016	62878	GMC	SIERRA	2015	Yes	1
2016	62890	GMC	SIERRA	2016	No	1
2016	80227	GMC	SIERRA	2014	No	1
2016	120271	GMC	SIERRA	2013	No	1
2016	120598	GMC	SIERRA	2013	No	1
2016	121127	GMC	SIERRA	2014	No	1
2016	121266	GMC	SIERRA	2014	No	1
2016	121276	GMC	SIERRA	2016	No	1

2016	121321	GMC	SIERRA	2013	Yes	1
2016	121688	GMC	SIERRA	2014	No	1
2016	121887	GMC	SIERRA	2015	No	1
2016	122583	GMC	SIERRA	2013	No	1
2016	122948	GMC	SIERRA	2015	No	1
2016	123002	GMC	SIERRA	2016	No	1
2016	130071	GMC	SIERRA	2014	No	1
2016	130322	GMC	SIERRA	2015	Yes	1
2016	131356	GMC	SIERRA	2014	No	1
2016	170090	GMC	SIERRA	2015	No	1
2016	170137	GMC	SIERRA	2013	Yes	1
2016	170495	GMC	SIERRA	2014	No	1
2016	180321	GMC	SIERRA	2015	No	1
2016	180659	GMC	SIERRA	2014	No	1
2016	190023	GMC	SIERRA	2015	No	1
2016	190134	GMC	SIERRA	2013	Yes	1
2016	190349	GMC	SIERRA	2016	No	1
2016	200171	GMC	SIERRA	2015	No	1
2016	210174	GMC	SIERRA	2016	Yes	1
2016	210504	GMC	SIERRA	2015	No	1
2016	220028	GMC	SIERRA	2014	No	1
2016	220104	GMC	SIERRA	2014	No	1
2016	220114	GMC	SIERRA	2014	Yes	1
2016	220139	GMC	SIERRA	2014	Yes	1
2016	220230	GMC	SIERRA	2015	No	1
2016	220233	GMC	SIERRA	2014	Yes	1
2016	220246	GMC	SIERRA	2016	No	1
2016	220325	GMC	SIERRA	2016	Yes	1
2016	220512	GMC	SIERRA	2015	No	1
2016	220536	GMC	SIERRA	2015	No	1
2016	220677	GMC	SIERRA	2015	Yes	1
2016	240198	GMC	SIERRA	2015	No	1
2016	260042	GMC	SIERRA	2014	No	1
2016	260245	GMC	SIERRA	2016	No	1
2016	260678	GMC	SIERRA	2014	No	1
2016	260741	GMC	SIERRA	2016	No	1
2016	270092	GMC	SIERRA	2015	No	1
2016	270171	GMC	SIERRA	2014	No	1
2016	270257	GMC	SIERRA	2013	Yes	1
2016	270304	GMC	SIERRA	2015	No	1
2016	280361	GMC	SIERRA	2013	Yes	1
2016	280565	GMC	SIERRA	2015	No	1
2016	290382	GMC	SIERRA	2013	No	1
2016	290703	GMC	SIERRA	2015	No	1
2016	300024	GMC	SIERRA	2014	No	1

2016	350260	GMC	SIERRA	2016	No	1
2016	360255	GMC	SIERRA	2014	Yes	1
2016	360701	GMC	SIERRA	2016	Yes	1
2016	370915	GMC	SIERRA	2013	Yes	1
2016	371221	GMC	SIERRA	2014	No	1
2016	380062	GMC	SIERRA	2016	No	1
2016	390226	GMC	SIERRA	2013	No	1
2016	390601	GMC	SIERRA	2014	Yes	1
2016	390808	GMC	SIERRA	2016	No	1
2016	400145	GMC	SIERRA	2015	No	1
2016	400321	GMC	SIERRA	2013	No	1
2016	450249	GMC	SIERRA	2013	No	1
2016	450282	GMC	SIERRA	2015	No	1
2016	450440	GMC	SIERRA	2015	No	1
2016	450589	GMC	SIERRA	2013	No	1
2016	450592	GMC	SIERRA	2014	No	1
2016	470981	GMC	SIERRA	2016	Yes	1
2016	480231	GMC	SIERRA	2014	No	1
2016	480245	GMC	SIERRA	2015	No	1
2016	480284	GMC	SIERRA	2014	Yes	1
2016	480387	GMC	SIERRA	2015	Yes	1
2016	480515	GMC	SIERRA	2015	No	1
2016	480654	GMC	SIERRA	2014	No	1
2016	480976	GMC	SIERRA	2013	No	1
2016	481117	GMC	SIERRA	2015	Yes	1
2016	481192	GMC	SIERRA	2013	No	1
2016	481291	GMC	SIERRA	2014	Yes	1
2016	481338	GMC	SIERRA	2014	Yes	1
2016	481465	GMC	SIERRA	2015	Yes	1
2016	481676	GMC	SIERRA	2014	No	1
2016	481905	GMC	SIERRA	2014	Yes	1
2016	481948	GMC	SIERRA	2014	No	1
2016	481964	GMC	SIERRA	2013	Yes	1
2016	482066	GMC	SIERRA	2015	Yes	1
2016	482075	GMC	SIERRA	2016	No	1
2016	482094	GMC	SIERRA	2016	No	1
2016	482451	GMC	SIERRA	2013	No	1
2016	482763	GMC	SIERRA	2014	No	1
2016	482914	GMC	SIERRA	2013	No	1
2016	483253	GMC	SIERRA	2015	No	1
2016	483272	GMC	SIERRA	2016	No	1
2016	490093	GMC	SIERRA	2015	No	1
2016	510393	GMC	SIERRA	2015	No	1
2016	530095	GMC	SIERRA	2015	No	1
2016	530117	GMC	SIERRA	2015	No	1

2016	550166	GMC	SIERRA	2016	No	1
2016	550178	GMC	SIERRA	2014	Yes	1
2016	560040	GMC	SIERRA	2015	No	1
2016	560074	GMC	SIERRA	2014	Yes	1
2017	10087	GMC	SIERRA	2015	No	1
2017	10372	GMC	SIERRA	2016	No	1
2017	10616	GMC	SIERRA	2017	No	1
2017	10681	GMC	SIERRA	2017	Yes	1
2017	10773	GMC	SIERRA	2015	No	1
2017	10787	GMC	SIERRA	2014	No	1
2017	10805	GMC	SIERRA	2017	No	1
2017	40157	GMC	SIERRA	2014	No	1
2017	40332	GMC	SIERRA	2015	No	1
2017	40785	GMC	SIERRA	2014	No	1
2017	50190	GMC	SIERRA	2014	Yes	1
2017	50242	GMC	SIERRA	2013	No	1
2017	50247	GMC	SIERRA	2015	No	1
2017	50370	GMC	SIERRA	2016	No	1
2017	50382	GMC	SIERRA	2016	No	1
2017	50408	GMC	SIERRA	2014	No	1
2017	50502	GMC	SIERRA	2017	Yes	1
2017	60522	GMC	SIERRA	2017	Yes	1
2017	60531	GMC	SIERRA	2017	Yes	1
2017	60621	GMC	SIERRA	2016	No	1
2017	60635	GMC	SIERRA	2014	No	1
2017	60712	GMC	SIERRA	2013	No	1
2017	60713	GMC	SIERRA	2014	No	1
2017	61191	GMC	SIERRA	2013	No	1
2017	61470	GMC	SIERRA	2016	No	1
2017	61555	GMC	SIERRA	2017	Yes	1
2017	61649	GMC	SIERRA	2014	No	1
2017	61946	GMC	SIERRA	2015	No	1
2017	62193	GMC	SIERRA	2013	Yes	1
2017	62704	GMC	SIERRA	2015	No	1
2017	63022	GMC	SIERRA	2017	Yes	1
2017	63048	GMC	SIERRA	2015	No	1
2017	63604	GMC	SIERRA	2015	No	1
2017	80040	GMC	SIERRA	2015	No	1
2017	80331	GMC	SIERRA	2017	No	1
2017	80407	GMC	SIERRA	2013	No	1
2017	90111	GMC	SIERRA	2016	Yes	1
2017	90249	GMC	SIERRA	2016	No	1
2017	120926	GMC	SIERRA	2013	No	1
2017	121731	GMC	SIERRA	2014	No	1
2017	122341	GMC	SIERRA	2016	No	1

2017	122865	GMC	SIERRA	2015	No	1
2017	130129	GMC	SIERRA	2016	No	1
2017	130233	GMC	SIERRA	2015	Yes	1
2017	130284	GMC	SIERRA	2017	No	1
2017	130734	GMC	SIERRA	2017	No	1
2017	130741	GMC	SIERRA	2015	No	1
2017	130837	GMC	SIERRA	2015	No	1
2017	131022	GMC	SIERRA	2016	No	1
2017	131436	GMC	SIERRA	2015	No	1
2017	170558	GMC	SIERRA	2013	No	1
2017	170603	GMC	SIERRA	2013	Yes	1
2017	170988	GMC	SIERRA	2013	No	1
2017	180001	GMC	SIERRA	2017	Yes	1
2017	180249	GMC	SIERRA	2016	No	1
2017	190023	GMC	SIERRA	2013	Yes	1
2017	200003	GMC	SIERRA	2013	No	1
2017	210282	GMC	SIERRA	2014	Yes	1
2017	210303	GMC	SIERRA	2016	Yes	1
2017	210486	GMC	SIERRA	2015	No	1
2017	210709	GMC	SIERRA	2015	Yes	1
2017	220064	GMC	SIERRA	2015	No	1
2017	220090	GMC	SIERRA	2013	No	1
2017	220124	GMC	SIERRA	2015	No	1
2017	220167	GMC	SIERRA	2016	No	1
2017	220188	GMC	SIERRA	2013	No	1
2017	220293	GMC	SIERRA	2014	Yes	1
2017	220402	GMC	SIERRA	2013	No	1
2017	220597	GMC	SIERRA	2015	No	1
2017	220675	GMC	SIERRA	2016	No	1
2017	230068	GMC	SIERRA	2016	Yes	1
2017	230074	GMC	SIERRA	2016	No	1
2017	230076	GMC	SIERRA	2015	No	1
2017	230134	GMC	SIERRA	2017	No	1
2017	230143	GMC	SIERRA	2015	Yes	1
2017	240178	GMC	SIERRA	2013	No	1
2017	250174	GMC	SIERRA	2016	No	1
2017	250197	GMC	SIERRA	2017	No	1
2017	250315	GMC	SIERRA	2015	No	1
2017	260032	GMC	SIERRA	2015	No	1
2017	260572	GMC	SIERRA	2016	No	1
2017	260689	GMC	SIERRA	2017	No	1
2017	260726	GMC	SIERRA	2016	No	1
2017	270081	GMC	SIERRA	2014	No	1
2017	270334	GMC	SIERRA	2018	No	1
2017	280178	GMC	SIERRA	2014	No	1

2017	280295	GMC	SIERRA	2014	No	1
2017	280456	GMC	SIERRA	2014	Yes	1
2017	280491	GMC	SIERRA	2017	No	1
2017	280551	GMC	SIERRA	2016	No	1
2017	290106	GMC	SIERRA	2014	No	1
2017	290177	GMC	SIERRA	2015	No	1
2017	290245	GMC	SIERRA	2015	No	1
2017	290528	GMC	SIERRA	2016	No	1
2017	290799	GMC	SIERRA	2015	No	1
2017	290815	GMC	SIERRA	2015	No	1
2017	310027	GMC	SIERRA	2015	Yes	1
2017	310179	GMC	SIERRA	2017	No	1
2017	340072	GMC	SIERRA	2016	No	1
2017	340332	GMC	SIERRA	2014	No	1
2017	340566	GMC	SIERRA	2017	No	1
2017	350042	GMC	SIERRA	2015	No	1
2017	360540	GMC	SIERRA	2015	No	1
2017	360573	GMC	SIERRA	2015	No	1
2017	360633	GMC	SIERRA	2015	No	1
2017	360746	GMC	SIERRA	2013	No	1
2017	360831	GMC	SIERRA	2013	No	1
2017	360926	GMC	SIERRA	2015	No	1
2017	370480	GMC	SIERRA	2013	Yes	1
2017	370580	GMC	SIERRA	2015	No	1
2017	371025	GMC	SIERRA	2016	No	1
2017	371143	GMC	SIERRA	2015	No	1
2017	371302	GMC	SIERRA	2015	Yes	1
2017	380017	GMC	SIERRA	2014	Yes	1
2017	380055	GMC	SIERRA	2014	No	1
2017	380069	GMC	SIERRA	2017	Yes	1
2017	390878	GMC	SIERRA	2017	No	1
2017	391028	GMC	SIERRA	2015	No	1
2017	400028	GMC	SIERRA	2015	No	1
2017	400089	GMC	SIERRA	2013	Yes	1
2017	400152	GMC	SIERRA	2015	No	1
2017	410010	GMC	SIERRA	2016	No	1
2017	420546	GMC	SIERRA	2014	No	1
2017	420777	GMC	SIERRA	2017	No	1
2017	421040	GMC	SIERRA	2016	No	1
2017	440026	GMC	SIERRA	2015	No	1
2017	450475	GMC	SIERRA	2014	No	1
2017	450620	GMC	SIERRA	2017	Yes	1
2017	450639	GMC	SIERRA	2016	No	1
2017	450690	GMC	SIERRA	2014	No	1
2017	450752	GMC	SIERRA	2015	No	1

2017	450828	GMC	SIERRA	2015	No	1
2017	460097	GMC	SIERRA	2015	No	1
2017	460099	GMC	SIERRA	2016	No	1
2017	470400	GMC	SIERRA	2015	No	1
2017	470455	GMC	SIERRA	2016	No	1
2017	470478	GMC	SIERRA	2014	No	1
2017	470508	GMC	SIERRA	2015	Yes	1
2017	470768	GMC	SIERRA	2015	No	1
2017	470790	GMC	SIERRA	2015	No	1
2017	470880	GMC	SIERRA	2014	Yes	1
2017	470954	GMC	SIERRA	2016	No	1
2017	470967	GMC	SIERRA	2016	No	1
2017	480387	GMC	SIERRA	2014	No	1
2017	480497	GMC	SIERRA	2014	No	1
2017	480608	GMC	SIERRA	2014	Yes	1
2017	480714	GMC	SIERRA	2014	No	1
2017	480777	GMC	SIERRA	2015	No	1
2017	480896	GMC	SIERRA	2015	No	1
2017	481213	GMC	SIERRA	2015	No	1
2017	481387	GMC	SIERRA	2016	No	1
2017	481892	GMC	SIERRA	2016	No	1
2017	482046	GMC	SIERRA	2015	No	1
2017	482161	GMC	SIERRA	2016	No	1
2017	482193	GMC	SIERRA	2016	No	1
2017	482328	GMC	SIERRA	2013	No	1
2017	482346	GMC	SIERRA	2015	No	1
2017	482403	GMC	SIERRA	2015	No	1
2017	482669	GMC	SIERRA	2014	No	1
2017	482792	GMC	SIERRA	2015	Yes	1
2017	482983	GMC	SIERRA	2013	No	1
2017	483017	GMC	SIERRA	2014	No	1
2017	483018	GMC	SIERRA	2016	No	1
2017	483026	GMC	SIERRA	2017	No	1
2017	483140	GMC	SIERRA	2016	No	1
2017	483141	GMC	SIERRA	2016	Yes	1
2017	490115	GMC	SIERRA	2014	No	1
2017	530233	GMC	SIERRA	2015	No	1
2017	540096	GMC	SIERRA	2015	No	1
2017	550199	GMC	SIERRA	2017	No	1
2018	10126	GMC	SIERRA	2013	No	1
2018	10177	GMC	SIERRA	2015	Yes	1
2018	20012	GMC	SIERRA	2015	No	1
2018	20045	GMC	SIERRA	2017	No	1
2018	40005	GMC	SIERRA	2017	No	1
2018	40379	GMC	SIERRA	2015	No	1

2018	40558	GMC	SIERRA	2016	No	1
2018	40580	GMC	SIERRA	2017	No	1
2018	40855	GMC	SIERRA	2014	No	1
2018	50109	GMC	SIERRA	2013	No	1
2018	50217	GMC	SIERRA	2014	No	1
2018	50373	GMC	SIERRA	2014	No	1
2018	60535	GMC	SIERRA	2017	No	1
2018	60560	GMC	SIERRA	2015	No	1
2018	60937	GMC	SIERRA	2016	Yes	1
2018	61167	GMC	SIERRA	2018	Yes	1
2018	61268	GMC	SIERRA	2014	No	1
2018	61493	GMC	SIERRA	2015	No	1
2018	61508	GMC	SIERRA	2017	No	1
2018	61589	GMC	SIERRA	2014	No	1
2018	62091	GMC	SIERRA	2014	Yes	1
2018	62405	GMC	SIERRA	2015	Yes	1
2018	62732	GMC	SIERRA	2016	No	1
2018	62838	GMC	SIERRA	2013	No	1
2018	62876	GMC	SIERRA	2014	No	1
2018	62902	GMC	SIERRA	2015	No	1
2018	63461	GMC	SIERRA	2018	No	1
2018	80098	GMC	SIERRA	2015	No	1
2018	80131	GMC	SIERRA	2013	Yes	1
2018	80192	GMC	SIERRA	2015	No	1
2018	80327	GMC	SIERRA	2018	No	1
2018	80341	GMC	SIERRA	2016	No	1
2018	80521	GMC	SIERRA	2015	No	1
2018	120101	GMC	SIERRA	2017	No	1
2018	120313	GMC	SIERRA	2013	Yes	1
2018	120390	GMC	SIERRA	2016	No	1
2018	120581	GMC	SIERRA	2015	No	1
2018	121162	GMC	SIERRA	2016	No	1
2018	121968	GMC	SIERRA	2017	Yes	1
2018	122500	GMC	SIERRA	2014	No	1
2018	122736	GMC	SIERRA	2018	No	1
2018	130120	GMC	SIERRA	2014	No	1
2018	130299	GMC	SIERRA	2016	No	1
2018	130639	GMC	SIERRA	2015	Yes	1
2018	130725	GMC	SIERRA	2017	Yes	1
2018	130833	GMC	SIERRA	2018	Yes	1
2018	131327	GMC	SIERRA	2014	No	1
2018	131425	GMC	SIERRA	2017	No	1
2018	150034	GMC	SIERRA	2018	No	1
2018	160219	GMC	SIERRA	2016	No	1
2018	170024	GMC	SIERRA	2017	No	1

2018	170354	GMC	SIERRA	2013	No	1
2018	180342	GMC	SIERRA	2017	No	1
2018	180366	GMC	SIERRA	2018	No	1
2018	180450	GMC	SIERRA	2016	Yes	1
2018	180463	GMC	SIERRA	2013	No	1
2018	180572	GMC	SIERRA	2016	No	1
2018	180573	GMC	SIERRA	2014	No	1
2018	180703	GMC	SIERRA	2016	No	1
2018	180785	GMC	SIERRA	2014	No	1
2018	190194	GMC	SIERRA	2015	No	1
2018	190246	GMC	SIERRA	2015	No	1
2018	190289	GMC	SIERRA	2018	No	1
2018	200215	GMC	SIERRA	2017	No	1
2018	210090	GMC	SIERRA	2017	No	1
2018	210646	GMC	SIERRA	2013	No	1
2018	220024	GMC	SIERRA	2017	Yes	1
2018	220104	GMC	SIERRA	2017	No	1
2018	220111	GMC	SIERRA	2017	No	1
2018	220166	GMC	SIERRA	2016	No	1
2018	220168	GMC	SIERRA	2013	No	1
2018	220230	GMC	SIERRA	2014	No	1
2018	220286	GMC	SIERRA	2017	No	1
2018	220307	GMC	SIERRA	2017	No	1
2018	220387	GMC	SIERRA	2015	Yes	1
2018	220401	GMC	SIERRA	2014	Yes	1
2018	220552	GMC	SIERRA	2015	Yes	1
2018	220560	GMC	SIERRA	2014	Yes	1
2018	220596	GMC	SIERRA	2018	No	1
2018	230006	GMC	SIERRA	2016	No	1
2018	230029	GMC	SIERRA	2014	No	1
2018	240163	GMC	SIERRA	2014	No	1
2018	250018	GMC	SIERRA	2017	No	1
2018	250042	GMC	SIERRA	2016	Yes	1
2018	260012	GMC	SIERRA	2013	No	1
2018	260068	GMC	SIERRA	2015	Yes	1
2018	260085	GMC	SIERRA	2016	Yes	1
2018	260295	GMC	SIERRA	2014	No	1
2018	260465	GMC	SIERRA	2017	Yes	1
2018	260827	GMC	SIERRA	2017	No	1
2018	270044	GMC	SIERRA	2015	No	1
2018	270190	GMC	SIERRA	2017	No	1
2018	270194	GMC	SIERRA	2015	No	1
2018	280028	GMC	SIERRA	2014	No	1
2018	280121	GMC	SIERRA	2015	No	1
2018	280261	GMC	SIERRA	2014	No	1

2018	280409	GMC	SIERRA	2013	Yes	1
2018	280491	GMC	SIERRA	2014	No	1
2018	280514	GMC	SIERRA	2018	No	1
2018	290015	GMC	SIERRA	2014	No	1
2018	290265	GMC	SIERRA	2018	No	1
2018	290329	GMC	SIERRA	2017	Yes	1
2018	290734	GMC	SIERRA	2016	Yes	1
2018	310004	GMC	SIERRA	2015	No	1
2018	310075	GMC	SIERRA	2015	No	1
2018	310114	GMC	SIERRA	2014	No	1
2018	330014	GMC	SIERRA	2017	No	1
2018	330061	GMC	SIERRA	2015	No	1
2018	330070	GMC	SIERRA	2015	No	1
2018	350045	GMC	SIERRA	2015	No	1
2018	350267	GMC	SIERRA	2014	No	1
2018	350350	GMC	SIERRA	2016	No	1
2018	360065	GMC	SIERRA	2013	No	1
2018	360308	GMC	SIERRA	2015	Yes	1
2018	360895	GMC	SIERRA	2015	No	1
2018	370237	GMC	SIERRA	2016	Yes	1
2018	370249	GMC	SIERRA	2018	No	1
2018	370481	GMC	SIERRA	2015	No	1
2018	370785	GMC	SIERRA	2018	Yes	1
2018	371050	GMC	SIERRA	2018	Yes	1
2018	371054	GMC	SIERRA	2016	No	1
2018	371233	GMC	SIERRA	2014	No	1
2018	380069	GMC	SIERRA	2015	No	1
2018	390303	GMC	SIERRA	2018	No	1
2018	390365	GMC	SIERRA	2016	No	1
2018	390733	GMC	SIERRA	2014	No	1
2018	390751	GMC	SIERRA	2018	No	1
2018	390867	GMC	SIERRA	2017	No	1
2018	400177	GMC	SIERRA	2017	Yes	1
2018	400237	GMC	SIERRA	2017	Yes	1
2018	400282	GMC	SIERRA	2015	No	1
2018	400397	GMC	SIERRA	2017	No	1
2018	400422	GMC	SIERRA	2014	No	1
2018	400473	GMC	SIERRA	2014	No	1
2018	410009	GMC	SIERRA	2017	No	1
2018	410034	GMC	SIERRA	2017	No	1
2018	410061	GMC	SIERRA	2017	Yes	1
2018	410065	GMC	SIERRA	2015	No	1
2018	410120	GMC	SIERRA	2013	No	1
2018	410329	GMC	SIERRA	2019	No	1
2018	420112	GMC	SIERRA	2014	No	1

2018	420123	GMC	SIERRA	2014	No	1
2018	450012	GMC	SIERRA	2016	No	1
2018	450493	GMC	SIERRA	2014	No	1
2018	450705	GMC	SIERRA	2016	No	1
2018	470281	GMC	SIERRA	2013	No	1
2018	480297	GMC	SIERRA	2013	Yes	1
2018	480358	GMC	SIERRA	2015	Yes	1
2018	480406	GMC	SIERRA	2018	Yes	1
2018	480417	GMC	SIERRA	2013	No	1
2018	480489	GMC	SIERRA	2014	No	1
2018	480567	GMC	SIERRA	2013	No	1
2018	480595	GMC	SIERRA	2015	Yes	1
2018	480626	GMC	SIERRA	2016	Yes	1
2018	480764	GMC	SIERRA	2014	No	1
2018	480800	GMC	SIERRA	2015	No	1
2018	480817	GMC	SIERRA	2014	No	1
2018	481645	GMC	SIERRA	2016	No	1
2018	481736	GMC	SIERRA	2013	Yes	1
2018	481737	GMC	SIERRA	2013	No	1
2018	481813	GMC	SIERRA	2015	No	1
2018	481975	GMC	SIERRA	2014	Yes	1
2018	481999	GMC	SIERRA	2016	Yes	1
2018	482021	GMC	SIERRA	2014	Yes	1
2018	482029	GMC	SIERRA	2013	No	1
2018	482218	GMC	SIERRA	2015	No	1
2018	482248	GMC	SIERRA	2016	Yes	1
2018	482321	GMC	SIERRA	2015	No	1
2018	482334	GMC	SIERRA	2013	No	1
2018	482365	GMC	SIERRA	2017	No	1
2018	482681	GMC	SIERRA	2014	No	1
2018	482732	GMC	SIERRA	2013	No	1
2018	482808	GMC	SIERRA	2016	No	1
2018	483059	GMC	SIERRA	2016	No	1
2018	483125	GMC	SIERRA	2017	No	1
2018	483217	GMC	SIERRA	2017	No	1
2018	483329	GMC	SIERRA	2017	No	1
2018	490136	GMC	SIERRA	2015	No	1
2018	490138	GMC	SIERRA	2016	No	1
2018	500026	GMC	SIERRA	2015	Yes	1
2018	510520	GMC	SIERRA	2015	No	1
2018	510632	GMC	SIERRA	2015	No	1
2018	530099	GMC	SIERRA	2015	Yes	1
2018	540145	GMC	SIERRA	2018	No	1
2018	540214	GMC	SIERRA	2016	No	1
2018	550056	GMC	SIERRA	2015	No	1

2018	550258	GMC	SIERRA	2017	Yes	1
2018	550293	GMC	SIERRA	2013	No	1
2018	550455	GMC	SIERRA	2015	Yes	1
2019	10112	GMC	SIERRA	2014	No	1
2019	10435	GMC	SIERRA	2014	No	1
2019	10548	GMC	SIERRA	2015	No	1
2019	10680	GMC	SIERRA	2014	Yes	1
2019	40025	GMC	SIERRA	2016	Yes	1
2019	40224	GMC	SIERRA	2016	No	1
2019	40262	GMC	SIERRA	2017	No	1
2019	40314	GMC	SIERRA	2016	No	1
2019	40381	GMC	SIERRA	2015	No	1
2019	40487	GMC	SIERRA	2014	No	1
2019	40730	GMC	SIERRA	2018	No	1
2019	40767	GMC	SIERRA	2018	No	1
2019	40790	GMC	SIERRA	2014	Yes	1
2019	50151	GMC	SIERRA	2015	Yes	1
2019	50279	GMC	SIERRA	2017	Yes	1
2019	50290	GMC	SIERRA	2018	No	1
2019	50367	GMC	SIERRA	2014	No	1
2019	50373	GMC	SIERRA	2014	No	1
2019	60027	GMC	SIERRA	2017	No	1
2019	60132	GMC	SIERRA	2015	Yes	1
2019	60252	GMC	SIERRA	2018	No	1
2019	60511	GMC	SIERRA	2016	No	1
2019	60736	GMC	SIERRA	2016	No	1
2019	60737	GMC	SIERRA	2018	No	1
2019	61514	GMC	SIERRA	2016	No	1
2019	61696	GMC	SIERRA	2019	No	1
2019	61847	GMC	SIERRA	2016	No	1
2019	62205	GMC	SIERRA	2017	No	1
2019	62732	GMC	SIERRA	2019	No	1
2019	63035	GMC	SIERRA	2013	No	1
2019	80014	GMC	SIERRA	2017	No	1
2019	80202	GMC	SIERRA	2013	No	1
2019	80209	GMC	SIERRA	2015	Yes	1
2019	80390	GMC	SIERRA	2019	No	1
2019	80453	GMC	SIERRA	2018	No	1
2019	90238	GMC	SIERRA	2018	No	1
2019	120098	GMC	SIERRA	2015	Yes	1
2019	120109	GMC	SIERRA	2016	No	1
2019	120216	GMC	SIERRA	2014	No	1
2019	120276	GMC	SIERRA	2014	No	1
2019	120720	GMC	SIERRA	2016	No	1
2019	120859	GMC	SIERRA	2018	No	1

2019	121192	GMC	SIERRA	2016	No	1
2019	121245	GMC	SIERRA	2014	No	1
2019	121406	GMC	SIERRA	2014	No	1
2019	121837	GMC	SIERRA	2017	No	1
2019	122174	GMC	SIERRA	2018	No	1
2019	122348	GMC	SIERRA	2015	No	1
2019	123053	GMC	SIERRA	2014	No	1
2019	123086	GMC	SIERRA	2015	No	1
2019	123114	GMC	SIERRA	2015	No	1
2019	130101	GMC	SIERRA	2014	Yes	1
2019	130360	GMC	SIERRA	2017	No	1
2019	130397	GMC	SIERRA	2016	No	1
2019	130557	GMC	SIERRA	2014	Yes	1
2019	130608	GMC	SIERRA	2015	Yes	1
2019	130633	GMC	SIERRA	2013	Yes	1
2019	130668	GMC	SIERRA	2016	No	1
2019	130684	GMC	SIERRA	2013	No	1
2019	130818	GMC	SIERRA	2018	No	1
2019	131065	GMC	SIERRA	2016	Yes	1
2019	131138	GMC	SIERRA	2013	No	1
2019	131310	GMC	SIERRA	2016	No	1
2019	131316	GMC	SIERRA	2019	Yes	1
2019	131345	GMC	SIERRA	2016	No	1
2019	131380	GMC	SIERRA	2015	No	1
2019	150054	GMC	SIERRA	2015	No	1
2019	160054	GMC	SIERRA	2017	No	1
2019	170197	GMC	SIERRA	2016	No	1
2019	170359	GMC	SIERRA	2016	Yes	1
2019	170503	GMC	SIERRA	2017	No	1
2019	170871	GMC	SIERRA	2019	Yes	1
2019	180028	GMC	SIERRA	2016	No	1
2019	180206	GMC	SIERRA	2016	No	1
2019	180235	GMC	SIERRA	2017	No	1
2019	180367	GMC	SIERRA	2014	No	1
2019	180421	GMC	SIERRA	2017	No	1
2019	180640	GMC	SIERRA	2017	No	1
2019	180712	GMC	SIERRA	2017	No	1
2019	180773	GMC	SIERRA	2017	No	1
2019	190286	GMC	SIERRA	2013	No	1
2019	190298	GMC	SIERRA	2015	No	1
2019	200111	GMC	SIERRA	2015	No	1
2019	200137	GMC	SIERRA	2018	No	2
2019	200137	GMC	SIERRA	2017	No	2
2019	220103	GMC	SIERRA	2016	No	1
2019	220240	GMC	SIERRA	2019	Yes	1

2019	220289	GMC	SIERRA	2013	Yes	1
2019	220397	GMC	SIERRA	2016	No	1
2019	220659	GMC	SIERRA	2019	Yes	1
2019	230010	GMC	SIERRA	2017	No	1
2019	230026	GMC	SIERRA	2013	No	1
2019	240063	GMC	SIERRA	2017	No	1
2019	240154	GMC	SIERRA	2015	Yes	1
2019	240301	GMC	SIERRA	2017	No	1
2019	260013	GMC	SIERRA	2014	No	1
2019	260273	GMC	SIERRA	2014	No	1
2019	260356	GMC	SIERRA	2019	Yes	1
2019	260649	GMC	SIERRA	2015	No	1
2019	260736	GMC	SIERRA	2013	No	1
2019	260775	GMC	SIERRA	2018	No	1
2019	260807	GMC	SIERRA	2015	No	1
2019	280026	GMC	SIERRA	2014	Yes	1
2019	280043	GMC	SIERRA	2013	No	1
2019	280336	GMC	SIERRA	2017	Yes	1
2019	280390	GMC	SIERRA	2016	Yes	1
2019	280403	GMC	SIERRA	2015	No	1
2019	280433	GMC	SIERRA	2014	No	1
2019	280484	GMC	SIERRA	2015	No	1
2019	290336	GMC	SIERRA	2016	Yes	1
2019	290534	GMC	SIERRA	2018	No	1
2019	290701	GMC	SIERRA	2015	No	1
2019	290778	GMC	SIERRA	2014	Yes	1
2019	300059	GMC	SIERRA	2017	No	1
2019	300099	GMC	SIERRA	2018	No	1
2019	310192	GMC	SIERRA	2017	No	1
2019	330012	GMC	SIERRA	2018	Yes	1
2019	330033	GMC	SIERRA	2013	Yes	1
2019	350148	GMC	SIERRA	2017	No	1
2019	350156	GMC	SIERRA	2015	No	1
2019	350184	GMC	SIERRA	2015	No	1
2019	350195	GMC	SIERRA	2017	No	1
2019	350254	GMC	SIERRA	2014	No	1
2019	350347	GMC	SIERRA	2015	No	1
2019	350367	GMC	SIERRA	2013	No	1
2019	360642	GMC	SIERRA	2016	No	1
2019	360666	GMC	SIERRA	2016	No	1
2019	360817	GMC	SIERRA	2018	No	1
2019	370095	GMC	SIERRA	2018	Yes	1
2019	370300	GMC	SIERRA	2015	No	1
2019	370867	GMC	SIERRA	2014	No	1
2019	370969	GMC	SIERRA	2014	No	1

2019	371016	GMC	SIERRA	2014	Yes	1
2019	371127	GMC	SIERRA	2016	No	1
2019	371250	GMC	SIERRA	2015	No	1
2019	380002	GMC	SIERRA	2018	Yes	1
2019	390333	GMC	SIERRA	2017	No	1
2019	400002	GMC	SIERRA	2018	Yes	1
2019	400342	GMC	SIERRA	2015	No	1
2019	400426	GMC	SIERRA	2013	Yes	1
2019	410253	GMC	SIERRA	2016	No	1
2019	410448	GMC	SIERRA	2013	No	1
2019	420106	GMC	SIERRA	2016	No	1
2019	420249	GMC	SIERRA	2014	No	1
2019	420614	GMC	SIERRA	2014	Yes	1
2019	420989	GMC	SIERRA	2019	No	1
2019	440027	GMC	SIERRA	2018	No	1
2019	450266	GMC	SIERRA	2017	No	1
2019	450362	GMC	SIERRA	2013	Yes	1
2019	450400	GMC	SIERRA	2016	No	1
2019	450475	GMC	SIERRA	2013	No	1
2019	450535	GMC	SIERRA	2014	No	1
2019	450601	GMC	SIERRA	2014	Yes	1
2019	450732	GMC	SIERRA	2014	No	1
2019	470071	GMC	SIERRA	2014	No	1
2019	470202	GMC	SIERRA	2015	No	1
2019	470463	GMC	SIERRA	2016	No	1
2019	470547	GMC	SIERRA	2018	No	1
2019	470996	GMC	SIERRA	2015	No	1
2019	480091	GMC	SIERRA	2016	No	1
2019	480261	GMC	SIERRA	2019	No	1
2019	480289	GMC	SIERRA	2014	No	1
2019	480363	GMC	SIERRA	2018	No	1
2019	480511	GMC	SIERRA	2018	No	1
2019	480512	GMC	SIERRA	2015	No	1
2019	480562	GMC	SIERRA	2015	No	1
2019	480690	GMC	SIERRA	2014	No	1
2019	480784	GMC	SIERRA	2014	No	1
2019	480805	GMC	SIERRA	2019	Yes	1
2019	481190	GMC	SIERRA	2014	No	1
2019	481194	GMC	SIERRA	2014	No	1
2019	481276	GMC	SIERRA	2015	No	1
2019	481525	GMC	SIERRA	2015	Yes	1
2019	481601	GMC	SIERRA	2016	Yes	1
2019	481607	GMC	SIERRA	2017	No	1
2019	481621	GMC	SIERRA	2014	No	1
2019	481852	GMC	SIERRA	2015	Yes	1

2019	482048	GMC	SIERRA	2016	Yes	1
2019	482106	GMC	SIERRA	2018	Yes	1
2019	482200	GMC	SIERRA	2014	Yes	1
2019	482240	GMC	SIERRA	2014	No	1
2019	482256	GMC	SIERRA	2014	No	1
2019	482284	GMC	SIERRA	2014	No	1
2019	482305	GMC	SIERRA	2013	Yes	1
2019	482307	GMC	SIERRA	2018	No	1
2019	482337	GMC	SIERRA	2019	No	1
2019	482444	GMC	SIERRA	2015	No	1
2019	482462	GMC	SIERRA	2013	No	1
2019	482644	GMC	SIERRA	2013	No	1
2019	482727	GMC	SIERRA	2013	No	1
2019	482820	GMC	SIERRA	2015	Yes	1
2019	482892	GMC	SIERRA	2019	Yes	1
2019	482951	GMC	SIERRA	2018	Yes	1
2019	483080	GMC	SIERRA	2014	No	1
2019	483241	GMC	SIERRA	2018	No	1
2019	490008	GMC	SIERRA	2015	No	1
2019	490151	GMC	SIERRA	2015	No	1
2019	510174	GMC	SIERRA	2015	No	1
2019	510295	GMC	SIERRA	2018	No	1
2019	510526	GMC	SIERRA	2015	No	1
2019	530490	GMC	SIERRA	2017	No	1
2019	540167	GMC	SIERRA	2015	Yes	1
2019	540234	GMC	SIERRA	2015	No	1
2019	550050	GMC	SIERRA	2018	No	1
2019	550193	GMC	SIERRA	2019	No	1
2019	550359	GMC	SIERRA	2016	No	1

APPENDIX J

J.1 (GMC Terrain Data Collection)

Table 30. GMC Terrain Data Collection for FWCS

Crash Year/Vehicle Model Year		Number
2012	2012	1
	Total	1
2013	2012	1
	Total	1
2014	2010	1
	2013	1
	Total	2
2015	2010	1
	2011	1
	Total	2
2016	2012	2
	Total	2
2017	2012	1
	2017	1
	Total	2
2019	2010	1
	2012	1
	2013	1
	2015	1
	2017	2
	Total	6
2009-2019	2010	3
	2011	1
	2012	6
	2013	2
	2015	1
	2017	3
	Total	16

APPENDIX K

K.1 (Cadillac Escalade Data Collection)

Table 31. Cadillac Escalade Data Collection for LKAS

Crash Year	Case Number	Vehicle Number	Make	Model	Model Year	Ran-Off-Road	Number of Subject Vehicles Involved
2014	60528	1	CADILLAC	ESCALADE	2014	No	1
2015	60970	1	CADILLAC	ESCALADE	2015	No	1
2015	270189	1	CADILLAC	ESCALADE	2015	Yes	1
2016	62017	1	CADILLAC	ESCALADE	2015	No	1
2016	120326	1	CADILLAC	ESCALADE	2015	No	1
2016	482666	1	CADILLAC	ESCALADE	2015	No	1
2016	62359	1	CADILLAC	ESCALADE	2016	No	1
2016	190339	1	CADILLAC	ESCALADE	2016	Yes	1
2017	310187	1	CADILLAC	ESCALADE	2014	No	1
2017	470303	1	CADILLAC	ESCALADE	2014	Yes	1
2017	121467	1	CADILLAC	ESCALADE	2015	No	1
2017	370421	1	CADILLAC	ESCALADE	2015	No	1
2017	62528	1	CADILLAC	ESCALADE	2016	No	1
2017	483260	1	CADILLAC	ESCALADE	2016	Yes	1
2018	63355	1	CADILLAC	ESCALADE	2015	No	1
2018	130741	1	CADILLAC	ESCALADE	2015	Yes	1
2018	130873	1	CADILLAC	ESCALADE	2016	No	1
2018	360916	1	CADILLAC	ESCALADE	2016	No	1
2018	180156	1	CADILLAC	ESCALADE	2017	No	1
2018	400517	1	CADILLAC	ESCALADE	2017	Yes	1
2018	360565	1	CADILLAC	ESCALADE	2018	No	1
2018	390608	1	CADILLAC	ESCALADE	2018	Yes	1
2018	480265	1	CADILLAC	ESCALADE	2018	Yes	1
2018	550375	1	CADILLAC	ESCALADE	2018	Yes	1
2019	10306	1	CADILLAC	ESCALADE	2015	Yes	1
2019	50243	1	CADILLAC	ESCALADE	2015	No	1
2019	62220	1	CADILLAC	ESCALADE	2015	No	1
2019	350343	1	CADILLAC	ESCALADE	2015	No	1
2019	60219	1	CADILLAC	ESCALADE	2016	No	1
2019	420253	1	CADILLAC	ESCALADE	2016	No	1

2019	510659	1	CADILLAC	ESCALADE	2016	Yes	1
2019	62047	1	CADILLAC	ESCALADE	2018	Yes	1
2019	62254	1	CADILLAC	ESCALADE	2018	Yes	1
2019	410297	1	CADILLAC	ESCALADE	2018	Yes	1
2019	180444	1	CADILLAC	ESCALADE	2019	No	1
2019	481857	1	CADILLAC	ESCALADE	2019	No	1