NEVADA

# Traffic Records Coordinating Committee

## Data Dictionary

| Crash | Vehicle | Driver | Roadway | Citation/ Adjudication | EMS/Injury Surveillance |
|---|---|---|---|---|---|
| *LEAs & NDOT & OTS* | *DMV* | *DMV* | *NDOT* | *LEAs & NV Courts & OTS* | *EMS & UNR & UNLV* |

Nevada Department of Public Safety
Office of Traffic Safety

zero Fatalities
Drive Safe Nevada

Nevada DOT
Safe and Connected

Kimley»Horn

**DATA DICTIONARY**

**FOR**

# TRAFFIC RECORDS COORDINATING COMMITTEE

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## List of Acronyms

| | |
|---|---|
| AADT | Annual Average Daily Traffic |
| AASHTO | American Association of State Highway and Transportation Officials |
| CDC | Center for Disease Control and Prevention |
| CEA | Critical Emphasis Area |
| DMV | Department of Motor Vehicles |
| DPS | Department of Public Safety |
| EITS | Enterprise Information Technology Services |
| EMS | Emergency Medical Services |
| ENT | Ears, Nose, and Throat |
| EOA | Esophageal Obturator Airway |
| ETT | Endotracheal Tube |
| FARS | Fatality Analysis Reporting System |
| FDE | Fundamental Data Elements |
| FHWA | Federal Highway Administration |
| GCS | Glasgow Coma Scale |
| HSIP | Highway Safety Improvement Programs |
| IHSDM | Interactive Highway Safety Design Model |
| LEAs | Law Enforcement Agencies |
| LVMPD | Las Vegas Metropolitan Police Department |
| NCATS | Nevada Citation and Accident Tracking System |
| NCATSDW | Nevada Citation and Accident Tracking System Data Warehouse |
| NCHRP | National Cooperative Highway Research Program |
| NDOT | Nevada Department of Transportation |
| NHP | Nevada Highway Patrol |
| NHTSA | National Highway Traffic Safety Administration |
| NRS | Nevada Revised Statutes |
| OTS | Office of Traffic Safety |
| QA/QC | Quality Control/Quality Assurance |
| SE | Safety Engineering Division |
| SHSP | Strategic Highway Safety Plan |
| SSDS | State Safety Data System |
| TRCC | Traffic Records Coordinating Committee |
| TSE | Traffic Safety Engineering |
| UNR | University of Nevada Reno |
| UNLV | University of Las Vegas |

# 1. INTRODUCTION

The Nevada Traffic Records Data Dictionary (Data Dictionary) was created to document definitions related to traffic records and crash data into one location. The Data Dictionary was created with the purpose of providing unified and uniform definitions for consistent use and understanding of data related to traffic safety throughout the State of Nevada. The below Primary Data Components create the organizational framework for the Data Dictionary. The contact agency is stated in parentheses after the data component. For a full list of contact information refer to **Appendix A**. The data components and their relationship to the combined database is shown in **Figure 1**: Database Components and Connections

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The six primary data quality attributes are also listed. Lastly, a summary list of the sources used in the development of this document are listed at the bottom of this page. The full citations can be found at the end of this document in the reference section.

**Six Primary Data Components**

- Crash (LEAs & NDOT & OTS)
- Vehicle (DMV)
- Driver (DMV)
- Roadway (NDOT)
- Citation/Adjudication (LEAs & NV Courts & OTS)
- Emergency Medical Services (EMS)/Injury Surveillance (EMS & UNR & UNLV)

Six Primary Data Quality Attributes

- Timeliness
- Accuracy
- Completeness
- Uniformity
- Integration
- Accessibility

Definitions used in this document were pulled from a variety of sources. Each source is listed below along with how the source is referenced in the Data Dictionary:

- American National Standard - ANSI D.16-2017 *(ANSI)*
- Model Minimum Uniform Crash Criteria – Fifth Edition *(MMUCC)*
- Model Inventory of Roadway Elements – Version 2.0 *(MIRE)*
- Nevada Strategic Highway Safety Plan *(SHSP)*
- Nevada Citation and Accident Tracking System – Data Dictionary *(NCATS-DD)*
- National Highway Traffic Safety Administration *(NHTSA)*
- Fatality Analysis Reporting System *(FARS)*
- Federal Highway Administration *(FHWA)*

**Figure 1** shows the six data components and the contact agency in parenthesis. The goal is to provide a database platform and/or data sharing that allows for advanced analysis that cross references the different data components. This could be completed through a common database where each of the data components would be housed or virtual data linkages.

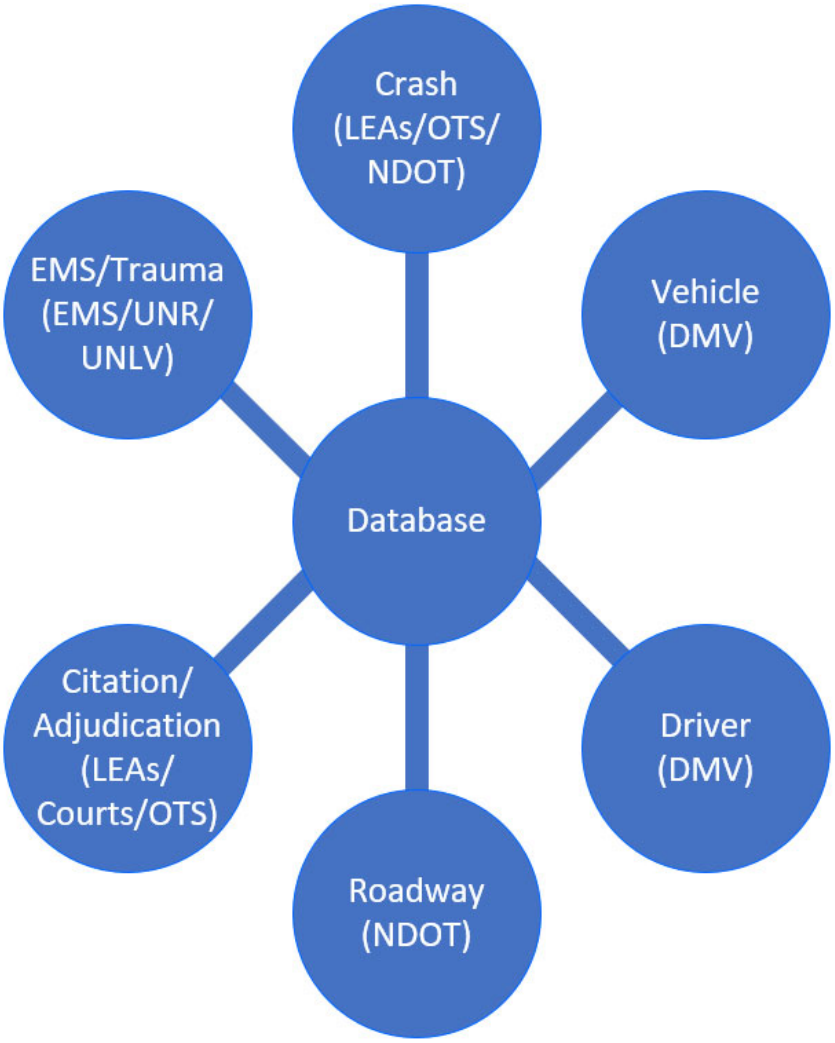


Figure 1: Database Components and Connections

# 2. SIX PRIMARY DATA COMPONENTS

## 2.1. Crash

For the purpose of this data dictionary a crash involves a motor vehicle. The reason transportation professionals use the word crash rather than accident is because “Accident” implies that no one is at fault whereas “Crash” indicates that someone is at fault, that is a predictable, preventable event. NHTSA, FHWA, many traffic safety and enforcement agencies across the nation and the Nevada Executive Committee of Traffic Safety have committed to not use the term accident. Using the term crash is part of changing the Safety Culture and shifting the focus to what can be done to prevent crashes and the resulting injuries and fatalities.

### Crash

An event that produces injury and/or property damage, involves a motor vehicle in transport (moving or stopped vehicle, not parked), and occurs on a trafficway or while the vehicle is still in motion after running off the trafficway *(NHTSA)*. A crash can be a collision or non-collision event. A crash can also have a secondary collision component. The TRCC would not count a crash if it has any of the following circumstances: deliberate intent, legal intervention, and cataclysm.

*Collision:*

Collision is defined by ANSI as:

> *Collision events include those involving a road vehicle in which the first harmful event is a collision of the road vehicle and a fixed object (poles, walls, buildings, barriers, bridge supports, etc.) or a collision of the road vehicle and a non-fixed object (pedestrians, animals, pedal cyclists, other motor vehicles, etc.).*

Collision (Collision Type) is defined by NCATS as:

> *The manner in which two motor vehicles in transport initially came together without regard to the direction of force. This data element refers only to crashes where the first harmful event involves a collision between two motor vehicles in transport.*

*The NCATS Data Dictionary definition is currently not consistent with the ANSI definition since the NCATS Data Dictionary definition only includes when two motor vehicles collide. This definition is currently being updated within NCATS Data Dictionary to be consistent with the ANSI definition.*

*Non-Collision:*

Non-Collision is defined by ANSI as:

*A crash that involves one or more of the following non-collision events:*

- A single motor vehicle on a roadway catches fire;
- A motor vehicle runs off a trafficway and is immersed in a body of water;
- An occupant of a motor vehicle is injured by falling from that vehicle while it is in motion or on a roadway;
- An occupant of a motor vehicle is injured by shifting cargo or flying objects within that vehicle during emergency handling / braking;

- A vehicle suffers damage from a pavement irregularity (loose plate, high manhole, pot hole, etc.);
- And others.

Non-Collision is defined by NCATS Data Dictionary as:

*Any collision that involves only one vehicle or vehicle vs. non-motorist.*

*The NCATS Data Dictionary definition is currently not consistent with the ANSI definition since the NCATS Data Dictionary definition includes any collision with only one vehicle. This definition is currently being updated within NCATS Data Dictionary to be consistent with the ANSI definition.*

*Secondary Collision:*

Secondary Collision is defined by NCATS Data Dictionary as:

*A crash occurring within an incident scene or within a traffic queue, including the opposite direction, resulting from an original incident.*

*The original incident does not have to be a collision, could be a disabled motorist, vehicles on the side of the road or any other unusual circumstance related to traffic backup or change in traffic flow as long as it played a role in distracting the driver or the causation in the collision. If the queue is normal, everyday occurrence without an original unplanned incident then a crash is not secondary.*

*Deliberate Intent:*

Deliberate Intent is defined by ANSI:

*As the classification given to the cause of an event which occurs when a person acts deliberately to cause the event or deliberately refrains from prudent acts which would prevent occurrence of the event.*

Examples:

- Suicide
- Self-inflicted injury
- Homicide
- Injury or damage purposely inflicted

*Legal Intervention:*

Legal Intervention is defined by ANSI as a category of deliberate intent in which the person who acts or refrains from acting is a law-enforcing agent or other official.

*Un-Stabilized Situation:*

An un-stabilized situation is defined by ANSI as a set of events not under human control. It originates when control is lost and terminates when control is regained or, in the absence of persons who are able to regain control, when all persons and property are at rest.

*Cataclysm:*

Cataclysm is defined by ANSI as an avalanche, landslide/mudslide, hurricane, cyclone, downburst, flood, torrential rain, cloudburst, lightning, tornado, tidal wave, earthquake, or volcanic eruption (See 2.4.9 transport crash).

*Crash Data Columns:*

- Crash Severity – Severity category that the crash is classified as (Property Damage Only, Injury Crash, Fatal Crash)
- Crash Date – Date the crash occurred
- Crash Year – Calendar year the crash occurred
- Crash Time – Time of day the crash occurred
- Primary Street – Street the crash occurred on, or the largest of the two cross streets
- Distance – Distance from the reference street
- Dir – Direction from the reference street
- Secondary Street – Reference cross street to the crash location along the primary street
- Mile Marker – Approximate mile marker along the primary street for the crash
- Adj. Mile Marker – Adjacent mile marker in the field
- Weather – Primary weather category that the weather on the day of the crash represents (Blowing, Clear, Cloudy, Cloudy: Rain, Rain, Unknown)
- Fatalities – Number of fatalities that occurred due to the crash
- Injured – Number of injuries due to the crash
- Property Damage Only – Category for crashes that did not result in any fatalities or injuries
- Injury Type – Injury category of the most serious injury (A, B, C)
- Crash Type – Classification of the crash type (Angle, Rear-End, Head-On, Non-Collision, Sideswipe, Backing, etc.)
- Total Vehicles – Total number of vehicles involved in the crash
- V1 Type – Body style of the primary vehicle in the crash (Sedan 4 Door, Sedan 2 Door Carry-All, Pickup, Motorcycle, Van, Convertible, etc.)
- V1 Dir – Cardinal direction of travel of vehicle 1
- V1 Driver Age – Age of the driver of vehicle 1
- V1 Lane Num – Lane designation number of vehicles 1 (1: Closest to curb, 2: Next lane out from the curb, etc.)
- V1 Action – Action vehicle 1 was taking at the time of the crash (Turning Left, Turning Right, Going Straight, Stopped, Changing Lanes, Making U-Turn, etc.)
- V1 Driver Factors – Driver related factors that may have contributed to the crash (Apparently Normal, Fell Asleep, Inattention, Had Been Drinking, Drug Involvement, etc.)
- V1 Driver Distracted – Factors that may have distracted the driver (Radio/CD Player, Electronic Equipment, Eating, Cell Phone, etc.)
- V1 Vehicle Factors – Actions related to operation of the vehicle that may have contributed to the crash (Driving too Fast for Conditions, Hit and Run, Followed too Closely, etc.)
- V1 Most Harmful Event – Event deemed most harmful leading up to the crash
- V1 All Events – Full list of events that may have contributed to the crash
- V2 Type – Body style of the secondary vehicle in the crash (Sedan 4 Door, Sedan 2 Door Carry-All, Pickup, Motorcycle, Van, Convertible, etc.)

- V2 Dir – Cardinal direction of travel of vehicle 2
- V2 Driver Age – Age of the driver of vehicle 2
- V2 Lane Num – Lane designation number of vehicles 2 (1: Closest to curb, 2: Next lane out from the curb, etc.)
- V2 Action – Action vehicle 2 was taking at the time of the crash (Turning Left, Turning Right, Going Straight, Stopped, Changing Lanes, Making U-Turn, etc.)
- V2 Driver Factors – Driver related factors that may have contributed to the crash (Apparently Normal, Fell Asleep, Inattention, Had Been Drinking, Drug Involvement, etc.)
- V2 Driver Distracted – Factors that may have distracted the driver (Radio/CD Player, Electronic Equipment, Eating, Cell Phone, etc.)
- V2 Vehicle Factors – Actions related to operation of the vehicle that may have contributed to the crash (Driving too Fast for Conditions, Hit and Run, Followed too Closely, etc.)
- V2 Most Harmful Event – Event deemed most harmful leading up to the crash
- V2 All Events – Full list of events that may have contributed to the crash
- First Harmful Event – Event deemed to be most significant for cause of the crash
- Nonmotorist Factors – Factors related to the action of nonmotorists such as pedestrian, cyclist, scooter, or other (Improper Crossing, Darting, Failure to Obey Traffic Signs, etc.)
- Factors Roadway – Factors related to the roadway that may have contributed to the crash (Dry, Ice/Snow, Wet, etc.)
- Lighting – Lighting conditions at the time of the crash (Daylight, Dark-Continuous Lighting, Dark-Spot Lighting, Dark-Unknown Lighting, Dusk, and Dawn)
- HWY Factors – Highway factors that may have contributed to the crash (None, Weather, Active Work Zone, Animal in Road, Other Environmental, etc.)
- Agency – The agency that responded to the crash (LVMPD, NHP, etc.)
- Accident Rec Num – The unique ID attributed to the crash so that it can be tracked through various databases

As seen in **Figure 2,** Crash Data is collected by LEAs using Brazos, an electronic software for crash and citation data collection. NDOT TSE requests the data from Brazos and performs checks for any errors or deviations in quality. Any deviations are corrected, and the data then goes through a transformation and is validated by EITS. Lastly the data is reviewed by Traffic Safety Engineering staff and uploaded to NCATSDW.

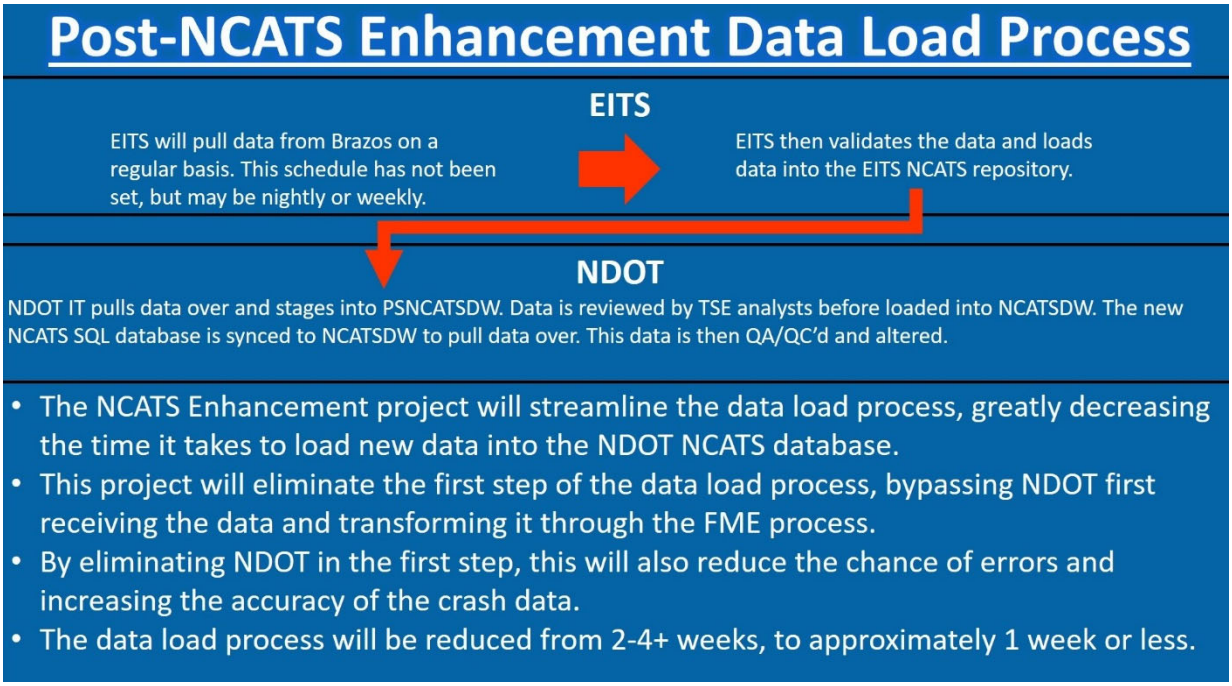


Figure 2: Flow Chart of Data moving from LEAs to Nevada Department of Transportation (NDOT)

### 2.1.1. Crash Severity

As stated above, a crash involves injury and/or property damage. The severity of a crash is based on the most severe injury or injury status to any person involved in the crash *(MMUCC)*. However, data should be reported on a person level for all people that suffered an injury. For example, if a person was seriously injured in a fatal crash, the person seriously injured is counted at the person level for serious injuries. The full extent of a person's injuries are not always known at the scene of the crash, therefor terms such as suspected are used to indicate that the person is suspected to have obtained a certain level of injury. Additionally, injury status is an evolving state whereas injury severity is a ranking of the level of severity of the injury with the current information. General crash severity designations are listed below in addition to in-depth definitions of each classification.

- K – Fatal Injury
- A – Suspected Serious Injury
- B – Suspected Minor Injury
- C – Possible Injury
- O – Property Damage Only
- U – Unknown
- N – Not Reported

#### Injury/Harmful Event

Harmful event is defined by ANSI as an occurrence of injury or damage.

Note: Injury or damage resulting when a driver dies or loses consciousness because of a disease condition such as a stroke, heart attack, diabetic coma, or epileptic seizure. In such a

case, the immediate effect of the disease, such as the driver's death or loss of consciousness, is not itself considered to be a harmful event.

**Injury Status**
The injury severity level for a person involved in a crash. The determination of which designation is assigned should be based on the latest information available at the time the report is completed, except in the case of fatal injuries. *(MMUCC)*

**Injury Severity**
A breakdown that best describes the most serious injury of the injury severity suffered in the collision. (*NCATS-DD)*

**Fatal Injury (K)**
*An injury sustained during the crash that results in death at the time of, or within thirty 30 days of the crash. (NCATS-DD) (MMUCC)*

**Suspected Serious Injury (A)**
*Any injury visible, or diagnosed by a physician, that prevents the injured party from walking, driving, or normally continuing the activities that he/she could perform prior to the crash. (NCATS-DD) (MMUCC)*

*Examples: Fractures of the spine, open or displaced fractures of the limbs, exposure of underlying tissue, crush injuries, significant burns (2nd/ 3rd degree over 10% of body), unconsciousness when taken from the crash scene, paralysis.*

**Suspected Minor Injury (B)**
*Any visible injury that does not rise to the level of a suspected serious injury. (NCATS-DD) (MMUCC)*

*Examples: Lump on head, abrasions, bruises, minor lacerations (cuts on the skin surface with minimal bleeding, no exposure of deep tissue/muscle.*

**Possible Injury (C)**
*Any non-visible injury stated, or claimed, by the driver / occupant that does not rise to the level of a fatal, suspected serious, or suspected minor injury. Possible injuries: including claims of injuries not evident, limping, complaint of pain, soreness, nausea, or hysteria. (NCATS-DD) (MMUCC)*

**No Apparent Injury/Property Damage Only (O)**
*A type of collision involving a motor vehicle in transport on a traffic way in which no one involved in the collision suffered any injuries. (NCATS-DD) (MMUCC)*

**N - Not Reported**
Injury classification was not determined by the investigator. *(NCATS-DD)*

### 2.1.2. Critical Emphasis Areas

The definitions found in this section of the Data Dictionary are based on the queries used to extract crash data sets for the Strategic Highway Safety Plan (SHSP) Critical Emphasis Areas (CEA). Definitions are provided both for Fatality Analysis Reporting System (FARS) and NCATS. For query values and definitions related to a value or range of values, reference the

latest (FARS) Analytical User's Manual. Adaptations to these queries may be needed at times to evaluate the data at a person level. This is made fairly easy in FARS with the Person level data set. However, other datasets such as NCATS may need to be separated into crash level and person level query formats.

### Occupant Protection

**Fatality:** Unrestrained individual who died in a crash as a driver or passenger in any vehicle.

**Fatal Crash:** Any crash involving an unrestrained individual who died in a crash as a driver or passenger in any vehicle.

*FARS Query (National)*

FARS Accident file: REST_USE=20 (2017-2018), REST_USE=7 (2013-2016), and INJ_SEV_ = 4

An occupant protection crash on a National level is a crash where an unbelted person dies in the crash. Occupant protection fatalities are the total number of unbelted people who died in the crash. The Fatality Analysis Reporting System (FARS) data uses the attribute "Restraint System/Helmet Use (REST_USE)" in the Person data set to determine if a person was using a restraining device such as a seatbelt, and the attribute "Injury Severity (INJ_SEV)" to determine the level of the persons injuries. The two attribute codes used are "None Used/Not Applicable" for restraint use and "Fatal Injury (K)" for injury severity. If a crash reports both attributes, the crash is deemed an occupant protection crash.

*FARS Query (Nevada)*

FARS Accident file: [REST_USE=20 (2017-2018), REST_USE=7 (2013-2016), or REST_USE = 1, 2, 3, 4, 5, 8, 10, 11, or 12 and REST_MIS = 1], and INJ_SEV_ = 4

An occupant protection crash in Nevada is a crash where an unbelted person or a person not properly using a restraining device dies in the crash. Occupant protection fatalities are the total number of unbelted or improperly restrained people who died in the crash. The Fatality Analysis Reporting System (FARS) data uses the attributes "Restraint System/Helmet Use (REST_USE)" and "Indication of Misuse of Restraint System/Helmet (REST_MIS)" in the Person data set to determine if a person was using or misusing a restraining device such as a seatbelt or car seat, and the attribute "Injury Severity (INJ_SEV)" to determine the level of the persons injuries. The attribute codes used are "None Used/Not Applicable", "Shoulder Belt Only Used", "Child Safety Seat/Booster Seat", "Child Restraint - Type Unknown", "Restraint Used – Type Unknown", "Child Restraint System – Rear Facing", "Booster Seat with Lap/Shoulder Belt Used Properly", "Booster Seat" for restraint use, "Yes" for restraint misuse, and "Fatal Injury (K)" for injury severity. If a crash reports a fatality and either the nonuse or misuse of a restraint device, the crash is deemed an occupant protection crash.

*NCATS Query*

NCATSDW.PERSON. AP_OCC_RESTR_DESC = 'NONE USED - VEHICLE OCCUPANT'

### Impaired Driving

**Fatality**: Any individual who died in a crash involving at least one driver impaired by alcohol or with drugs in their system.

**Fatal Crash:** Any crash involving a fatality in which there was at least one driver impaired by alcohol or with drugs in their system.

*FARS Query*

FARS Person file 2013 to 2014: PER_TYP = 1, and 8 ≤ ALC_RES < 94, and/or 100 ≤ DRUGRES (1, 2, and/or 3) ≤ 996 or DRUGRES (1, 2, and/or 3) = 998

FARS Person file 2015 to 2018: PER_TYP = 1, and 80 ≤ ALC_RES < 994, and/or 100 ≤ DRUGRES (1, 2, and/or 3) ≤ 996 or DRUGRES (1, 2, and/or 3) = 998

For 2018 Drugs file: 100 ≤ DRUGRES ≤ 996 or DRUGRES = 998

Impaired Driver crashes are fatal crashes where a driver in the crash had either a blood alcohol content of 0.08 or above and/or tested positive for drugs in their system. The Fatality Analysis Reporting System (FARS) data uses the attribute "Alcohol Test Result (ALC_RES)" in the Person data set to report the BAC test result, and the attribute "Drug Test Result (DRUGRES)" in the Person data set to report the type of drug(s) present in a person's system at the time of the crash. The FARS data allowed for up to 3 drugs to be reported per person until 2017. In 2018 the FARS data changed to report as many drug tests as administered to each person with no known maximum number of tests. The following attribute codes are used for drug impairment: Narcotic, Depressant, Stimulant, Hallucinogen, Cannabinoid, Phencyclidine (PCP), Anabolic Steroid, and Inhalant. If the driver in a fatal crash had either a BAC greater than or equal to 0.08 and/or the driver had drugs in their system which showed up on a drug test, the crash was classified as an impaired driver crash.

*NCATS Query*

V1 Driver = Alcohol, Drugs, or Alcohol and Drugs

### Lane Departure

**Fatality**: Any individual who died in a crash in which one or more vehicles departed from their lane of travel.

**Fatal Crash:** Any crash that involved at least one fatality where a motor vehicle departed its lane of travel.

*FARS Query*

FARS Cevent file: EVENTNUM = 1 and SOE = 3, 19-43,46-48, 52, 53, 57, 59, 63-65, or 68

Lane departure crashes are fatal crashes where a motor vehicle in transit leave its designated lane. The Fatality Analysis Reporting System (FARS) data uses the attributes "Event Number (EVENTNUM)", and "Sequence of Events (SOE)" in the Crash Event (CEVENT) dataset to identify if and how the vehicle left its lane of travel. One attribute code is used for the Event Number because only the first event (1) is used when analyzing Lane Departure crashes. Analysis utilizes 32 sequence of event attribute codes: Immersion or Partial Immersion, Building, Impact Attenuator/Crash Cushion, Bridge Pier or Support, Bridge Rail (Includes Parapet), Guardrail Face, Concrete Traffic Barrier, Other Traffic Barrier, Utility Pole/Light Support, Post/Pole/Other Support, Culvert, Curb, Ditch, Embankment, Fence, Wall, Fire Hydrant, Shrubbery, Tree (Standing Only), Other Fixed Object, Traffic Signal Support, Snow Bank, Guardrail End, Mail Box, Cable Barrier, Traffic Sign Support, Ran Off Road – Right, Ran Off Road – Left, Cross Median, and Cross Centerline. If a fatal crash has any of the listed attribute codes assigned to it the crash is deemed a lane departure crash.

*NCATS Query*

NCATSDW.CRASH_INFO_ACC.V1_SEQ_EVENT1 IN ('BRIDGE OVERHEAD STRUCTURE','BRIDGE PARAPET END','BRIDGE PIER OR ABUTMENT','BRIDGE RAIL','CONCRETE TRAFFIC BARRIER','CROSS MEDIAN/CENTERLINE','CULVERT','CURB','DITCH','EMBANKMENT','FENCE/WALL','GUARDRAIL END','GUARDRAIL FACE','HIGHWAY TRAFFIC SIGN POST','IMPACT ATTENUATOR/CRASH CUSHION','LIGHT/LUMINARY SUPPORT','MAILBOX','MEDIAN BARRIER','OTHER FIXED OBJECTS (BUILDING, TUNNEL, ETC.)','OTHER POST, POLE OR SUPPORT','OTHER TRAFFIC BARRIER','OVERHEAD SIGN SUPPORT','PARKED MOTOR VEHICLE','RAN OFF ROAD LEFT','RAN OFF ROAD RIGHT','TRAFFIC SIGNAL SUPPORT','TREE/SHRUB','UNKNOWN FIXED OBJECT','UTILITY POLE','WORK ZONE MAINTENANCE EQUIPMENT') AND SECONDARY_STREET_NAME NOT LIKE 'MILE MARKER %'

### Intersection

**Fatality**: Any individual who died in a crash at an intersection or in a crash deemed intersection related.

**Fatal Crash:** Any crash that involved at least one fatality at an intersection or a crash that was deemed intersection related.

*FARS Query*

FARS Accident file in 2009: RELJCT2 = 2 or 3 or 10 or 11

FARS Accident file from 2010 to 2018: RELJCT2 = 2 or 3

Intersection crash data includes all crashes where the reporting officer designates the crash as taking place at an intersection or as being intersection related. The Fatality Analysis Reporting System (FARS) data uses the attribute "Relation to Junction- Specific Location (RELJCT2)" in the Crash (ACCIDENT) dataset to identify the crash location with respect to the presence in or proximity to roadway junctions or interchanges. Two attribute codes used are "Intersection" and "Intersection Related". If a fatal crash had either of the two attribute codes assigned to it the crash is deemed an intersection related crash.

*NCATS Query*

NCATSDW.ACCIDENT.DISTANCE IS NULL OR NCATSDW.ACCIDENT.DISTANCE = 0

### Pedestrian

**Fatality**: any pedestrian who died in a crash.

**Fatal Crash:** any crash that involved the death of a pedestrian.

*FARS Query (National)*

PER_TYP=5 or and INJ_SEV=4.

A pedestrian crash is a crash in which a pedestrian dies in the crash. Pedestrian crash fatalities are the total number of pedestrians killed in crashes. The Fatality Analysis Reporting System (FARS) data uses the attribute "Person Type (PER_TYP)" in the person data set to determine if the person was a pedestrian, and "Injury Severity (INJ_SEV)" to determine the level of the persons injuries. The two attribute codes used are "Pedestrian" for the person type, and "Fatal Injury (K)" for injury severity. If a crash reports both attributes, the crash is deemed a pedestrian crash.

*FARS Query (Nevada)*
PER_TYP=5 or 8 and INJ_SEV=4.

A pedestrian crash is a crash in which a pedestrian dies in the crash. Pedestrian crash fatalities are the total number of pedestrians killed in crashes. The Fatality Analysis Reporting System (FARS) data uses the attribute "Person Type (PER_TYP)" in the person data set to determine if the person was a pedestrian, and "Injury Severity (INJ_SEV)" to determine the level of the persons injuries. The attribute codes used are "Pedestrian" and "Person on a Personal Conveyance" for the person type, and "Fatal Injury (K)" for injury severity. If a crash reports the fatality of a "Pedestrian" or a "Person on a Personal Conveyance", the crash is deemed a pedestrian crash.

*NCATS Query*
NCATSDW.PERSON.PERSON_TYPE_DESC =
'PEDESTRIAN','SKATER','WHEELCHAIR','OTHER NONMOTORIST'

## Motorcycle

**Fatality**: Any individual on a motorcycle who died in a crash.

**Fatal Crash:** Any crash that involved a fatality of any individual on a motorcycle.

*FARS Query*
FARS Vehicle file: 82 ≤ BODY_TYP ≤ 87 or BODY_TYP = 80 or BODY_TYP = 89, and DEATHS > 0

VEHICLE data file was used with a query for the BODY_TYP field. If 82 ≤BODY_TYP≤87 or BODY_TYP = 80 or BODY_TYP = 89 was true and DEATHS > 0, the crash was counted as a fatal motorcycle crash. This was tied into the ACCIDENT data file by counting the number of motorcycles in each crash. For any case where the number of motorcycles was greater than zero, it was considered a motorcycle crash.

*NCATS Query*
NCATSDW.VEHICLE.MOTORCYCLE = 'Y'
OR
NCATSDW.VEHICLE.STYLE_DESC = 'MOTORCYCLE'
OR
NCATSDW.VEHICLE.STYLE_DESC IN ('MOTORCYCLE', 'MOPED', 'MOTORSCOOTER', 'MULTI-WHEEL'

## Young Driver

**Fatality**: Any individual who died in a crash involving at least one driver between the ages of 15 and 20, regardless of fault.

**Fatal Crash:** Any crash that involved a fatality and at least one driver between the ages of 15 and 20, regardless of fault.

*FARS Query*
FARS Person file: 15 ≤ AGE ≤ 20 and PER_TYP = 1

A young driver crash is a crash in which a person between the ages 15 and 20 was a driver in the crash regardless of fault. The Fatality Analysis Reporting System (FARS) data uses

the attribute “Person Type (PER_TYP)” in the person data file to determine if the person was the driver, and “Age” in the person data file to determine the age of the driver. The two attribute codes used are “Driver of a Motor Vehicle In-Transport” to indicate the person was the driver and age values of 15 to 20 to designate the person as being the specified age range. If a crash reports both attributes, the crash is deemed a young driver crash.

*NCATS Query*
Driver Age = 15, 16, 17, 18, 19, or 20

### 2.1.3. Additional Program Areas

#### Distracted

**Fatality**: Any individual who died in a crash involving at least one distracted driver, regardless of fault.

**Fatal Crash:** Any crash that involved at least one distracted driver, regardless of fault, and at least one fatality.

*FARS Query*
FARS Distracted file: MDRDSTRD ≠ 0, 16, 96, or 99 therefore MDRDSTRD = 1-15, 17-93, or 97-98

A distracted driver crash is a crash in which the driver of the motor vehicle was distracted, and this contributed to the crash. The Fatality Analysis Reporting System (FARS) data uses the attribute “Driver Distracted By (MDRDSTRD)” in the Distracted (DISTRACT) data file to indicate what distracted the driver. All of the attribute codes for the attribute “Driver Distracted By (MDRDSTRD)” are used with the exception of “Not Distracted”, “No Driver Present/Unknown if Driver Present”, “Not Reported”, and “Unknown if Distracted”. The other 19 attribute codes cover a range of situations and activities such as: By Other Occupant(s), While Talking or Listening to Cellular Phone, While Adjusting Audio or Climate Controls, Eating or Drinking, Smoking Related, Careless/Inattentive, etc. If a crash reports any of the 24 attribute codes, the crash is deemed a distracted driver crash.

*NCATS Query*
NCATSDW.VEHICLE.DRVR_DISTRACTED_DESC IS NOT NULL
OR
NCATSDW.VEHICLE.DRVR_DISTRACTED_DESC IS NOT NULL AND
NCATSDW.VEHICLE.DRVR_DISTRACTED_DESC <> ‘UNKNOWN’

#### Speeding

**Fatality**: Any individual who died in a crash in which at least one vehicle was speeding.

**Fatal Crash:** Any crash that involved at least one fatality and one vehicle that was speeding.

*FARS Query*
FARS Vehicle file: 0 < SPEEDREL < 6

A speeding related crash is a crash in which responding officer deemed the crash to be related the vehicle speeding. The Fatality Analysis Reporting System (FARS) data uses the attribute “Speeding Related (SPEEDREL)” in the Vehicle file to indicate if a crash was speeding related. For this analysis five (5) attribute codes were used: “Yes”, “Yes, Racing”,

"Yes, Exceeded Speed Limit", "Yes, Too Fast for Conditions", "Yes, Specifics Unknown". If a crash reports any of the attribute codes, the crash is deemed a speeding related crash.

*NCATS Query*
NCATSDW.CRASH_INFO_VEH.FACTORS_VEH LIKE '%EXCEEDED AUTHORIZED SPEED LIMIT%' OR NCATSDW.CRASH_INFO_VEH.FACTORS_VEH LIKE '%DRIVING TOO FAST FOR CONDITIONS%' OR NCATSDW.CRASH_INFO_VEH.VEH_ACTION = 'RACING'

### Bicycle

**Fatality**: Any bicyclist who died in a crash.

**Fatal Crash:** Any crash that involved a bicyclist who died.

*FARS Query*
FARS Person file: PER_TYP= 6 or 7 and INJ_SEV = 4

A bicycle crash is a crash in which a cyclist is killed. Bicycle crash fatalities are the total number of cyclists who died in a crash. The Fatality Analysis Reporting System (FARS) data uses the attribute "Person Type (PER_TYP)" in the person data file to determine if the person was a cyclist, and "Injury Severity (INJ_SEV)" to determine the level of the persons injuries. Three attribute codes are used: "Bicyclist" and "Other Cyclist" for person type, and "Fatal Injury (K)" for injury severity. If a crash reports either "Bicyclist" or "Other Cyclist" and a "Fatal Injury (K)", the crash is deemed a fatal bicycle crash.

*NCATS Query*
NCATSDW.PERSON.PERSON_TYPE_DESC IN ('PEDALCYCLIST', 'PEDALCYCLIST (BICYCLE, TRICYCLE, UNICYCLE, PEDAL CAR)')

### Child Passenger Age 4 or Younger

**Fatality**: Any person age 4 or younger who died in a crash as a passenger in a motor vehicle.

**Fatal Crash:** Any crash that involved a person age 4 or younger who died as a passenger in a motor vehicle.

*FARS Query*
FARS Person file: AGE ≤ 4 and INJ_SEV = 4 and PER_TYP = 2

A child passenger is a crash in which a passenger of a motor vehicle age 4 or younger is killed. Child passenger crash fatalities are the total number of children, age 4 or younger, who died as motor vehicle passengers in the crash. The Fatality Analysis Reporting System (FARS) data uses the attribute "Age" in the person data file to determine the persons age, the "Person Type (PER_TYP)" in the person data file to determine if the person was a passenger in a motor vehicle, and "Injury Severity (INJ_SEV)" to determine the level of the persons injuries. Seven attribute codes are used: value of 0 to 4 for age, "Passenger of a Motor Vehicle in Transport" for person type, and "Fatal Injury (K)" for injury severity. If a crash reports age 0 to 4 and "Passenger of a Motor Vehicle in Transport" and a "Fatal Injury (K)", the crash is deemed a fatal child passenger crash.

*NCATS Query*
NCATSDW.PERSON.PERSON_TYPE_DESC IN ('PASSENGER', 'OCCUPANT OF MOTOR VEHICLE NOT IN TRANSPORT (PARKED, ETC.)' AND AGE IN (0, 1, 2, 3, 4)

### Helmeted Motorcycle

**Fatality**: Any individual wearing a helmet while riding a motorcycle who died in a crash.

**Fatal Crash:** Any crash that involved a fatality of any individual on a motorcycle who was wearing a helmet.

*FARS Query*

FARS Person file 2017 and 2018: REST_USE ≠ 17, 82 ≤ BODY_TYP ≤ 87 or BODY_TYP = 80 or BODY_TYP = 89, and INJ_SEV = 4

FARS Person file 2013 to 2016: REST_USE = 5 or REST_USE = 16, 82 ≤ BODY_TYP ≤ 87 or BODY_TYP = 80 or BODY_TYP = 89, and INJ_SEV = 4

The PERSON data file was used with a query for the Restrain Use (REST_USE) field, the Vehicle Body Type (BODY_TYP) field, and the Injury Severity (INJ_SEV). For the years 2017 and 2018 if restrain use does not equal "No Helmet", and if the vehicle body type was described as "Three-Wheel Motorcycle (2 Rear Wheels)" or "Off-Road Motorcycle" or "Motor Scooter" or "Unenclosed 3-Wheel Motorcycle / Unenclosed Autocycle (1 Rear Wheel)" or "Enclosed 3-Wheel Motorcycle / Enclosed Autocycle (1 Rear Wheel)" or "Unknown Three Wheel Motorcycle Type" or "Two Wheel Motorcycle (excluding motor scooters)" or "Unknown Motored Cycle Type", and the injury severity was "Fatal", the crash is counted as a fatal helmeted motorcycle crash. For the years 2013 to 2016 the same attributes are used with the exception of the restraining device being equal to "DOT-Compliant Motorcycle Helmet" or "Helmet, Other than DOT-Compliant Motorcycle Helmet". This was tied into the ACCIDENT data file by counting the number of helmeted motorcycles in each crash. For any case where the number of helmeted motorcycles was greater than zero, it was considered a fatal helmeted motorcycle crash.

*NCATS Query*

NCATSDW.VEHICLE.STYLE_DESC = 'MOTORCYCLE' AND NCATSDW.PERSON.AP_OCC_RESTR_DESC IN ('DOT-COMPLIANT HELMET', 'HELMET USED', 'OTHER HELMET')

### Unhelmeted Motorcycle

**Fatality**: Any individual not wearing a helmet while riding a motorcycle who died in a crash.

**Fatal Crash:** Any crash that involved a fatality of any individual on a motorcycle who was not wearing a helmet.

*FARS Query*

FARS Person file 2017 and 2018: REST_USE = 17, 82 ≤ BODY_TYP ≤ 87 or BODY_TYP = 80 or BODY_TYP = 89, and INJ_SEV = 4

FARS Person file 2013 to 2016: REST_USE ≠ 5 or REST_USE ≠ 16, 82 ≤ BODY_TYP ≤ 87 or BODY_TYP = 80 or BODY_TYP = 89, and INJ_SEV = 4

The PERSON data file was used with a query for the Restrain Use (REST_USE) field, the Vehicle Body Type (BODY_TYP) field, and the Injury Severity (INJ_SEV). For the years 2017 and 2018 if restrain use is equal "No Helmet", and if the vehicle body type was described as "Three-Wheel Motorcycle (2 Rear Wheels)" or "Off-Road Motorcycle" or "Motor Scooter" or "Unenclosed 3-Wheel Motorcycle / Unenclosed Autocycle (1 Rear Wheel)" or "Enclosed 3-Wheel Motorcycle / Enclosed Autocycle (1 Rear Wheel)" or "Unknown Three Wheel

Motorcycle Type" or "Two Wheel Motorcycle (excluding motor scooters)" or "Unknown Motored Cycle Type", and the injury severity was "Fatal", the crash is counted as a fatal unhelmeted motorcycle crash. For the years 2013 to 2016 the same attributes are used with the exception of the restraining device not being equal to "DOT-Compliant Motorcycle Helmet" or "Helmet, Other than DOT-Compliant Motorcycle Helmet". This was tied into the ACCIDENT data file by counting the number of unhelmeted motorcycles in each crash. For any case where the number of unhelmeted motorcycles was greater than zero, it was considered a fatal unhelmeted motorcycle crash.

*NCATS Query*

NCATSDW.VEHICLE.STYLE_DESC = 'MOTORCYCLE' AND
NCATSDW.PERSON.AP_OCC_RESTR_DESC = 'NO HELMET'

### 2.1.4. NCATS Data Dictionary Glossary of Definitions

**Vehicle Factors**

The action or condition for this vehicle before the start of the destabilized situation that begins the "collision." The action or condition which, in the Officer's opinion, contributed to the cause of the collision. (*NCATS-DD*)

**Non-Motorist Condition**

- Apparently Normal – Involved party appears normal in all respects and has not been drinking, is not fatigued, and is not physically impaired. *(NCATS-DD)*
- Physical Impairment – If this box is checked explain the physical impairment in the narrative; For example, one arm, leg or eye; deafness; color blind; illness; epilepsy, etc. *(NCATS-DD)*
- Under Influence - Medication/ Drugs/ Alcohol – Check this box if one of the impairment factors is involved. Use the Alcohol / Drug Involvement section along with the Method of Determination section and Test Results to explain. If Medication(s) is involved and the Method of Determination does not apply, then explain your findings in the Crash Narrative section located on the Scene Page. *(NCATS-DD)*
- Fatigued/ Asleep/ Fainted – Select this box if the involved party was asleep; involved party appears to be tired, may be slow in responding, or may go to sleep during the investigation; involved party admits to having fainted prior to the crash. *(NCATS-DD)*
- Emotional – If the involved party, in the investigator's opinion, was visibly agitated or distraught then check this box. *(NCATS-DD)*
- Illness – Involved party had visible signs of illness. *(NCATS-DD)*
- Unknown – If the condition of the Non-Motorist is unknown, then check this box. *(NCATS-DD)*
- Other – If none of the above descriptions depict the Non-Motorist check this box. Then explain in the space provided. *(NCATS-DD)*

**Non-Motorist Action**

- Entering or Crossing at Location – If the Non-Motorist was entering the roadway or crossing the roadway at the location where the crash occurred. *(NCATS-DD)*
- Walking, Running, Playing, Cycling – If the Non-Motorist was walking, running, playing, or cycling in the roadway at the location that the crash occurred. *(NCATS-DD)*

- Approaching or Leaving Vehicle – If the Non-Motorist was approaching or leaving a vehicle at the time of the crash. *(NCATS-DD)*
- Playing or Working on Vehicle – If the Non-Motorist was playing or working on a vehicle at the time of the crash. *(NCATS-DD)*
- Other – If none of the descriptions explain the actions of the Non-Motorist. Define what the action was, in the space provided or if necessary in the narrative. *(NCATS-DD)*
- Pushing Vehicle – If the Non-Motorist was pushing a vehicle at the time of the crash. *(NCATS-DD)*
- Working in Roadway – If the Non-Motorist was working in the roadway at the time of the crash, such as a construction worker. *(NCATS-DD)*
- Standing – If the Non-Motorist was standing in the roadway at the time the crash occurred. *(NCATS-DD)*
- Unknown – If the investigator does not know what action the Non-Motorist was doing. *(NCATS-DD)*
- Going to/from K-12 – If the Non-Motorist was going to or from school. *(NCATS-DD)*
- Waiting to cross Roadway – If the Non-Motorist was waiting to cross the roadway. *(NCATS-DD)*
- Approaching/leaving School Bus – Check this box if the Non-Motorist was approaching or leaving a school bus. *(NCATS-DD)*

### Alcohol Involvement

Nevada defines a collision as alcohol-related or alcohol-involved if either a driver or a non-motorist had a measurable or estimated blood alcohol concentration (Blood Alcohol Content of 0.01 grams per deciliter or above). Nevada defines a non-fatal collision as alcohol-related or alcohol-involved if police indicate on the police collision report that there is evidence of alcohol present. The code does not necessarily mean that a driver, passenger, or non-occupant was tested for alcohol.

### Ejected

Refers to occupants being totally or partially thrown from the vehicle as a result of an impact or rollover.

### Occupant

Any person who is in or upon a motor vehicle in transport. This includes: the driver, passengers, and any persons riding on the exterior of a motor vehicle.

### Passenger

A passenger is any occupant of a vehicle other than its driver.

## 2.2. Vehicle

The only vehicle data currently being reviewed is that which is recorded within the NCATS Form 5 crash report. Additional vehicle data that is collected and maintained by the Nevada Department of Motor Vehicles (DMV) and is being pursued.

### 2.2.1. NCATS Data Dictionary Glossary of Definitions

**Gross Vehicle Weight Rating/Gross Combined Vehicle Weight Rating (GVWR/GCWR)**
The maximum rated capacity of a vehicle, including the weight of the base vehicle, all added equipment, driver and passengers, trailers and all cargo loaded into or on the vehicle. (*NCATS-DD*)

**Motor Vehicle**
A mechanically or electrically powered device not operated on rails, upon which or by which any person or property may be transported or drawn upon a roadway is a motor vehicle. (*NCATS-DD*)

**Pedestrian**
Any person not in or upon a vehicle. This includes a person in or operating a pedestrian conveyance, such as a baby carriage. (*NCATS-DD*)

**Pedalcycle**
Bicyclist victims include the driver (rider) and/or passenger of any device propelled exclusively by human power through a belt, chain or gears and having two or more wheels. (*NCATS-DD*)

**Total Vehicles**
The total number of motor vehicles involved in the crash.

**V1 and V2 Type**
The type of vehicles (Sedan 4 door, Pickup, Carry-All, etc.) involved int the crash for vehicle one (V1) and vehicle two (V2) respectively.

### 2.2.2. Motor Vehicle Automation Definitions

**Motor Vehicle Automated Driving System(s)**
The hardware and software that are collectively capable of performing part or all the dynamic driving task on a sustained basis; this term is used generically to describe any system capable of level 1-5 driving automation. Level of driving automation is based on SAE International Standard J3016 for automation level determination. (MMUCC)

**No Automation (Level 0)**
The full-time performance by the human driver of all aspects of the dynamic driving task, even when enhanced by warning or intervention systems. (MMUCC)

**Driver Assistance (Level 1)**
Driver assistance system of either steering or acceleration/ deceleration using information about the driving environment and with the expectation that the human driver performs all remaining aspects of the dynamic driving task. (MMUCC)

**Partial Automation (Level 2)**
The driving mode-specific execution by one or more driver assistance systems of both steering and acceleration/deceleration using information about the driving environment and with the expectation that the human driver performs all remaining aspects of the dynamic driving task.

### Conditional Automation (Level 3)
The driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task with the expectation that the human driver will respond appropriately to a request to intervene. (MMUCC)

### High Automation (Level 4)
The driving mode-specific performance by an automated driving system of all aspects of the dynamic driving task, even if a human driver does not respond appropriately to a request to intervene. (MMUCC)

### Full Automation (Level 5)
The full-time performance by an automated driving system of all aspects of the dynamic driving task under all roadway and environmental conditions that can be managed by a human driver. (MMUCC)

### Dynamic driving task
Includes the operational (steering, braking, accelerating, monitoring the vehicle and roadway) and tactical (responding to events, determining when to change lanes, turn, use signals, etc.) aspects of the driving task, but not the strategic (determining destinations and waypoints) aspect of the driving task. (MMUCC)

### Driving mode
A type of driving scenario with characteristic dynamic driving task requirements (e.g., expressway merging, high-speed cruising, low speed traffic jam, closed-campus operations, etc.). (MMUCC)

### Request to intervene
The notification by the automated driving system to a human driver that s/he should promptly begin or resume performance of the dynamic driving task. (MMUCC)

## 2.3. Driver

The only driver data currently being reviewed is that which is recorded within the NCATS Form 5 crash report. Additional driver data that is collected and maintained by the Nevada DMV is being pursued.

### 2.3.1 Action and Factors Definitions

The following definitions are driver related information within crash data and are defined based on NCATS definitions.

### Driver Factors
The actions by the driver that may have contributed to the crash. This data element is based on the judgment of the law enforcement officer investigating the crash (*NCATS-DD*).

- Apparently normal – The involved party appears normal in all respects. None of the factors apply.
- Had been drinking – If determined through your investigation that the driver had been drinking an intoxicating beverage while operating, or prior to operating, the motor vehicle involved in the crash.

- Drug involvement – If the driver had indications of drug use, as determined through your investigation.
- Apparently Fatigued/Asleep – If determined through your investigation, the driver had indications of being fatigued or had fallen asleep prior to the collision.
- Obstructed View – If determined through your investigation, the driver's view was obstructed.
- Driver Ill/Injured – Determined through your investigation that the driver was ill or injured prior to the collision and this affected his/her ability to operate the vehicle which resulted in a collision.
- Other Improper Driving – If determined though your investigation that the driver had a condition not specifically listed here that contributed to his/her ability to operate the vehicle resulting in a collision.
- Driver Inattention/Distracted – If determined through your investigation that the driver was distracted or showed evidence of inattention. Then refer to the Code List and select the code that indicates the inattention or distraction that was noted.
- Physical Impairment – If determined through your investigation that the driver's physical impairment affected his ability to operate the vehicle. This physical impairment is not considered being related to alcohol or drug involvement.
- Unknown – For collisions involving hit and run drivers or when the existence of impairment cannot be determined. If necessary, this may be explained in the narrative.

**Hit and Run**
The crash being reported involved one or more vehicles that fled the scene without providing aid or information as required by NRS.

**Driver 1**
The person in physical control of the first vehicle reported on the collision report form. Normally assumed to be the at fault driver.

**Driver 2 and Subsequent**
The person in physical control of the subsequent vehicle reported on the collision report form.

**V1 and V2 Driver Age**
The age of the driver of vehicle one (V1) or vehicle two (V2), respectively.

## 2.4 Roadway

Roadway data is collected by a variety of sources but is maintained and housed with the Nevada Department of Transportation (NDOT). Model Inventory of Roadway Elements (MIRE) is maintained by the Federal Highway Administration (FHWA) and is the primary guideline for the roadway elements that each state should inventory.

### 2.4.1 Model Inventory of Roadway Elements (MIRE) Definitions

MIRE, the Model Inventory of Roadway Elements, is a recommended listing of roadway inventory and traffic elements critical to safety management. MIRE is intended as a guideline to help transportation agencies improve their roadway and traffic data inventories. It provides a basis for a standard of what can be considered a good/robust data inventory and helps

agencies move towards the use of performance measures to assess data quality. The Moving Ahead for Progress in the 21st Century (MAP-21) reauthorizing legislation identifies the need for improved and more robust safety data for better safety analysis to support the development of State's Strategic Highway Safety Plans (SHSPs) and their Highway Safety Improvement Programs (HSIPs). Among these new analytic tools are: The Highway Safety Manual, the Interactive Highway Safety Design Model (IHSDM), AASHTO are Safety Analyst™, as well as AASHTO's NCHRP Series 500 Data and Analysis Guide, which all require crash, roadway, and traffic data to achieve the most accurate results.

MIRE 2.0 provides a structure for roadway inventory data that will allow State and local transportation agencies to use analysis tools with their own data rather than relying on default values that may not reflect local conditions. As more States and local transportation agencies adopt these MIRE data elements, their capabilities will be enhanced for improved evaluation of the safety effectiveness of highway improvements and will support more data driven decisions about safety investments. MIRE 2.0 reports six (6) Categories with a total of 205 roadway elements. The full MIRE 2.0 document is located in **Appendix B**.

MIRE - (US Department of Transportation Federal Highway Administration, 2017)

- Segment (109 Elements)
- Intersection (18 Elements)
- Intersection Leg (40 Elements)
- Interchange/ramp (25 Elements)
- Horizontal Curve (8 Elements)
- Vertical Grade (5 Elements)

NDOT's Safety Engineering Division (SE) is in the process of developing an action plan to build a State Safety Data System (SSDS) which will require the collection of MIRE Fundamental Data Elements (FDE). These elements need to be collected for all public roads and be stored 9/30/2026. There is a total of 34 MIRE FDE and they are all listed below.

- Annual Average Daily Traffic (AADT) Year – The year in which the AADT data corresponds to
- Access Control – Measured on a degree scale (Full, Partial, or None) for a section of roadway
- AADT
- Begin Point Segment Descriptor – Location information defining the beginning of the segment.
- Direction of Inventory – Noted if divided roads are inventoried in each direction
- End Point Segment Descriptor – Location information defining the end of the segment
- Federal Aid – Indicate the system on which the route is located
- Functional Class – FHWA approved Functional Classification System
- Interchange Type
- Intersection/Junction Geometry
- Intersection/Junction Traffic Control
- Location Identifier for Road 1 Crossing Point
- Location Identifier for Road 2 Crossing Point

- Location Identifier for Roadway at Beginning Ramp Terminal
- Location Identifier for Roadway at Ending Ramp Terminal
- Median Type
- Number of Through Lanes
- One/Two-Way Operations
- Ramp AADT
- Ramp Length
- Roadway Type at Beginning Ramp Terminal
- Roadway Type at Ending Ramp Terminal
- Route Number
- Route Type
- Route/Street Name
- Rural/Urban Designation
- Segment Identifier
- Segment Length
- Surface Type
- Type of Governmental Ownership
- Unique Approach Identifier
- Unique Interchange Identifier
- Unique Junction Identifier
- Year of Ramp AADT

### 2.4.2 NCATS Data Dictionary Glossary of Definitions

#### Intersection

- The area embraced within the prolongation or connection of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways of two highways which join one another at, or approximately at, right angles or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict.
- Where a highway includes two roadways 30 feet or more apart, then every crossing of each roadway of such divided highway by an intersecting highway shall be regarded as a separate intersection. In the event, such intersecting highway also includes two roadways 30 feet or more apart, then every crossing of two roadways of such highways shall be regarded as a separate intersection.
- The junction of an alley with a street, road, or highway shall not constitute an intersection.

If the crash occurs at a railroad crossing, describe the crash location in relation to an intersection or a fixed reference point. A railroad crossing is not an intersection as defined by NRS. *(NCATS-DD)*

#### Total Through Lanes

When counting the through travel lanes, count all through lanes. This will only include the lanes allowing through traffic for this roadway. If the crash occurred on a highway that is divided by a physical barrier (i.e. guardrail or concrete barrier), then the through lanes are to be taken only

on the side pertaining to the crash. **Include both sides only if the crash involves both sides of the roadway when a physical barrier exists.** *(NCATS-DD)*

### Total All Lanes

Enter the total number of lanes on the highway, within the crash scene. You will include all turn lanes, storage lanes, and through travel lanes for both directions of travel on the highway unless a physical barrier divides the roadway. **Include both sides only if the crash involves both sides of the roadway when a physical barrier exists.** *(NCATS-DD)*

### Access Control

- None – You can gain access to the highway through the means of a private drive, public access property, or other means not controlled by a public authority. *(NCATS-DD)*
- Full – Access to the highway can only be obtained using on and off ramps. *(NCATS-DD)*
- Partial – Access to the highway can be obtained not only through the on and off ramp system, but by other means not established by a public authority. *(NCATS-DD)*

### Roadway Description

- Two-Way, Not Divided – a physical barrier does not separate the opposing lanes of travel. This would include highways where the opposing lanes of travel are separated by a centerline or center turn lane. *(NCATS-DD)*
- Two-Way, Divided, Unprotected Median – No physical barrier separates the opposing lanes of travel. 'Unprotected' means that there is not a guardrail, fence, or raised concrete barrier separating the median from the travel lanes. *(NCATS-DD)*
- Two-Way, Divided, Median Barrier – The opposing lanes of travel are separated by a physical barrier such as a guardrail, fence, cable barrier or raised concrete barrier. *(NCATS-DD)*
- One -Way, Not Divided – All lanes are traveling in the same direction. *(NCATS-DD)*
- Unknown – When the type of roadway has not been identified, such as when completing an 'Office Report'. *(NCATS-DD)*
- Off Road – Those crashes that occur in an area not determined to be a roadway. i.e. dry lake bed or desert area. If selecting Off Road, the crash will not meet the definition of a crash as defined in NRS. This category is for crashes that need investigation, although will not be reported against statistical crash data. *(NCATS-DD)*

### PHYSICAL GORE

An area on the ramp where a non-traversable road surface hinders road users from crossing from a ramp to the through lanes or vice versa. *(NCATS-DD)*

### MARKED (THEORETICAL) GORE

The tip of the generally triangular-shaped (marked gore) neutral area where the channelizing line for the ramp separates from the channelizing line for the adjacent through lane. *(NCATS-DD)*

### Clearance Time

- Roadway Clearance Time – Time between first recordable awareness of an incident by a responding agency and first confirmation that all lanes are available for traffic flow. (NCATS-DD)

- Incident Clearance Time – Time between first recordable awareness of time by a responding agency and time at which the last responder has left the scene. (*NCATS-DD*)

### Construction Zone
An area usually marked by signs, barricades, or other devices indicating that highway construction or highway maintenance activities are ongoing can be active or inactive. (*NCATS-DD*)

### Fixed Object
Stationary structures or substantial vegetation attached to the terrain. (*NCATS-DD*)

### Separator
A separator is the area of a trafficway between parallel roads separating travel in the same direction or separating a frontage road from other roads. (*NCATS-DD*)

### Rural Area
Rural areas are comprised of all areas outside the city limit boundaries of urbanized area. Refer to your own jurisdiction for additional information. (*NCATS-DD*)

### Urban Area
The area encompassed within the city limit boundaries of a city whose population is 10,000 or more (NRS 484.2155). Nevada's urban areas are Las Vegas, North Las Vegas, Henderson, Boulder City, Carson City, Fallon, Elko, Reno, Sparks, Winnemucca, and Fernley. (*NCATS-DD*)

## 2.5 Citation/Adjudication

Citation Data is collected by Nevada Highway Patrol and local law enforcement using Brazos, an electronic citation software. This data is then shared with the DMV, and Court System. Adjudication is the legal process by which a judge or other arbiter reviews evidence and determines the rights and obligations between parties involved. This process is carried out by the court system. Citation/Adjudication data include:

## 2.6 EMS/Injury Surveillance

EMS and Injury surveillance data is collected by hospitals. Access to databases such as the trauma registry can be assessed through special permission after training. The primary institutions that have access to this data for analysis are universities like UNR and UNLV. EMS/ Injury surveillance data includes:

Note: Currently Reviewing Draft Data Columns

**Trauma Registry Data Columns:**

- Hospital Name
- Designation of Treatment Location – Northern Nevada or Southern Nevada
- Year in which the trauma occurred
- Month in which the trauma occurred
- Age – Calculated from date of birth and admission date
- CDC Age Group Classification – (0-4, 5-9, 10-14, etc.)

- Age Under 12 (Child)
- Age Over 65 (Elderly)
- Age under 25 (Youth)
- Age 0-2 Years (Baby)
- Car Seat Age (0-6 years)
- Booster Seat Age (4-8 years)
- Booster Seat Not Covered by Nevada Law (6-7 years)
- Age 15-24 years
- Teen Drivers (Age 16-19 years)
- Car Seat Used – Yes, No, Unknown
- Seatbelt or Restraint Used – Yes, No, Unknown
- Safety Gear/Devices Used
- Helmet Used
- Patient City of Residence
- Patient State of Residence
- Patient Country of Residence
- Worst chief complaint mechanism verbalized by the patient or mode of injury
- City Where Injury Occurred
- State Where Injury Occurred
- Injury e-code
- Location where injury Occurred
- Injury e-code formatted in excel
- Admitting Service
- Patient's initial condition upon arrival to hospital either in the ER or Direct Admit
- Length of Stay in Hospital
- Days Free of the Hospital (Set at 30 days)
- Length of Stay in Intensive Care Unit
- Total Days on Ventilator Support
- Total Days Free of Ventilator Support (Set at 30 days)
- Abbreviated Injury Score Chest
- Abbreviated Injury Score Extremities
- Abbreviated Injury Score Face
- Abbreviated Injury Score Head and Neck
- Abbreviated Injury Score Thorax
- Abbreviated Injury Score External
- Abbreviated Injury Score Head
- Abbreviated Injury Score Neck
- Abbreviated Injury Score Upper Extremities
- Abbreviated Injury Score Lower Extremities
- Abbreviated Injury Score Spine
- Abbreviated Injury Score Skin/Soft Tissue Region

- Injury Severity Score – No Injury (0), Minor Injury (1-8), Moderate Injury (9-15), Severe Injury (16-24), Very Severe Injury (25+), Unknown/System missing
- New Injury Severity Score – No Injury (0), Minor to Moderate (1-8), Serious to Critical Injury (9+)
- New Injury Severity Score Grouped by Severity - No Injury (0), Minor Injury (1-3), Moderate Injury (4-8), Serious Injury (9-15), Severe Injury (16-24), Very Severe Injury (25+), Unknown/System missing
- Probability of Survival – Scale of 0 to 1 i.e. 0% to 100%
- Hospital Disposition – Death, Home, Nursing/Rehab, Other, Missing/Blank
- Disposition Death – Yes, No, Blank/Missing
- Hospital Discharge Services – Burn, Cardiology, ENT, General Surgery, etc.
- Hospital Charges
- Insurance/Primary Payor
- Ethyl Alcohol
- Suspected Ethyl Alcohol
- Use of Ethyl Alcohol Test Results – No, Yes (Beyond Legal Limit), Yes (Trace Levels), etc.
- Drug Use Specific Test Results – No, Yes (Illegal Drug Use), Yes (Prescription Drug), etc.
- Homelessness Status – No, Yes, Blank/Missing
- Patient Home Zip Code
- Patient Injury Location Zip Code
- Arrival time at Referring Hospital
- Arrival time of EMS at the Scene
- CPR Management at the Scene
- Per-Hospital Systolic Blood Pressure
- Condition of Patient at the Scene
- Dispatch Date of EMS
- EMS Agency
- EMS Departure Time
- Eye Score on Initial Glasgow Coma Scale at the Scene
- Prehospital Glasgow Coma Scale – Field Range 3-15
- Initial Pulse Rate at the Scene – Beats per Minute
- Initial Respiratory Rate at the Scene – Breaths per Minute
- Revised Trauma Scale at the Scene – Field Range 0-13
- Transport Time of EMS – Military Time (00:00 – 23:59)
- Pre-Hospital Thoracentesis/Tube Thoracostomy – Performed, Not Performed, Not Available, Not Recorded/Not Applicable
- The patients initial Verbal Response on the initial GCS at the scene – No Response, Incomprehensible Sounds, Inappropriate Words, Disoriented and Converses, Oriented and Converses, Not Recorded/Not Available/Not Performed
- Location of Injury – Address or Cross Streets

- Referring Hospital Airway – No, Yes, Bag & Mask, EOA, Cricothyrotomy, Nasal ETT, Not preformed, Oral, Oral ETT, Trach, Unknown/Not Available/Not Recorded
- Arrival Date at Referring Hospital – mm/dd/yyyy
- Arrival Time at Referring Hospital - Military Time (00:00 – 23:59)
- Patient's Initial Systolic Blood Pressure taken at referring hospital
- Referring Hospital Discharge Date – mm/dd/yyyy
- Referring Hospital Discharge Time – Military Time (00:00 – 23:59)
- Initial Eye Score of GCS at the Referring Hospital – Does Not Open Eyes, Opens Eyes to Pain, Opens Eyes to Commands, Spontaneous Eye Opening, Not Recorded/Not Available/Not Performed
- Hospital Transfer – No, Yes, Not Recorded/Not Available
- Initial Glasgow Coma Score at Referring Hospital – Field Range 3-15
- Referring Hospital Name
- Initial Pulse Rate at Referring Hospital – Referring range is 0-300
- Initial Respiratory Rate at Referring Hospital – Field range is 0-99
- Arrival/Admission Date at Current Hospital – mm/dd/yyyy
- Arrival/Admission Time at Current Hospital – Military Time (00:00 – 23:59)
- Revised Trauma Score at the Referring Hospital – Field range is 0-12
- Initial Verbal Response on GCS at the Referring Hospital – No Response, Incomprehensible Sounds, Inappropriate Words, Disoriented and Converses, Oriented and Converses, Not Recorded/Not Available/Not Performed
- The location from which the patient arrived – Home, Jail, Clinic, EMS Station, MD Office, Urgent Care, Rehab Center, Nursing Home, Not Available/Not Recorded
- Emergency Department Discharge Date – mm/dd/yyyy
- Emergency Department Discharge Date – Military Time (00:00 – 23:59)
- Airway Management used in ED – No, Yes, Bag & Mask, EOA, Cricothyrotomy, Nasal ETT, Not preformed, Oral, Oral ETT, Trach, Unknown/Not Available/Not Recorded
- Units of Blood – Blood Administered in the First 24 hours (Amount not known)
- Blood Products used on Patient – Packed Red Blood Cells, Plasma, Platelets, Other Blood Substitute, Not Applicable/Blank/Missing/Unknown
- Emergency Department Systolic Blood Pressure – Range 0-250
- CPR Management in the ED – CPR Performed in ED, CPR Not Performed, Not Available/Not Recorded/Not Applicable
- Patients initial Eye Score on GCS – Does Not Open Eyes, Opens Eyes to Pain, Opens Eyes to Commands, Spontaneous Eye Opening, Not Recorded/Not Available/Not Performed
- Patient's Initial Glasgow Coma Score – Range 3-15
- Patient's Initial Motor Response on GCS – No Response, Extends to Pain, Flexes to Pain, Moves to Pain, Localizes Pain, Follows Command, Not Recorded/Not Available/Not Performed/Blank/Unknown
- Patient's Initial Pulse Rate in the Emergency Department – Range 0-300
- Patient's Initial Respiratory Rate in the Emergency Department – Field range 0-300
- Revised Trauma Score in the Emergency Department

- Patient's Internal Temperature ED – Field Range 0-110 degrees Fahrenheit
- Patients Initial Response on GCS – No Response, Incomprehensible Sounds, Inappropriate Words, Disoriented and Converses, Oriented and Converses, Not Recorded/Not Available/Not Performed
- ROW 603 – Trauma Location
- Operating Room Disposition – DOA (death), Death, Floor, ICU, Step Down, Morgue, Post Anesthesia Care Unit, Home, Not Available/Not Recorded/Not Applicable
- Row 662 – ICD 9 Procedure Code
- Date of Operation/Procedure – mm/dd/yyyy
- Comorbidities
- Autopsy Performed – Yes (Y), No (N), Pending (P), Not Recorded (V), Not Available (X), Blank/Missing/Unknown
- Discharge Date – mm/dd/yyyy
- Patient Street Address
- Patient Street Address Continued
- Calculated Age
- Hospital Charges Reimbursed (in dollars)
- Drug Screen (type of drug) – No Drugs, Amphetamine, Benzodiazepines, Cocaine, Iatrogenic, Marijuana, Methamphetamine, Opiates, Missing/Unknown/Not Available
- Drug Use Y/N – No (Confirmed by Test), No (Not Tested), Not Applicable, Unknown, Yes (Confirmed by Test Illegal Drug Use), Yes (Confirmed by Test Prescription Drug)
- Safety or Restraint Devices Used – Child Booster Seat, Child Car Seat, Seatbelt, Harness, Roll Cage, Air Bag, Helmet, Gloves, etc.
- Patient Wearing Seatbelt at the Time of the Crash – Yes, No, Missing/Blanks/Unknown
- Type/Location Airbag Used 1 – Airbag Deployed Other, Airbag Type Unknown, Airbags did not Deploy, Front Deployed, Side Deployed, No Airbags in Vehicle, Not Applicable/Unknown/Blank/Missing
- Type/Location Airbag Used 2 – Airbag Deployed Other, Airbag Type Unknown, Airbags did not Deploy, Front Deployed, Side Deployed, No Airbags in Vehicle, Not Applicable/Unknown/Blank/Missing
- Protective Equipment Used – Helmet, Eye Protection, Protective Clothing, Other, Protective Non-Clothing Gear, None, Not Applicable/Unknown/Blank/Missing
- Pre-Hospital Procedures – Cardiac Monitor, CPR, Cricothyrotomy, Endotracheal Tube – Nasal, Endotracheal Tube – Oral Extrication, Intravenous Fluids, Spinal Immobilization, Venous Access, etc.
- Pre-Hospital Cardiac Arrest – Yes, No, Blank/Missing/Unknown
- EMS Transfer Agency – American Medical Response, Care Flight, Nellis AFB Ambulance, etc.
- Patient's Initial Respiratory Rate at the Scene – Continuous Data
- Injury Location ICD 9 – Home, Industry, Mine, Other, etc.
- Injury Location ICD 10 – Y92.39, Y92.410, etc.
- Referring Hospital Diastolic Blood Pressure – Continuous Data Range 47-195
- Patient's Initial Respiratory Rate at the Referring Hospital – Continuous Data Range

- Mode of Arrival – Fixed-Wing Ambulance, Ground Ambulance, Helicopter Ambulance, Other, Private Vehicle or Walk-In, Unknown/Blank/Missing
- Activation Level – Partial, Full, Consult, No Trauma Activation, Unknown/Blank/Missing
- Head Computer Tomography (CT Scan) - Range 15.1-53.7, Unknown/Blank/Missing
- Emergency Department Diastolic Blood Pressure – Continuous Data
- Intubated – Yes, No, Unknown/Blank/Missing
- Organ Donor – Yes, No, Unknown/Blank/Missing
- Dead on Arrival (DOA) – Arrived with No Signs of Life, Arrived with Signs of Life, Unknown/Blank/Missing
- Manner of Death – Accidental, Unknown/Blank/Missing

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Fatality Analysis Reporting System (FARS)
https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars
https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812827

Federal Highway Administration (FHWA)
https://safety.fhwa.dot.gov/

Manual on Uniform Traffic Control Devices (MUTCD)
https://mutcd.fhwa.dot.gov/services/publications/fhwaop02090/twtmarkings_longdesc.htm

Model Inventory of Roadway Elements (MIRE)
https://safety.fhwa.dot.gov/rsdp/downloads/fhwasa17048.pdf

Model Minimum Uniform Crash Criteria (MMUCC)
https://crashstats.nhtsa.dot.gov/Api/Public/Publication/812433

Nevada Citation and Accident Tracking System (NCATS) Data Dictionary
https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/nv_ncats_datadictionary_rev5_2_06.pdf

National Highway Traffic Safety Administration (NHTSA)
https://www.nhtsa.gov/

Nevada Strategic Highway Safety Plan (SHSP)
https://www.nevadadot.com/home/showdocument?id=4728

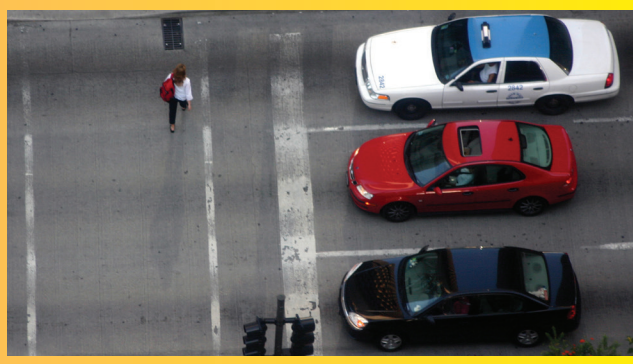
# APPENDIX A

## MODEL INVENTORY OF ROADWAY ELEMENTS – VERSION 2.0 *(MIRE)*

Limited excerpts from the document are included in this appendix, the full document is available at:

https://safety.fhwa.dot.gov/rsdp/downloads/fhwasa17048.pdf

# Model Inventory of Roadway Elements
# MIRE 2.0



## FHWA Safety Program

July 2017

U.S. Department of Transportation
**Federal Highway Administration**

Safe Roads for a Safer Future
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# ACRONYMS

| | |
|---|---|
| AADT | Annual average daily traffic |
| AASHTO | American Association of State Highway and Transportation Officials |
| ADA | Americans with Disabilities Act |
| AC | Asphalt-Concrete |
| ARNOLD | All Road Network of Linear Referenced Data |
| CFI | Continuous Flow Intersection |
| CRCP | Continuously Reinforced Concrete Pavement |
| DCD | Double-Crossover Diamond |
| DDI | Diverging Diamond Interchange |
| DLT | Displaced Left-turn |
| DOT | Department of Transportation |
| FAST Act | Fixing America's Surface Transportation Act |
| FDE | Fundamental Data Elements |
| FHWA | Federal Highway Administration |
| FIPS | Federal Information Processing Standard |
| FMIS | Financial Management Information Systems |
| FRA | Federal Railroad Administration |
| GLC | Geographic Locator Codes |
| GSA | General Service Administration |
| HAWK | High-Intensity Activated Crosswalk |
| HOT | High-occupancy Toll |
| HOV | High-occupancy Vehicle |
| HPMS | Highway Performance Monitoring System |
| HSIP | Highway Safety Improvement Program |
| HSIS | Highway Safety Information System |
| HSM | Highway Safety Manual |
| IRI | International Roughness Index |
| ITS | Intelligent transportation systems |
| JPCP | Jointed Plain Concrete Pavement |
| JRCP | Jointed Reinforced Concrete Pavement |
| LRS | Linear Referencing System |
| LTPP | Long-Term Pavement Performance |
| MAP-21 | Moving Ahead for Progress in the 21st Century |
| MIRE | Model Inventory of Roadway Elements |
| MIS | Management Information System |

| | |
|---|---|
| MMUCC | Model Minimum Uniform Crash Criteria |
| mph | Miles per hour |
| MUT | Median U-turn |
| NBI | National Bridge Inventory |
| NHS | National Highway System |
| NHTSA | National Highway Traffic Safety Administration |
| NPS | National Park Service |
| PCC | Portland Cement Concrete |
| PHB | Pedestrian Hybrid Beacon |
| PSR | Present Serviceability Rating |
| RCUT | Restricted crossing U-turn |
| RID | Roadway Information Database |
| RIP | Road Inventory Program |
| RSDP | Roadway Safety Data Program |
| RTOR | Right Turns-On-Red |
| Safety PM | Safety Performance Management Measures |
| SHRP | Strategic Highway Research Program |
| SOV | Single-occupancy Vehicle |
| SPI | Single Point Interchange |
| TMG | Traffic Monitoring Guide |
| U.S. | United States |

# EXECUTIVE SUMMARY

Data are key to making sound decisions on the safety performance of roadways. Critical data include not only crash, but roadway and traffic data as well. In 2010, the Federal Highway Administration (FHWA) published the Model Inventory of Roadway Elements - MIRE, Version 1.0 (MIRE 1.0) (*1*). MIRE provides a comprehensive listing of roadway and traffic data elements and accompanying data dictionary that serves as a model of a robust inventory to support data-driven safety decision making. MIRE is a recommended guideline of data elements that States could collect to develop a comprehensive roadway and traffic data inventory for safety management.

Since FHWA released MIRE 1.0, safety analysis techniques have advanced, and both the safety and data communities have developed an increased awareness of the importance of quality data in safety analysis. Additionally, there are new Federal requirements for related data, including the MIRE Fundamental Data Elements (FDE) and the Highway Performance Monitoring System (HPMS) All Road Network of Linear Referenced Data (ARNOLD). The HPMS ARNOLD requirement expanded State obligation to include all public roads into a State's linear referencing system (LRS) base map. This LRS requirement provides at least one means to geospatially locate MIRE data elements. In response to these changes, FHWA initiated a reassessment of MIRE 1.0. The reassessment has resulted in MIRE 2.0.

MIRE 2.0 features a revised format to reflect agencies' transitions to modern database environments away from siloed datasets. MIRE 2.0 aligns with other Federal datasets/requirements, including the HPMS, across FHWA. The updates in MIRE 2.0 include additional operations and design elements that have become more widely implemented since FHWA released the previous iteration of MIRE. The total number of elements in MIRE 2.0 is 205, a net increase of 3 from MIRE 1.0.

MIRE is intended as a guideline to help transportation agencies improve their roadway and traffic data inventories supporting safety analyses. A State does not need to collect every MIRE element or have all their element names and attributes match to MIRE exactly. Rather, States can take what is useful in MIRE and apply it in a way that helps them improve their inventories, and ultimately lead to better data-driven decision making.

# MIRE ELEMENTS

This section presents a listing of the MIRE elements. The elements are broken down into six main sections:

I. Segment

II. Intersection

III. Intersection Leg

IV. Interchange/ramp

V. Horizontal Curve

VI. Vertical Grade

At the beginning of each section is a listing of the elements in that section, followed by detailed information for each element. The information includes an element name, definition, recommended attributes, and a crosswalk table (if applicable) showing the comparison between MIRE and other national datasets.

## I. ROADWAY SEGMENT

1. County Name
2. County Code
3. Highway District
4. Type of Governmental Ownership [FDE]
5. Specific Governmental Ownership
6. City/Local Jurisdiction Name
7. City/Local Jurisdiction Urban Code
8. Route Number [FDE]
9. Route/Street Name [FDE]
10. Begin Point Segment Descriptor [FDE]
11. End Point Segment Descriptor [FDE]
12. Segment Identifier [FDE]
13. Segment Length [FDE]
14. Route Signing
15. Route Signing Qualifier
16. Coinciding Route Indicator
17. Coinciding Route – Minor Route Information
18. Direction of Inventory [FDE]
19. Functional Class [FDE]
20. Rural/Urban Designation [FDE]
21. Federal Aid [FDE]
22. Route Type [FDE]
23. Access Control [FDE]
24. Surface Type [FDE]
25. Total Paved Surface Width
26. Surface Friction
27. Surface Friction Date
28. International Roughness Index (IRI)
29. International Roughness Index (IRI) Date
30. Pavement Condition (Present Serviceability Rating [PSR])
31. Pavement Condition (PSR) Date
32. Number of Through Lanes [FDE]
33. Outside Through Lane Width
34. Inside Through Lane Width
35. Cross Slope
36. Auxiliary Lane Presence/Type
37. Auxiliary Lane Length
38. High-occupancy Vehicle (HOV) Lane Presence/Type

39. HOV Lanes
40. Reversible Lanes
41. Presence/Type of Bicycle Facility
42. Width of Bicycle Facility
43. Number of Peak Period Through Lanes
44. Right Shoulder Type
45. Right Shoulder Total Width
46. Right Paved Shoulder Width
47. Right Shoulder Rumble Strip Presence/Type
48. Left Shoulder Type
49. Left Shoulder Total Width
50. Left Paved Shoulder Width
51. Left Shoulder Rumble Strip Presence/Type
52. Sidewalk Presence
53. Curb Presence
54. Curb Type
55. Median Type [FDE]
56. Median Width
57. Median Barrier Presence/Type
58. Median (Inner) Paved Shoulder Width
59. Median Shoulder Rumble Strip Presence/Type
60. Median Sideslope
61. Median Sideslope Width
62. Median Crossover/Left-Turn Lane Type
63. Roadside Clearzone Width
64. Right Sideslope
65. Right Sideslope Width
66. Left Sideslope
67. Left Sideslope Width
68. Roadside Rating
69. Tapered Edge
70. Major Commercial Driveway Count
71. Minor Commercial Driveway Count
72. Major Residential Driveway Count
73. Minor Residential Driveway Count
74. Major Industrial/Institutional Driveway Count
75. Minor Industrial/Institutional Driveway Count
76. Other Driveway Count
77. Terrain Type
78. Number of Signalized Intersections in Segment

79. Number of Stop-Controlled Intersections in Segment
80. Number of Uncontrolled/Other Intersections in Segment
81. Annual Average Daily Traffic (AADT) [FDE]
82. AADT Year [FDE]
83. AADT Annual Escalation Percentage
84. Percent Single Unit Trucks or Single Truck AADT
85. Percent Combination Trucks or Combination Truck AADT
86. Percentage Trucks or Truck AADT
87. Total Daily Two-Way Pedestrian Count/Exposure
88. Bicycle Count/Exposure
89. Motorcycle Count or Percentage
90. Hourly Traffic Volumes (or Peak and Off peak AADT)
91. K-Factor
92. Peak Hour Directional Factor
93. One/Two-Way Operations [FDE]
94. Speed Limit
95. Truck Speed Limit
96. Nighttime Speed Limit
97. 85th Percentile Speed
98. Mean Speed
99. School Zone Indicator
100. On-Street Parking Presence
101. On-Street Parking Type
102. Roadway Lighting
103. Toll Charged
104. Toll Type
105. Edgeline Presence/Width
106. Centerline Presence/Width
107. Centerline Rumble Strip Presence/Type
108. Passing Zone Percentage
109. Bridge Numbers for Bridges in Segment

## II. AT-GRADE INTERSECTION/JUNCTIONS

110. Unique Junction Identifier [FDE]
111. Type of Intersection/Junction
112. Location Identifier for Road 1 Crossing Point [FDE]
113. Location Identifier for Road 2 Crossing Point [FDE]
114. Location Identifier for Additional Road Crossing Points
115. Intersection/Junction Number of Legs
116. Intersection/Junction Geometry [FDE]
117. School Zone Indicator
118. Railroad Crossing Number
119. Intersecting Angle
120. Intersection/Junction Offset Distance
121. Intersection/Junction Traffic Control [FDE]
122. Signalization Presence/Type
123. Intersection/Junction Lighting
124. Circular Intersection - Number of Circulatory Lanes
125. Circular Intersection - Circulatory Lane Width
126. Circular Intersection - Inscribed Diameter
127. Circular Intersection - Bicycle Facility

## III. INTERSECTION LEG (EACH APPROACH)

128. Intersection Identifier for this Approach
129. Unique Approach Identifier [FDE]
130. Approach AADT
131. Approach AADT Year
132. Approach Mode
133. Approach Directional Flow
134. Number of Approach Through Lanes
135. Left-Turn Lane Type
136. Number of Exclusive Left-Turn Lanes
137. Amount of Left-Turn Lane Offset
138. Right-Turn Channelization
139. Traffic Control of Exclusive Right-Turn Lanes
140. Number of Exclusive Right-Turn Lanes
141. Length of Exclusive Left-Turn Lanes
142. Length of Exclusive Right-Turn Lanes
143. Median Type at Intersection
144. Approach Traffic Control
145. Approach Left Turn Protection
146. Signal Progression
147. Crosswalk Presence/Type
148. Pedestrian Signal Activation Type
149. Pedestrian Signal Presence/Type
150. Crossing Pedestrian Count/Exposure
151. Left/Right Turn Prohibitions
152. Right Turn-On-Red Prohibitions
153. Left Turn Counts/Percent
154. Year of Left Turn Counts/Percent
155. Right Turn Counts/Percent
156. Year of Right Turn Counts/Percent
157. Transverse Rumble Strip Presence
158. Circular Intersection – Entry Width
159. Circular Intersection – Number of Entry Lanes
160. Circular Intersection – Presence/Type of Exclusive Right-Turn Lane
161. Circular Intersection – Entry Radius
162. Circular Intersection – Exit Width
163. Circular Intersection – Number of Exit Lanes
164. Circular Intersection – Exit Radius
165. Circular Intersection – Pedestrian Facility

166. Circular Intersection – Crosswalk Location
167. Circular Intersection – Island Width

## IV. INTERCHANGE/RAMP

168. Unique Interchange Identifier [FDE]
169. Location Identifier for Road 1 Crossing Point
170. Location Identifier for Road 2 Crossing Point
171. Location Identifier for Additional Road Crossing Points
172. Interchange Type [FDE]
173. Interchange Lighting
174. Interchange Entering Volume
175. Interchange Identifier for this Ramp
176. Unique Ramp Identifier
177. Ramp Length [FDE]
178. Ramp Acceleration Lane Length
179. Ramp Deceleration Lane Length
180. Ramp Number of Lanes
181. Ramp AADT [FDE]
182. Year of Ramp AADT [FDE]
183. Ramp Metering
184. Ramp Advisory Speed Limit
185. Roadway Type at Beginning Ramp Terminal [FDE]
186. Roadway Feature at Beginning Ramp Terminal
187. Location Identifier for Roadway at Beginning Ramp Terminal [FDE]
188. Location of Beginning Ramp Terminal Relative to Mainline Flow
189. Roadway Type at Ending Ramp Terminal [FDE]
190. Roadway Feature at Ending Ramp Terminal
191. Location Identifier for Roadway at Ending Ramp Terminal [FDE]
192. Location of Ending Ramp Terminal Relative to Mainline Flow

## V. HORIZONTAL CURVE

193. Curve Identifiers
194. Curve Feature Type
195. Horizontal Curve Degree or Radius
196. Horizontal Curve Length
197. Curve Superelevation
198. Horizontal Transition/Spiral Curve Presence
199. Horizontal Curve Intersection/Deflection Angle
200. Horizontal Curve Direction

## VI. VERTICAL GRADE

201. Grade Identifiers and Linkage Elements
202. Vertical Alignment Feature Type
203. Percent of Gradient
204. Grade Length
205. Vertical Curve Length

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# APPENDIX B

## MODEL MINIMUM CRASH CRITERIA – FIFTH EDITION *(MMUCC)*

Limited excerpts from the document are included in this appendix, the full document is available at:

https://crashstats.nhtsa.dot.gov/Api/Public/Publication/812433

# MMUCC Guideline

## Model Minimum Uniform Crash Criteria

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## Fifth Edition (2017)

U.S. Department of Transportation
National Highway Traffic Safety Administration

NHTSA

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# Executive Summary

Quality data on motor vehicle crashes is essential to improving highway safety at all levels of government. The data is used to identify issues, determine highway safety messages and strategic communication campaigns, optimize the location of selective law enforcement, inform decision-makers of needed highway safety legislation, and evaluate the impact of highway safety countermeasures.

Unfortunately, the use of State crash data is often hindered by a lack of uniformity. Sharing and comparing data between localities, States, and the federal government can be very difficult when the data elements used by separate agencies to describe the same crash characteristic have different definitions or attributes.

To encourage greater uniformity, a voluntary data collection guideline was developed cooperatively by the National Highway Traffic Safety Administration (NHTSA) and the Governors Highway Safety Association (GHSA) in 1998. The Model Minimum Uniform Crash Criteria (MMUCC) guideline identifies a minimum set of motor vehicle crash data elements and their attributes that States should consider collecting and including in their State crash data systems. MMUCC was updated in 2003, 2008, and 2012. This will be the fifth edition of MMUCC.

The *MMUCC 5th Edition* is the result of an 18-month collaboration between NHTSA, Federal Highway Administration (FHWA), Federal Motor Carrier Safety Administration (FMCSA), National Transportation Safety Board (NTSB), GHSA, and subject matter experts from State Departments of Transportation (DOTs), local law enforcement, emergency medical services, safety organizations, industry partners, and academia. There were also opportunities for the traffic records community and general public to contribute through two online forums and at the 2016 Traffic Records Forum.

A number of important changes were made in this edition. States are given more flexibility in how they collect crash data. Elements were rearranged into four distinct sections to streamline the collection of more detailed information on fatal crashes, crashes involving commercial motor vehicles or vehicles placarded as carrying hazardous materials, and crashes involving non-motorists. A new type of data element—the dynamic data element—is introduced for the first time to capture data on topics that are changing rapidly.

As changes to State datasets and systems can be costly and difficult to implement, it is anticipated that no further changes will be made to MMUCC for five years (with the exception of the dynamic data elements). During this period, each of the data elements and their attributes will be monitored for usefulness and reliability. The next update of MMUCC is tentatively scheduled for 2022.

# Introduction

According to the Centers for Disease Control and Prevention (CDC), motor vehicle crashes are the leading cause of death for youth aged 5 to 24. In addition, the National Highway Traffic Safety Administration (NHTSA) has reported increases in many significant motor vehicle crash statistics: in 2015, 35,092 people were killed in motor vehicle crashes—a 7.2% increase from 2014; and an estimated 2,443 million people were injured in motor vehicle crashes in 2015—a 4.5% increase from 2014. The number of fatal crashes also increased 7%, non-fatal injury crashes increased 4.1%, and property-damage-only crashes increased by 3.7% during that same period. Although much of the increase can be attributed to an improved economy and an increase in the number of miles that Americans drove, those two factors alone fail to fully explain this troubling increase. Good data about motor vehicle crashes is critical to help explain yearly fluctuations in motor vehicle deaths and injuries and guide policy makers as they consider appropriate investments to reduce those deaths and injuries.

Law enforcement officials collect data either electronically or manually about every motor vehicle crash (above a State-specified threshold) on police crash reports. The data on each crash report is then submitted to a State's centralized database where it is edited, reported and analyzed by a wide range of stakeholders. The State engineer or local public works director, for example, uses the data to determine which roadways or intersections are unsafe and need improvement. The commander of a State or local law enforcement agency uses the data to determine where to do selective enforcement. The State Highway Safety Office (SHSO) may use the data to determine whether to develop a new safety communication campaign. The State legislator may use the data to introduce safety legislation addressing a specific problem, such as distracted or drunk driving. High quality safety data is essential to identify safety problems, assess the impact of alternative safety countermeasures, communicate safety issues to the media and the public, make better programming and resource allocation decisions, and enable better program monitoring and evaluation.

Although law enforcement officials collect data about motor vehicle crashes, there are significant inconsistencies in the way that such data is collected. Data element definitions, the number and type of data elements, the number and specificity of attributes and the threshold for data collection often vary from jurisdiction to jurisdiction. This makes it especially difficult for data to be compared across State and local agencies, between States, and between States and the federal government. Determining larger patterns and trends in motor vehicle crash data becomes much more challenging under these circumstances.

To encourage greater uniformity and consistency, a voluntary guideline was created to help State and local agencies with the motor vehicle crash data elements and attributes they should consider collecting. The Model Minimum Uniform Crash Criteria (MMUCC) was first developed in 1998 cooperatively by NHTSA and the Governors Highway Safety Association (GHSA). MMUCC has been updated three times—in 2003, 2008 and 2012. This 2017 version is the fifth edition of MMUCC.

## What is MMUCC?

MMUCC is a voluntary guideline that represents a minimum, model set of variables (data elements) that describe a motor vehicle crash. Typically, the data elements and their values (attributes) describe who was involved, where the crash took place, when and under what circumstances it took place, what the impacts of the crash were, and why the crash happened. When used by a reporting agency, MMUCC data elements record what happened during and after a crash. Since this data is so critical to State and local decision-making, State and local

agencies are encouraged to collect as many of the recommended MMUCC data elements and their attributes as possible.

Data elements were incorporated into MMUCC if they were deemed necessary (needed for decision-making purposes) and comprehensive (included all aspects of the issue or problem being described). The MMUCC guideline is based on another standard, the ANSI D16 *Manual on Classification of Motor Vehicle Traffic Crashes*. It was also developed in close cooperation with NHTSA's Fatality Analysis Reporting System (FARS) and, in fact, some of the biggest changes in this 5th Edition of MMUCC were a result of efforts to better harmonize MMUCC and FARS. Data elements mandated by the Federal Motor Carrier Safety Administration (FMCSA) are also included in MMUCC. In addition, data elements recommended under the Model Inventory of Roadway Elements (MIRE) developed by the Federal Highway Administration (FHWA) were considered in the development process.

Every data element includes a definition, a set of attribute values, a rationale and edit checks (if applicable). The attributes may be divided into one or more subfields, and the number of times a characteristic should be reported is represented in MMUCC by labeled boxes. For an illustrative example, see "MMUCC Data Elements" (p. 7). The data is divided into crash, vehicle, person and roadway data elements.

While this 5th Edition of MMUCC presents for the first time a coding value for each attribute of an element, States are still free to implement their own coding system. States also have the option of designing the content and format of their crash report as well as the systems for data collection and data coding to meet their needs. However, a model crash report, which can be used electronically or manually, was developed for the 5th edition of MMUCC and is included in this document in "Appendix C: MMUCC Crash Report" (p. 183).

A process for comparing a State's current set of data elements and attributes with those recommended in this 5th edition of MMUCC is also included in Mapping to MMUCC 5*th* Edition (p. 128). The *Mapping to MMUCC 5th Edition* delineates a process for making the comparison and identifies rules that the traffic records expert must consider when doing the mapping. The intent of this document is to help States identify weaknesses in their data collection systems and then prioritize those data elements and attributes that need to be changed when the State or locality updates its crash report.

## Development Process

As with previous versions of MMUCC, an Expert Panel oversaw the development and revision processes. Public comment was also solicited at meetings such as the Traffic Records Forum and online.

For the 5th edition, the Expert Panel was comprised of representatives from law enforcement, State and local traffic engineers, State highway safety offices, emergency medical services, a motor vehicle manufacturer and researchers. Representatives from the three federal safety agencies (NHTSA, FHWA and FMCSA), as well as the National Transportation Safety Board (NTSB), also served on the Expert Panel. A liaison from the ANSI D16 revision effort also served as an Expert Panel member. (See "Appendix A: MMUCC 2016-2017 Expert Panel Members" (p. 175) for the complete list)

An online forum was developed to collect comments from the public, the traffic records community, and the Expert Panel. The online forum asked questions about specific data elements and solicited changes or improvements to MMUCC. The results of the online forum were aggregated and presented to the first meeting of the Expert Panel in July 2016. Suggestions for improving MMUCC from NHTSA, FMCSA, and FHWA were also presented. A number of

small working groups were formed to further hammer out suggested changes for specific data elements and their attributes.

Following the first meeting, the preliminary recommendations of the Expert Panel were presented to participants, and their comments were solicited, at the 2016 Traffic Records Forum (TRF) in Baltimore, MD.

A second online forum was subsequently posted with additional questions about the preliminary recommendations and other issues.

The Expert Panel met in October 2016 to review the comments made at the TRF and the results of the second online forum. The small working groups presented their recommendations for the data elements and attributes to which they were assigned. The Panel made final recommendations for changes. Following the meeting, the changes were incorporated into a draft of the 5th edition and sent to the Expert Panel for final review and approval.

A summary of changes to MMUCC from the 4th edition to the 5th edition is shown in Appendix B.

## New Features of MMUCC in the 5th Edition

Several significant changes were made in this edition of MMUCC.

First, the data elements are no longer divided into the categories: collected at the scene, derived from other data sources or linked to other databases (such as EMS, hospital, driver licensing, or roadway databases). States now have the autonomy of deciding how to collect each element based upon their individual capabilities. Data elements that were previously indicated as linked or derived are now shown in both the table of contents and by the data element name with the symbol 🔗.

Second, elements were divided into sections to streamline data collection and provide more in-depth information. The new sections address fatal crashes, crashes involving commercial motor vehicles and hazardous materials, and non-motorist crashes. Certain data elements will trigger the new sections and are indicated by **. In an electronic crash report, the new sections should appear on the form once the specific trigger is given.

Third, the document has been reformatted to eliminate multiple “subfields” to collect multiple attributes. A single set of attributes is provided along with the recommended number of selections. The number of selections that MMUCC recommends be collected for certain elements (or subfields of an element) is shown by the term “Select x – y” along with the number of boxes corresponding to the maximum number of allowable selections. Therefore, if an element says, “Select 1 – 2,” MMUCC is recommending that up to two attributes be selected from the accompanying list.

Fourth, many of the lists of attributes have been reordered. When the listing of attributes did not have an implicit ordering, they were grouped alphabetically. When they had an implicit set of groupings, they were listed alphabetically within each group.

Fifth, a coding value is suggested for each attribute in a list. As stated earlier, while these are suggestions, States are free to use their own coding system. In addition, where appropriate, each element or subfield also has the attributes “98 Not Applicable” and “99 Unknown.”

Sixth, as noted previously, suggested edit checks were added to every data element to provide guidance to States and localities so that their collected data is internally consistent and usable for analysis. However, these edit checks are not exhaustive and States are free (and are encouraged) to develop their own edit checks.

Finally, a new type of data element is introduced for the first time. Dynamic Data Elements focus on issues that are so fluid and changeable that they must be evaluated more frequently than once every five years. “DV1. Motor Vehicle Driving Automation System(s)” is an example of a Dynamic Data Element. This field is developing so rapidly that NHTSA plans to review the element every year in conjunction with the annual Traffic Records Forum.

## Reporting Threshold

In addition to specifying the minimum set of uniform data elements that should be collected, MMUCC also indicates for which crashes data should be collected by recommending the threshold for reporting be the most significant motor vehicle crashes.

Without collection of data on the most important crashes, a State or locality’s data will paint an incomplete picture of the motor vehicle crash problem in that jurisdiction. Analysis of the data will be skewed as a result, and the jurisdiction may end up allocating resources inappropriately.

MMUCC recommends the following threshold for all motor vehicle crashes, including those involving non-motorists:

- All crashes statewide involving death, personal injury, or property damage of $1,000 or more should be reported and entered into the statewide database.
- Crash data should be reported for all persons involved.
- Each State should adopt, and encourage their localities to adopt, a reporting threshold that is uniform and consistently implemented statewide.

## MMUCC Crash Reporting Tools and Future Updates

The *MMUCC 5th Edition*, *Mapping to MMUCC 5th Edition*, electronic spreadsheet and the MMUCC crash report form are posted online, available to all States and stakeholders.

MMUCC is generally updated every five years. The next update is tentatively scheduled for 2022. In the months preceding the next update, traffic records experts and the general public will have an opportunity to provide suggestions for improving the 5th Edition.

# MMUCC Data Elements

## *Element Format:*

### (Group + Type) Number. Data Element Name

**Definition** ENTER HERE

**Attribute Values:**

| | | |
|---|---|---|
| Subfield 1 | **Subfield Name/Category** | **Select 1** |
| **00** | **None** | |
| 01 | Attribute one | |
| 02 | Attribute two | |
| 03 | Attribute three | |
| 04 | Attribute four | |
| … | … | |
| **97** | **Not Applicable** | |
| **98** | **Other** | |
| **99** | **Unknown** | |

| | | |
|---|---|---|
| Subfield 2 | **Subfield Name/Category** | **Select 2** |
| **00** | **None** | |
| 01 | Attribute one | |
| 02 | Attribute two | |
| … | … | |
| **97** | **Not Applicable** | |
| **98** | **Other** | |
| **99** | **Unknown** | |

**Rationale** ENTER HERE

**Edit Checks:**

| | |
|---|---|
| E(GT)#.01 | Edit check one |
| E(GT)#.02 | Edit check two |
| … | … |
| E(GT)#.*n* | Edit check *n* |

*Note: "Not Reported" has not been listed as an attribute in this guideline, but signifies that no value was reported for a data element where one was expected (also termed "empty field" or "blank"). This differs from the value "Unknown," which is recorded by the police officer when they are unable to ascertain the correct value for that data element.*

## *Shorthand References*

The Fifth Edition of MMUCC now incorporates attribute number designations, like most State crash reports and FARS. This enables users to easily reference a particular elemental attribute. The shorthand to reference a particular element and attribute combination should be formatted the following way:

**(Group + Type) Number. Subfield Number. Attribute Number**

*Example: To designate First Harmful Event, Overturn/Rollover:* ***C7.1.07***

*C7 = First Harmful Event*

*1 = First Subfield*

*07 = Overturn/Rollover*

# APPENDIX C

## AMERICAN NATIONAL STANDARD - ANSI D.16-2017 (ANSI)

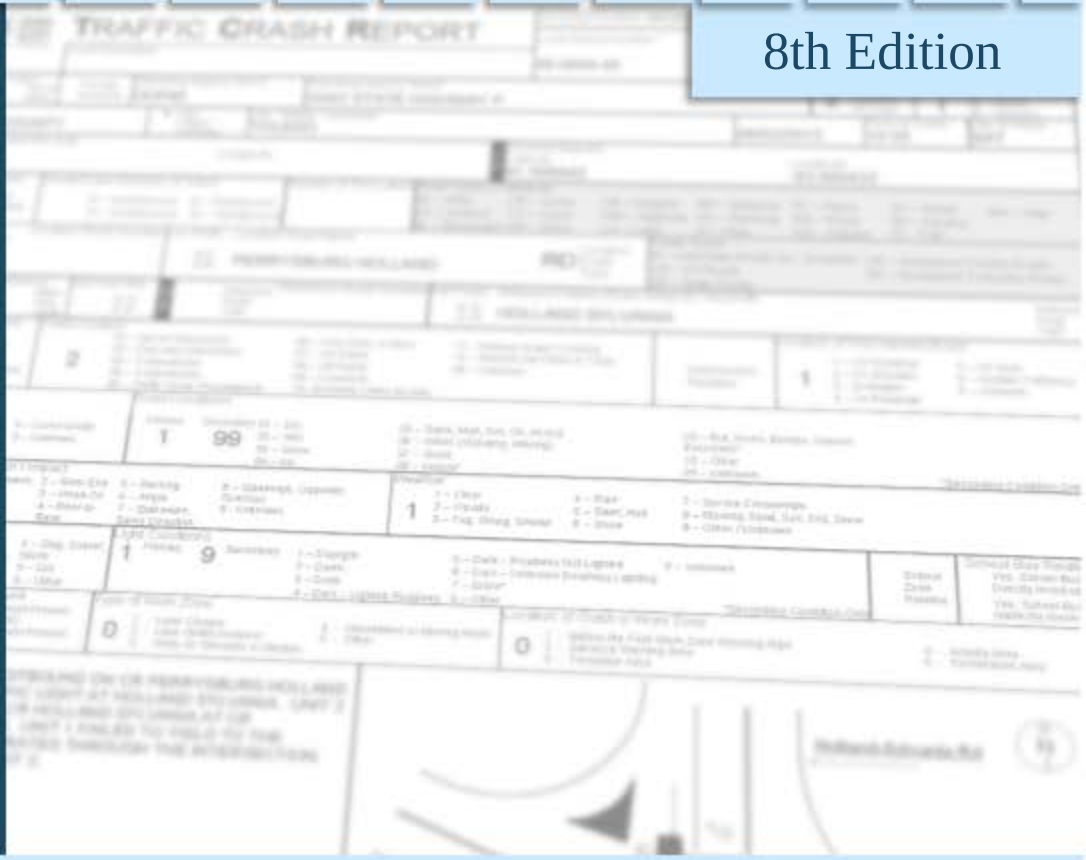
Limited excerpts from the document are included in this appendix, the full document is available at:

https://www.transportation.gov/sites/dot.gov/files/docs/resources/government/traffic-records/304331/ansid16-2017.pdf

AMERICAN NATIONAL STANDARD

ANSI D.16-2017

8th Edition



# Manual on Classification of Motor Vehicle Traffic Crashes

ANSI D.16-2017

Approved American National Standard

ANSI

ATSIP

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ASSOCIATION OF TRANSPORTATION SAFETY INFORMATION PROFESSIONALS

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