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EVALUATION OF 2007 MONTANA CRASH DATA REPORTED TO MCMIS CRASH FILE

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16. Abstract

This report is part of a series evaluating the data reported to the Motor Carrier Management Information System (MCMIS) Crash File undertaken by the Center for National Truck and Bus Statistics at the University of Michigan Transportation Research Institute. The earlier studies showed that reporting to the MCMIS Crash File was incomplete. This report examines the factors that are associated with reporting rates for the State of Montana.

MCMIS Crash File records were matched to the Montana crash file to determine the nature and extent of underreporting. It is estimated that that Montana reported 81.0 percent of reportable crash involvements in 2007.

Reporting rates were found to be related to crash severity, the configuration of the vehicle, and the type of enforcement agency that covered the crash. Over 97 percent of fatal crash involvements were reported, 80.2 percent of injury/transported involvements, and 80.2 percent of towed/disabled involvements. Trucks were reported at a significantly higher rate than buses. Large trucks, especially truck tractors, were reported at a higher rate than smaller trucks.

Missing data rates are low for most variables. Corresponding data elements in the MCMIS and Montana crash files were reasonably consistent, though specific problems were noted with respect to some variables. The timeliness of report was outstanding, with almost 99 percent of records submitted to the MCMIS file within 90 days of the crash.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
		NOTE: volumes greater than 1000 L shall be shown in m^3		
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
		TEMPERATURE (exact degrees)		
^oF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	^oC
		ILLUMINATION		
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	$candela/m^2$	cd/m^2
		FORCE and PRESSURE or STRESS		
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
		MASS		
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
		TEMPERATURE (exact degrees)		
^oC	Celsius	1.8C+32	Fahrenheit	^oF
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/m^2	$candela/m^2$	0.2919	foot-Lamberts	fl
		FORCE and PRESSURE or STRESS		
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in^2

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.
(Revised March 2003)

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1. Introduction

The Motor Carrier Management Information System (MCMIS) Crash file was developed by the Federal Motor Carrier Safety Administration (FMCSA) to serve as a census file of trucks and buses involved in traffic crashes meeting a specified crash severity threshold. FMCSA maintains the MCMIS file to support its mission to reduce crashes, injuries, and fatalities involving large trucks and buses. Accurate and complete crash data are essential to assess the magnitude and characteristics of motor carrier crashes and to design effective safety measures to prevent such crashes. The data in the file are extracted by the States from their own crash records, and uploaded through the SafetyNet system. The usefulness of the MCMIS Crash file thus depends upon individual states identifying and transmitting the correct records on the trucks and buses involved in traffic crashes that meet the crash file severity threshold.

The present report is part of a series of reports that evaluate the completeness and accuracy of the data in the MCMIS Crash file. Previous reports showed some underreporting which seemed to be related in large part to problems in interpreting and applying the reporting criteria within the states' respective crash reporting systems. The problems often were more severe in large jurisdictions and police departments. States also had issues specific to the nature of its own system. [See references 2 to 40.] The States are responsible for identifying and reporting qualifying crash involvements. Accordingly, improved completeness and accuracy ultimately depends upon the efficiency and effectiveness of individual state systems.

This report focuses on MCMIS Crash file reporting by Montana in 2007. Between 2003 and 2006, Montana reported 551 to 691 involvements each year to the MCMIS Crash file. Montana is the 44th largest state by population and in most years ranked about 41st among the states in terms of the number of annual truck and bus fatal involvements. In recent years the number of fatal truck and bus involvements in Montana has increased from 18 in 2004 to 33 in 2007.

Police accident report (PAR) data recorded in Montana's statewide files as of May 2010 were used in this analysis. The 2007 PAR file contains the crash records for 35,611 vehicles.

The process of evaluating state reporting consists of the following steps:

1. The complete police accident report file (PAR file hereafter) from Montana was obtained for the most recent year available, which was 2007.

2. An algorithm was developed, using the data coded in the Montana file, to identify all cases that qualified for reporting to the MCMIS Crash file.

3. All cases in the Montana PAR file—those that qualified for reporting to the Crash file as well as those that did not—were matched to the cases actually reported to the MCMIS Crash file from Montana.

4. Cases that should have been reported, but were not, were compared with those that were reported to identify the sources of underreporting.

5. Cases that did not qualify but which were reported were examined to identify the extent and nature of overreporting.

During the process of evaluation, a number of cases were identified in the Montana crash file as being reportable, but they could not be located in the MCMIS file as having been reported. This list of cases was transmitted to Montana, where personnel reviewed each case to determine why they had not been submitted. This was extremely helpful to understanding the process.

2. Data Preparation

The Montana PAR file and MCMIS Crash file each required processing before the Montana records in the MCMIS Crash file could be matched to the Montana PAR file. In the case of the MCMIS Crash file, the major tasks were to extract records reported from Montana and to eliminate duplicate records. The Montana PAR file was reformatted to create a comprehensive vehicle-level file from accident, vehicle, and person data.

The following sections describe the methods used to prepare each file and some of the problems uncovered.

2.1 MCMIS Crash Data File

The 2007 MCMIS Crash file as of August 27, 2008, was used to identify records submitted from Montana. For calendar year 2007 there were 626 cases reported to the file from Montana. An analysis file was constructed using all variables in the MCMIS file. This analysis file was examined for duplicate records (more than one record submitted for the same vehicle in the same crash; i.e., the report number and sequence number were identical). No such duplicates were found.

In addition, records were reviewed to find cases with identical values on accident number, accident date/time, county, city, vehicle identification number (VIN), and driver license number, but with different vehicle sequence numbers. The purpose is to find and eliminate cases where more than one record was submitted for the same vehicle and driver within a given accident. Duplicates can be generated when, for example, a record is corrected and the original record is not deleted. No such duplicates were found. The resulting MCMIS file contains 626 unique records.

2.2 Montana Police Accident Report File

The Montana PAR data for 2007 was obtained from the state in May 2010. The data were stored as comma-delimited files, representing Accident, Vehicle, and Person information. The files contained records for 21,799 traffic crashes involving 35,611 units. Data for the PAR file are coded from the State of Montana Crash Investigator’s Report (HQ-1599) completed by police officers.

The PAR file was first examined for duplicate records (involvements where more than one record was submitted for the same vehicle in the same crash). A search for records with identical case numbers and vehicle numbers found no instances of duplicates. In addition, inspection of case numbers verified that they were recorded in a consistent format, so there was no reason to suspect duplicate records based on similar, but not identical, number formats (such as 296708 and 2967-8, for example).

Just as in the preparation of the MCMIS Crash file, cases also were examined to determine if there were any records that contained identical time, place, and vehicle/driver variables, regardless of vehicle number. Records from two different crashes would not be expected to be identical on all variables. Records were examined for duplicate occurrences based on the fields for case number, accident date/time, crash county, VIN (first eleven characters), and driver age. Based on the above process, no duplicate pairs were found. The PAR file has 35,611 unique records.

3. Matching Process

The next step involved matching records from the Montana PAR file to corresponding records from the MCMIS file. There were 626 Montana records from the MCMIS file available for matching, and 35,611 records from the Montana PAR file. All records from the Montana PAR data file were used in the match, even those that apparently did not meet the requirements for reporting to the MCMIS Crash file. This allowed the identification of cases reported to the MCMIS Crash file that did not meet the reporting criteria.

Matching records in the two files is accomplished by using combinations of variables common to the two files that have a high probability of uniquely identifying accidents and specific vehicles within the accidents.

Accident ID, used to uniquely identify a crash in the Montana PAR data, and Report Number, in the MCMIS Crash file, are obvious first choices. Accident Key in the Montana PAR file is a 13-digit numeric field, and in the MCMIS Crash file Report Number is stored as a 12-character alphanumeric value. The report number in the MCMIS Crash file is constructed as follows: The first two columns contain the state abbreviation (MT, in this case), followed by nine digits, and a tenth numeric or alpha value. Fortunately, positions 6 to 13 of the PAR accident number, and positions 5 to 12 of the MCMIS report number appear to correspond, so this variable could be used in the match.

Other data items that are useful in matching at the crash level include Crash Date, Crash Time (stored in military time as hour/minute), Crash County, Crash City, Crash Street, and Reporting Officer's Identification number. The PAR file contained all of these variables, except for Crash Street. Officer Badge Number was among the digits of the PAR Accident ID. City Name was present, but unrecorded in 38.1 percent of PAR cases (which may mean that those crashes did not occur within the boundaries of a city).

Variables in the MCMIS file that can be used to distinguish one vehicle from another within the same crash include vehicle license plate number, driver license number, VIN, driver date of birth, and driver last name. Of these, the PAR data file only contains VIN (first eleven characters) and Driver Age. The first eleven characters of the VIN omit the identifying serial

numbers, but are nevertheless useful for matching purposes. The VIN was unrecorded in 22.3 percent of PAR cases, but in only 1 percent of MCMIS cases. Driver Age was not present in 8.5 percent of PAR cases, but was missing in only 2.1 percent of MCMIS cases.

The match was performed in five steps, using the available variables. At each step, records in either file with duplicate values on all the match variables for the particular step were excluded prior to attempting the match, along with records with missing values for the match variables. The first match included the variables crash number, crash date (month, day), crash time (hour, minute), county, city, vehicle identification number (VIN), and driver age. The second match step dropped city as well as driver age, and matched on crash number, crash date, crash time, county, and VIN. After some experimentation, the third match step included crash number, crash date, crash minute, county, driver age, and truck/bus type. The latter variable was created for matching purposes in the PAR and MCMIS datasets with code levels of Truck, Bus, and Other. The variables used in the final attempt at a computer-based match were crash number, truck/bus type, and driver age. The resulting matched records in steps 3 and 4 were each verified to ensure the VINs corresponded.

An attempt was made to hand-match the remaining 41 unmatched cases. In this process, for each unmatched MCMIS case, all cases in the Montana PAR file that occurred in the same county and on the same date were examined for any evidence that they were the same case. Matching by this means resulted in twenty-six additional cases. The fifteen remaining unmatched cases were also searched for by MCMIS report number and by VIN, resulting in one additional match. In total, this manual process resulted in 27 matched cases.

Ultimately, the combination of computerized matching and manual review resulted in matching 97.8 percent of the MCMIS records to the PAR file. Fourteen cases could not be matched. Some of these cases appeared to be duplicate records in the MCMIS file, as a somewhat similar MCMIS record had already been matched to a PAR record with a different crash number. Other records could not be matched due to unrecorded values in the match variables (VIN and driver age). Perhaps some of these records were added to the MCMIS file as a result of attempting to apply corrections to the original records. Table 1 shows the variables used in each match step and the number of records matched at each step.

Table 1 Steps in MCMIS/Montana PAR File Match, 2008

Step	Matching variables	Cases matched
Match 1	Crash number, crash date (month, day), crash time (hour, minute), county, city, vehicle identification number(11 digits), and driver age	28
Match 2	Crash number, crash date, crash time, county, and vehicle identification number(11 digits)	431
Match 3	Crash number, crash date, crash minute, county, truck/bus type, and driver age	99
Match 4	Crash number, truck/bus type, and driver age	27
Match 5	Hand-matched using all available variables	27
Total cases matched		612

The matches made were verified using other variables common to the MCMIS and PAR file as a final check to ensure each match was valid. The above procedure resulted in 612 matches, representing 97.8 percent of the 626 records reported to MCMIS.

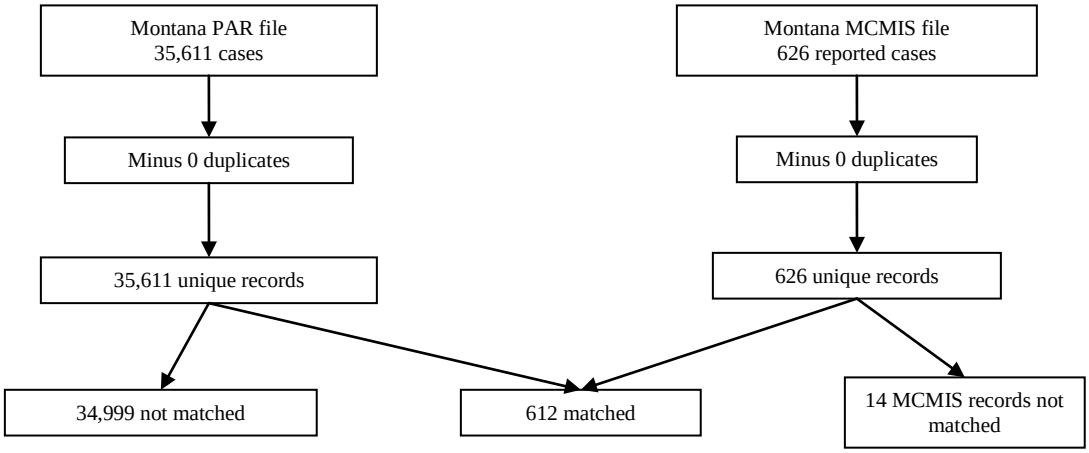

Figure 1 Case Flow in MCMIS/Montana Crash File Match

Of the 612 matched cases, 574 apparently met the MCMIS reporting criteria (and thus identified as "reportable"), insofar as that could be determined using the data supplied, and 38 did not meet the MCMIS reporting criteria (not reportable). The method of identifying cases reportable to the MCMIS Crash file is discussed in the next section.

4. Identifying Reportable Cases

To evaluate how complete reporting is to the MCMIS crash file, it is necessary as a first step to identify records that qualify for reporting, which involves identifying vehicles that meet the vehicle type reporting criteria, and crashes that meet the crash severity criteria. Records are selected as reportable using the information available in the computerized crash files supplied by the State of Montana. Records that are reportable to the MCMIS Crash file meet criteria specified by the FMCSA. The reporting criteria cover the type of vehicle and the severity of the crash. These criteria are discussed in more detail below, but the point here is that records transmitted to the MCMIS Crash file must be selected from among all the records in the state's crash data, using the data that are available in the state's crash data.

The method developed to identify reportable records is intended to be independent of any prior selection by the state being evaluated. This approach is necessary if there is to be an independent check on the completeness of reporting. Accordingly, this process relies on the information recorded by the officers on the crash report for all crashes.

The MCMIS criteria for a reportable crash involving a qualifying vehicle are shown in Table 2. Reportable records must meet both the vehicle type and crash severity criteria. The method used for vehicle criteria and crash severity are each discussed in turn.

Table 2 Vehicle and Crash Severity Threshold for MCMIS Crash File

Vehicle	Truck with GVWR over 10,000 or GCWR over 10,000, or Bus with seating for at least nine, including the driver, or Vehicle displaying a hazardous materials placard.
Accident	Fatality, or Injury transported to a medical facility for immediate medical attention, or Vehicle towed due to disabling damage.

Some states place some of the data elements intended for the MCMIS Crash file in a special section, with instructions to the reporting officer to complete that information only for vehicles and crashes that meet the MCMIS selection criteria. Montana uses a supplemental form (Large Vehicle and Fatal Crash Supplement) to the Crash Investigator's Report (HQ-1599) to collect some additional information on vehicles meeting the following criteria (see Appendix D, p. 37 of Crash Investigator's Instruction Manual):

(1) The vehicle has a gross vehicle weight rating or gross combination weight rating of more than 10,000 lbs. *This would include farm vehicles. Or*

(2) The vehicle is designed to transport more than 8 people, including the driver, *for compensation; or*

(3) The vehicle is designed to transport more than 15 people, including the driver, *and is not used to transport passengers for compensation; or*

(4) The vehicle is used in the transportation of hazardous material in a quantity *requiring placarding*. [all emphases in the original]

Much of the information for the MCMIS crash file is extracted from the HQ-1599 that is completed on all vehicles in the crash. But there are a number of variables for the MCMIS file that come from the Large Vehicle supplement, which is only completed for vehicles meeting the description quoted above.

The description quoted above reasonably matches the MCMIS file requirements, though the wording of point 3 may mislead some investigators, because taken literally it would exclude intercity motorcoaches and charter/tour bus operations, which are clearly intended to be included in the MCMIS crash file. The problem may be generated by point 2, where the notion of transport for compensation is introduced to exclude large family vehicles which may have seating for eight or more. The vehicle type criteria as stated by FMCSA is itemized in Table 2. All fifteen passenger buses should be included, if involved in a crash that meets the crash severity threshold.

4.1 Crash severity

With respect to crash severity, qualifying crashes include those involving a fatality, an injured person transported for immediate medical attention, or a vehicle towed from the scene due to disabling damage. The Montana Person file includes information about the injury severity for each person involved in the crash. Montana classifies injury using the common KABCN scale, where injuries are classified as fatal (K); incapacitating (A); nonincapacitating but evident (B); possible injury (C); not injured(N); injured, but severity unknown; died prior to accident; and unknown if injured.

Fatal crashes are readily identified using the Accident Severity variable. Determining whether an injured person was transported for immediate medical attention is also straightforward. There is an Injured Transportation variable on the Occupant file specifying how the injured person was transported to a medical facility, or if they were not transported. Crashes meeting the injured/transported criteria were thus identified as crashes involving an individual with an A-, B-, or C-injury, or Injured but Severity Unknown *and* transport to a medical facility was indicated. Note that the injury criteria is applied at the *crash* level, meaning any person involved in the crash, not just in a vehicle that meets the MCMIS reporting criteria.

The other reporting criteria related to crash severity has to do with vehicle damage, i.e., whether any vehicle in the crash was towed due to disabling damage. Again, this criteria is applied at the crash level, not just to the trucks or buses that meet the vehicle type criteria. The Montana PAR file includes information needed to identify such crashes. The crash form provides an area for the officer to record Towed Due to Damage (yes, no, unknown). In addition, another variable indicates Vehicle Damage Severity (none, disabling, functional, and other). Disabling is defined as "the vehicle is not drivable", and Functional means "damage to functional parts, but not disabling." Thus, we identified towed due to damage vehicles as those in which Towed =yes, ***or*** those where Vehicle Damage Severity was disabling, except if Towed=no.

4.2 Vehicle Type

Having identified crashes by crash severity, the next step is to identify vehicles that qualify for reporting to the MCMIS Crash file. Vehicle type is captured in the Vehicle Body Style field on the crash form that classifies vehicles among 31 distinct types. There is also a Hazardous Materials flag (Yes/No). The VIN can be used in many cases to definitively identify reportable vehicles, or to identify vehicles that do not meet the reporting criteria.

Vehicle Body Style, Vehicle Make, and the VIN were all used to identify vehicles that meet the vehicle type qualifications of the MCMIS reporting criteria. In general, the vehicle body style categorical variable and the decoded VIN were used primarily to identify reportable vehicles. Where the two variables were consistent and identify a vehicle that met the reporting criteria, those vehicles were taken. The VIN was used to eliminate vehicles that are not reportable, such as those with GVWR less than 10,000 lbs., or to identify reportable vehicles misclassified as light vehicles.

The VINs were decoded by David Hetzel of NISR, Inc., using software that he has developed. Hetzel decoded 27,652 VINs that were recorded in the Montana crash data. (VIN was unrecorded in 7,973 cases, 22.4 percent of all vehicles.) The vehicles with valid VINs were

classified as light vehicles (<10,000 GVWR), pickups with a GVWR over 10,000 pounds, medium and heavy trucks, several different bus types (cross-country, school, transit, etc.), and trailer. Table 3 shows the distribution of vehicle types identified by the VIN. The VIN decoding software is written for truck- and bus-related VINs, so passenger vehicles and other light vehicles that are not trucks are combined into a single category. Note that not all the vehicles identified by the software are necessarily reportable trucks or buses. For example, motorhomes do not qualify, since they are designed for private transportation. In addition, many medium/heavy (GVWR class 3) pickups are used solely for personal transportation and not part of a business. But most of the categories, such as single unit trucks and truck tractors, identify vehicles that are virtually never used solely for personal transportation and thus always qualify.

Table 3 VIN-based Vehicle Type

VIN vehicle	N	Percent
Cross country / intercity bus	9	0.0
Large van	48	0.1
Med/heavy truck based motorhomes	11	0.0
Medium/heavy pickups (>10k lbs)	202	0.6
Other bus type	1	0.0
School bus	68	0.2
Single unit truck (10k-19.5k lbs)	230	0.7
Single unit truck (19.5k-26k lbs)	64	0.2
Single unit truck (>26k lbs)	223	0.6
Step van	6	0.0
Step van or walk in van	1	0.0
Trailer	31	0.1
Transit/commuter bus	20	0.1
Truck tractor (cab only with/without trailer(s))	849	2.4
Light vehicle, un-decodable, or missing	33862	95.1
Total	35,625	100.0

Special attention was given to pickup trucks, since an increasing number of pickups with a class 3 GVWR are used for personal transportation only, i.e., just like any other light passenger vehicle. If the PAR Body Style variable denoted a pickup truck, but the decoded VIN determined that the vehicle was an SUT > 26K lbs. or a Tractor/trailer, then the vehicle was included as a qualifying truck. On the other hand, if the Body Style variable coded by the reporting police officer indicated pickup truck, and the VIN showed that the vehicle was a heavy pickup or an SUT 10-19.5K lbs, some evidence that the vehicle was used for commercial purposes was required. If the commercial flag variable was set to yes, that was taken as evidence that the vehicle was used for commercial purposes and was not a personal use only vehicle. Otherwise the case was excluded. This approach is conservative, in that, since the commercial flag was not indicated as “Yes” for many clearly reportable cases (such as large trucks), it is likely many qualifying heavy pickup trucks were missed, since there was no other evidence of commercial use.

The full method of identifying reportable vehicles is documented in Appendix B. Please see that appendix for the details.

Overall, this approach, while it uses available information to the fullest, is quite conservative. Many vehicles classified in the vehicle body style variable as truck/truck-tractors were found to be light vehicles by VIN. And most of the medium/heavy pickups were not included because no evidence could be found of commercial use.

In addition to these vehicle types, any vehicle, regardless of size, displaying a hazardous materials placard, also meets the MCMIS vehicle type definition. Montana's crash file includes a hazardous materials flag. It was used to identify vehicles transporting hazmat.

In total, there were 709 vehicles identified in the Montana PAR data as eligible trucks and buses in crashes with a K injury, A, B, C or Severity Unknown transported injury, or a towed/disabled vehicle. Table 4 shows the distribution by vehicle type. Medium or heavy trucks accounted for 93.2 percent of the vehicles, while 6.8 percent are buses. No light vehicles with hazmat placards were involved in the serious crashes used for the evaluation.

Table 4 Vehicles Meeting MCMIS Accident and Vehicle Criteria
Montana PAR File, 2007

Vehicle type	N	%
Truck	661	93.2
Bus	48	6.8
Other, transporting hazmat	0	0.0
Total	709	100.0

Implementing the eligible vehicle and crash severity filters identified a total of 709 cases in the Montana crash data in 2007. There were 709 qualifying vehicles—either a truck or bus—involved in a crash that included either a fatality; an A-, B-, C-injury or an injury of unknown severity transported for treatment; or a tow/disabled vehicle.

As Figure 1 above shows, there were 626 records reported to the MCMIS Crash file by Montana in 2007. Of these, 612 were matched to the Montana PAR file. Of the 612 matched records, 574 were identified as meeting the reporting criteria under the method described above, and 38 did not qualify for reporting. There were 626 records reported to the MCMIS Crash file for 2007, of which 574 were determined to meet the MCMIS reporting criteria. Therefore, of the 709 reportable records, 574 were actually reported, for an overall reporting rate of 81.0 percent.

5. Factors Associated with Reporting

The process described in section 4 identified 709 records in the 2007 Montana crash file as meeting the MCMIS Crash file reporting criteria. This section provides a discussion of factors that are associated with the successful identification and reporting of records to the MCMIS Crash file.

5.1 Overreporting

Table 5 shows the cross-classification of the 38 reported cases that apparently did not meet the MCMIS reporting criteria. Note that of the 38, only two were trucks and the rest were some other type of vehicle. Thirty-five of the records were for vehicles that the VIN showed were light

passenger vehicles, and therefore did not meet the truck or bus criteria. Two were pickup trucks that met the GVWR criteria, but there was no evidence in the crash file that the vehicle was used for commercial purposes. And in the case of three records, the information in the crash file showed that the vehicle was not involved in a crash that included either a fatality, injury transported for medical attention, or a vehicle towed due to disabling damage.

Table 5 Vehicle Type and Crash Severity for Reported Cases That Did Not Meet MCMIS Reporting Criteria

Vehicle type	Injured/ transported	Towed/ disabled	Other	Total
Truck	0	0	2	2
Other	9	26	1	36
Total	9	26	3	38

5.2 Reporting Criteria

This section presents the results of examining reporting rates by the factors—crash severity and vehicle type—that are used to determine if a specific crash involvement is reportable. This analysis is intended to help identify characteristics of the vehicle or crash that are more likely to trigger the process that results in a reported case.

Table 6 shows reporting rates, the number of unreported cases, and the proportion of unreported cases for each level of the MCMIS crash severity criteria. Traffic crashes that resulted in a fatality were reported at the highest rate, at 97.0 percent, with only one fatal crash involvement not reported. The two less-severe levels of crash severity were reported at lower but identical rates, 80.2 percent. Reporting rates are lower for non-fatal crashes. That is, non-fatal, yet reportable, crashes are less likely to be recognized as meeting the requirements of the MCMIS Crash file. Fatal crashes are likely given a higher level of scrutiny than non-fatal, and so are more likely to be included.

Table 6 Reporting Rate by MCMIS Crash Severity, Montana 2007

Crash severity	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Fatal crash	33	97.0	1	0.7
Injury/transported crash	247	80.2	49	36.3
Tow/disabled crash	429	80.2	85	63.0
Total	709	81.0	135	100.0

The second component of the MCMIS Crash file criteria is the vehicle type. As described above, trucks, buses, and other vehicles transporting sufficient amounts of hazmat to require a placard all meet the reporting requirements. There were no light vehicles transporting hazmat among the serious crashes evaluated in this report, so only reporting rates for trucks and buses are considered here. Table 7 shows the rates for the different general types of vehicles. The reporting rate for trucks was 85.2 percent, very near to the overall rate, which is expected since trucks account for 661 of the 709 total reportable vehicles. The rate for buses is significantly lower, at 22.9 percent. It appears that a significant proportion of buses are not identified. The inaccurate

description of the criteria for buses with seating for 15 or more passengers in the instruction manual identified above may contribute to the low reporting rate for buses.

Table 7 Reporting Rate by MCMIS Vehicle Class, Montana 2007

MCMIS vehicle class	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Truck	661	85.2	98	72.6
Bus	48	22.9	37	27.4
Total	709	81.0	135	100.0

Table 8 provides more detail about the effect of vehicle configuration on reporting rates, showing rates by the type of vehicle as indicated by the VIN. Note that, among the trucks, the highest reporting rates are for the biggest vehicles. Over 94.7 percent of truck tractors, 74.3 percent of single unit trucks (SUT) with a GVWR over 26,000 lbs., and 57.1 percent of SUTs with a GVWR between 19,500 and 26,000 lbs. were reported. On the other hand, only 35.5 percent of SUTs with a GVWR between 10,000 and 19,500 lbs were reported. Large trucks are most reliably recognized as meeting the reporting requirements, while smaller trucks, which also qualify, are more often overlooked. These vehicles account for almost two-thirds of unreported cases.

Table 8 Reporting Rate by PAR Vehicle Configuration, Montana 2007

VIN Vehicle Type	Reportable cases	Reporting rate	Unreported	% of total unreported
Light vehicle*	9	11.1	8	5.9
Large van	12	16.7	10	7.4
Step van	3	33.3	2	1.5
School bus	17	17.6	14	10.4
Cross country/intercity bus	3	33.3	2	1.5
Transit/commuter bus	6	33.3	4	3.0
Medium/heavy pickup truck (>10K lbs)	1	0.0	1	0.7
Single unit truck (10K-19.5K lbs)	31	35.5	20	14.8
Single unit truck (19.5K-26K lbs)	28	57.1	12	8.9
Single unit truck (>26K lbs)	113	74.3	29	21.5
Truck tractor with or without trailer(s)	471	94.7	25	18.5
Trailer	3	100.0	0	0.0
Unknown	12	33.3	8	5.9
Total	709	81.0	135	100.0

* Some light vehicles by VIN are included if the reporting officer classified the vehicle as a bus. Reportable buses include vehicles with GVWR under 10,000 lbs.

Reporting rates for buses are generally lower than for trucks. Rates for school buses are about half of the rates for cross country/intercity and transit/commuter buses, but the frequencies of the latter two categories are so small that the differences are not statistically meaningful. One-third of the reportable involvements of cross-country and transit buses were reported, and only about one in six reportable school bus crashes were reported.

Reporting rates, which are a measure of how reliably reportable records are recognized as meeting the MCMIS reporting criteria, vary by both the type of vehicle and by the severity of the crash. The effects do not seem to be additive. Reporting of fatal crashes is high for both trucks and buses, but significantly higher for trucks than buses for injury/transported crashes and towed/disabled crashes. (See Table 9.)

Table 9 Reporting Rate by Vehicle Type and Crash Severity, Montana 2007

MCMIS Vehicle type	Fatal	Injury/ transported	Towed/ disabled	Total
Truck	96.9	84.3	84.7	85.2
Bus	100.0	23.5	20.0	22.9
Total	97.0	80.2	80.2	81.0

5.3 Case Processing

It was also tested whether delays in transmitting cases may account for some proportion of the underreporting observed in the 2007 data. However, that does not appear to be the case. Table 10 shows reporting rates according to month of the crash. The overall reporting rate appears to be reasonably stable over the course of the year. There are no marked lows or highs. The overall rate was 81.0 percent and the reporting rate for most months was within a few percentage points of that number. March saw the lowest rate, but that was only 70.0 percent, and both the preceding and following months were very near or a few points higher than the overall rate. In fact the highest monthly rate followed immediately the lowest monthly rate. There do not appear to be any seasonal factors that might account for the low overall rate of reporting. As will be shown below reporting latency was outstanding, with effectively all cases reported within 90 days of the date of the crash.

Table 10 Reporting Rate by Accident Month, Montana 2007

Crash month	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
January	71	84.5	11	8.1
February	110	80.0	22	16.3
March	40	70.0	12	8.9
April	33	87.9	4	3.0
May	53	77.4	12	8.9
June	55	85.5	8	5.9
July	40	87.5	5	3.7
August	35	77.1	8	5.9
September	56	78.6	12	8.9
October	46	87.0	6	4.4
November	91	82.4	16	11.9
December	79	75.9	19	14.1
Total	709	81.0	135	100.0

5.4 Commercial Vehicle Indicator

The Montana Crash Investigator's Report includes a check box for commercial vehicles. The definition of a commercial vehicle is provided in Appendix D of the *Crash Investigator's Instruction Manual*. In Appendix D, somewhat different definitions are given for vehicles that are operated interstate and intrastate. The definition for interstate vehicles closely follows the MCMIS reportable vehicle type definition, with the exception of the definition of a bus for 15 or more passengers (discussed above on page 6). The definition of intrastate commercial vehicles also requires that the vehicle have a GVWR of 26,000 lbs. or more. This likely reflects a Montana regulatory distinction, but the MCMIS reporting definition does not include this distinction.

Setting the commercial vehicle indicator is strongly associated with correctly reporting reportable cases to the MCMIS crash file. Almost 93 percent of reportable vehicles that had the commercial vehicle indicator set were actually reported, compared with about 70 percent of reportable vehicles where the flag was not set. These cases account for almost 82 percent of the reportable cases that were not reported, so checking that box in every case where the vehicle meets the MCMIS vehicle type criteria would likely raise the reporting rate significantly. Of course, the information may be used for some other purpose than to identify MCMIS-reportable vehicles, so changing the effective use of the box on the crash form may not be appropriate.

Table 11 Reporting Rates by Commercial Vehicle Indicator, Montana 2007

Indicator	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
No	362	69.6	110	81.5
Yes	347	92.8	25	18.5
Total	709	81.0	135	100.0

Overall, the commercial vehicle indicator is set in only about 50 percent of the reportable cases. The rate is higher for vehicles with a GVWR over 26,000 lbs, but it is only about 60 percent for vehicles that the VIN shows as truck tractors, and only about 37 percent where the VIN shows the vehicle is a SUT with a GVWR over 26,000 lbs.

5.5 License state

License state could be used to more fully understand the use of the commercial vehicle indicator, given the inter/intrastate distinction in Montana's definition of a commercial vehicle. However, vehicle registration state was not included in the crash data file supplied for this evaluation.

5.6 Reporting Agency

In addition to the reporting criteria, reporting rates may reflect differences in the type of enforcement agency that investigated and reported the crash. The level and frequency of training or the intensity of supervision may also vary. Such differences can serve as a guide for directing resources to areas that would produce the greatest improvement. This section examines reporting rates by agency.

Reporting rates vary significantly by the type of investigating agency, as reflected in Table 12. There are three primary levels of investigating agencies identified in the Montana crash file: Highway Patrol, county sheriff, and city police. Crashes covered by the State police have the highest reporting rate, at 88.3 percent, while rates for the other agency types were lower. The reporting rate for county sheriff was 54.5 percent, and city police 41.2 percent. The Montana highway patrol covered the great majority (84.1 percent) of all reportable crashes, so the majority of unreported cases (51.9 percent) were covered by the highway patrol. Local police departments account for about 44.4 percent of the unreported cases and county sheriffs only 3.7 percent. It is likely the differences in training and enforcement duties account for the marked differences in reporting rates among the agencies.

Table 12 Reporting Rate by Investigating Agency, Montana 2007

Investigating agency	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Highway Patrol	596	88.3	70	51.9
County Sheriff	11	54.5	5	3.7
City Police	102	41.2	60	44.4
Total	709	81.0	135	100.0

Table 13 shows the top five police departments, in terms of the number of unreported cases. These five account for 80 percent of the unreported cases from police departments. These five cities are all among the largest in Montana. They are also located along the primary east-west and north-south routes through Montana. It is likely that they see a lot of truck travel on the Interstate highways.

Table 13 Reporting Rates for Selected Police Departments, Montana 2007

Police department	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Billings	26	30.8	18	30.0
Great Falls	19	36.8	12	20.0
Missoula	13	38.5	8	13.3
Helena	8	37.5	5	8.3
Kalispell	6	16.7	5	8.3
Five Dept. Total	72	33.3	48	80.0
All Police Depts.	102	41.2	60	100.0

The Montana Highway Patrol is organized into eight districts, covering geographically contiguous counties. Reporting rates were determined for each of the districts, to see if there was some variation in reporting rates between the districts, but there was no significant variation. There are no significant differences in the reporting rates between the Highway Patrol districts.

5.7 Fire Occurrence

FMCSA has a special interest in ensuring that reportable crash involvements in which a vehicle fire occurred are accurately reported. With respect to the occurrence of fire in reportable crash

involvements, there were 19 such cases, and 15 were reported, for a reporting rate of 78.9 percent. Sixteen of the fires occurred in truck crashes, and three in bus crashes. The reporting rate for truck fires was almost 88 percent, which the rate for bus fires was 33.3 percent.

Table 14 Reporting of Crash Involvements with Fire Occurrence, Montana 2007

Vehicle type	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Truck	16	87.5	2	50.0
Bus	3	33.3	2	50.0
Total	19	78.9	4	100.0

6. Data Quality and Reporting Latency of Reported Cases

In this section, we consider the quality of data reported to the MCMIS crash file, as well as reporting latency (time elapsed from crash occurrence to when the crash was reported). Two aspects of data quality are examined. The first is the amount of missing data. Missing data rates affect the usefulness of a data file because records with missing data cannot contribute to an analysis. The second aspect of data quality considered here is the consistency of coding between records as they appear in the state crash file and in the MCMIS Crash file. Inconsistencies may indicate problems in translating information recorded on the crash report to the values in the MCMIS Crash file.

In this section of the evaluation, all cases reported to the MCMIS crash file from Montana for 2007 are used, since the purpose of the analysis is to examine the quality of the data as reported.

6.1 Missing and inconsistent data

Table 15 shows missing data rates for selected, important variables in the MCMIS Crash file. Missing data rates are generally low, with a handful of exceptions. On most fundamental, structural variables, such as date, time, number of fatalities and number of injuries, missing data rates are either zero or extremely low.

The only variable with a significantly high rate of missing data is driver license class, where the information is not present for 12.6 percent of the cases. Roadway access also has a higher rate than other data elements. This information is collected on the Large Vehicle and Fatal Crash Supplement, and officers may be unfamiliar with how to classify roadway access. Rates for some of the sequence of events variables may appear to be high, but probably just reflect that crashes frequently include only one harmful event, the collision itself. The missing data rate for DOT number is calculated only for carriers coded as “Interstate,” which therefore must have a DOT number, but only 1.9 percent of such records in MCMIS were found to be missing that information. Overall, the rates of missing data are exceptionally low, reflecting very complete data collection on these variables.

Table 15 Missing Data Rates for Selected MCMIS Crash File Variables, Montana 2007

Variable	Percent unrecorded	Variable	Percent unrecorded
Report number	0.0	Fatal injuries	0.0
Accident year	0.0	Non-fatal injuries	0.0
Accident month	0.0	Interstate	0.0
Accident day	0.0	Light	2.2
Accident hour	0.0	Event one	1.1
Accident minute	0.0	Event two	58.0
County	0.0	Event three	82.3
Body type	2.7	Event four	95.4
Configuration	0.3	Number of vehicles	0.0
GVWR class	3.7	Road access	5.8
DOT number *	1.9	Road surface	2.2
Carrier state	0.0	Road trafficway	0.2
Citation issued	1.9	Towaway	0.0
Driver date of birth	2.1	Truck or bus	0.0
Driver license number	2.2	Vehicle license number	1.1
Driver license state	2.1	Vehicle license state	1.1
Driver license class	12.6	VIN	1.0
Driver license valid	1.9	Weather	2.2

* Based on cases where the carrier is coded interstate.

Hazardous materials variable	Percent unrecorded
Hazardous materials placard	96.5
Percentages of hazmat placarded vehicles only:	
Hazardous cargo release	9.1
Hazardous materials class (1-digit)	4.6
Hazardous materials class (4-digit)	9.1
Hazardous materials name	4.6

The second section of the table shows missing data rates for the hazardous materials (hazmat) variables. Whether the vehicle displayed a Hazmat Placard was unrecorded in 96.5 percent of cases. The other missing data rates shown are limited to the 22 Montana MCMIS records where the vehicle displayed a hazmat placard, indicating it was carrying hazmat. One record was missing for the 1-digit hazmat class code and the hazmat materials name, and two cases were missing the 4-digit hazmat class. Hazmat cargo release was missing for two records.

The second check on data quality is to compare values for the records in the Montana data with values for comparable variables in the MCMIS Crash file. Inconsistencies here may indicate a problem in preparing the data for upload. This comparison was made for all substantive variables, other than those that were used to match records in the two files.

The values for six variables were compared. Inconsistent results were found in each pair of variables compared, in percentages ranging from 0.5 percent to 4.4 percent. Three cases differed on the number of fatalities (one in the Montana data and zero in the MCMIS data). The other comparisons included vehicle configuration, road surface condition, weather condition, light condition, and hazmat placard.

In many cases, the inconsistency was that data was recorded for the case in the Montana file but the variable was left blank in the MCMIS file. For example, in 13 of the 26 records that were inconsistent on weather condition, there was a valid code in the Montana data, but the field was left blank in the MCMIS data. For light condition, it was 13 out of 24. In these cases, apparently the information was available in the Montana data, but it just was not uploaded into the MCMIS file.

The other inconsistencies were cases where one value was recorded in the Montana data and an inconsistent value in the MCMIS data. For example, there were four records in which the light condition was coded as daylight in the Montana data but dark/not lighted in the MCMIS file. There were seven records where the weather was coded as fog, smog, or smoke, but "not adverse" in the MCMIS data. Some of these problems may arise because the code levels and ordering of the code levels are different between the two files. And if there is manual transcription of the data into SafetyNet, these may be simple transcription errors. Manual data entry is well known to be prone to error. There does not appear to be any pattern to the inconsistencies, so they are not likely to be computer programming errors.

6.2 Reporting latency

Reporting latency also reflects data quality. All reportable crash involvements for a calendar year are required to be transmitted to the MCMIS Crash file within 90 days of the date of the crash. The 2007 MCMIS Crash file as of August 27, 2008, 240 days after the end of 2007, was used to identify records submitted from Montana, so all 2007 cases should have been reported by that date. Figure 2 shows the cumulative percent of cases submitted by latency in days, i.e. the number of days between the crash date and the date the case was uploaded to the MCMIS Crash file. Crash reports are required to be submitted to the MCMIS Crash file within 90 days of the crash. Almost 99 percent of the records that were ultimately reported were submitted within 90 days of the crash. Only seven records were submitted after more than 90 days had elapsed, and the highest number of days was only 137. The median time between crash occurrence and record upload is just 25 days. Two-thirds are submitted within 29 days, and 99 percent were submitted within 95 days.

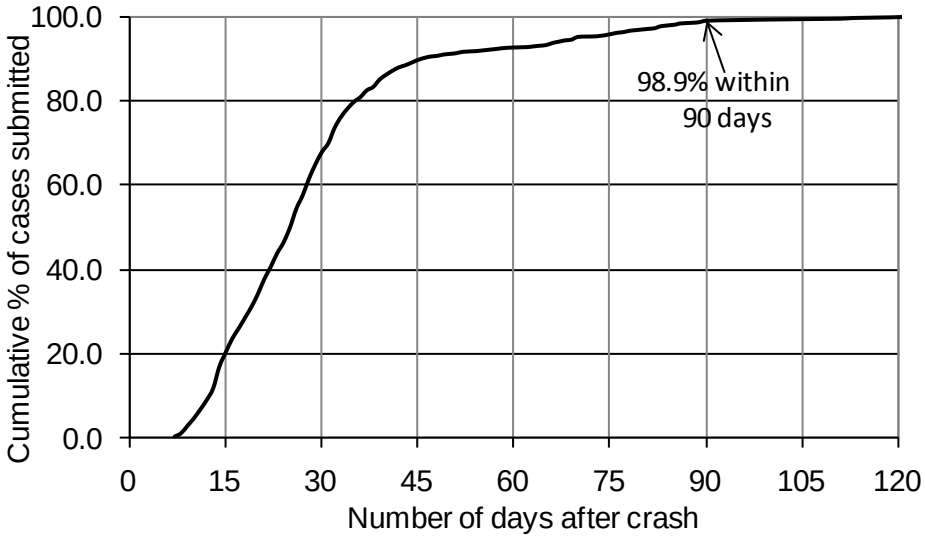

Figure 2 Cumulative Percent of Cases Submitted to MCMIS Crash File by Number of Days After Crash, Montana 2007

The first date on which crash records from 2007 were uploaded was January 16, 2007 when one record was uploaded. On average, uploads occurred every 3.1 days between then and April 18, 2008, when the last upload occurred. An average of 4.3 records were uploaded per upload. About 40 percent of the uploads contained one or two records, and the largest single upload was of 17 records. Most uploads consisted of one to three records, and 75 percent consisted of five or fewer.

7. Summary and Discussion

All the elements needed to identify reportable cases are present in the Montana crash file. The variables are there to find the vehicles that match the MCMIS reporting criteria, i.e., vehicle or combination with a GVWR over 10,000 lbs., a bus with seating for 8 or more passengers, or a vehicle displaying a hazmat placard. Similarly, the MCMIS crash severity criteria can be applied. The data identify people who were injured in the crash and whether they were transported for treatment, as well as vehicles towed due to disabling damage.

Reportable vehicles were identified using a combination of variables, including determining the vehicle's GVWR from the VIN. The primary information used was the vehicle body style field, as corroborated by the VIN, though for some situations—such as a vehicle identified by VIN as a light vehicle, but classified as a bus on the police report—we took the officer's coding over the VIN. In addition, class 3 pickup trucks were only included as reportable vehicles if there was positive evidence that the vehicle was used in commercial operations. The goal was to maximize available information.

A total of 709 records in the Montana data were determined to be reportable and 574 were located in the MCMIS crash file, for an overall reporting rate of 81.0 percent. It was determined that 38 of the records reported actually did not meet the MCMIS reporting criteria, primarily because the vehicles did not qualify as trucks, buses, or vehicles transporting hazardous

materials. Two were reportable trucks but the crash they were involved in did not meet the severity criteria.

The crash data were analyzed to identify factors that were associated with lower rates of reporting. Understanding the types of cases that were reported at a lower rate may be helpful in identifying weak points in the reporting process which can be strengthened.

Fatal crash involvements were reported at a higher rate than the nonfatal crash involvements. All but one of the fatal crashes were reported, but the injured/transported and tow/disabled crashes were reported at an identical 80.2 percent rate. Fatal crashes likely receive more intense investigation and so are more likely to be recognized as meeting the MCMIS reporting criteria. The lower but identical rates for injury/transported and tow/disabled crashes suggests that nonfatal crashes are handled in a separate process but that, within that process, crash severity does not affect the probability of identifying reportable records.

With respect to vehicle types, large trucks are more likely to be reported than smaller ones and trucks as a whole are more likely to be reported than buses. About 85 percent of reportable truck crashes are reported, while only about 23 percent of reportable bus crashes are. An appendix in the crash report's instruction manual inaccurately defines a reportable bus as a "vehicle … designed to transport more than 15 people, …, not for compensation," which, if applied, would exclude all motorcoaches and large commercial buses. This may account for some portion of the underreporting of buses. There may also be some confusion over whether school buses qualify as reportable vehicles. But, evaluation of other states shows there is a general underreporting of bus crashes, which may be because bus crashes do not have as a high a profile as truck.

Among truck involvements, smaller trucks tend to be reported at a lower rate than large trucks. The reporting rate for SUTs with a GVWR between 10,001 and 19,500 lbs. was 35.5 percent, compared with a 94.7 percent rate for truck tractors. Straight trucks in general are reported at a lower rate than truck tractors, even the largest straights. SUTs with a GVWR over 26,000 lbs. were reported at a 74.3 percent rate and accounted for over 1 out of 5 unreported cases. There is a tendency for big trucks to be more readily recognized as meeting the reporting requirements than smaller trucks.

The Montana crash report includes a check box to indicate that the vehicle was involved in a commercial operation. Whether this box was checked was found to be strongly associated with the probability of reporting. The reporting rate when the box was checked was 92.8 percent, compared to only 69.6 percent when it was not checked. Over 80 percent of the unreported cases did not have the commercial vehicle indicator box checked. More consistently checking this box would likely improve the reporting rate.

It terms of the enforcement agency type that covered the crashes, the Montana Highway Patrol had the highest reporting rate at almost 90 percent. The rates for county sheriffs and police departments was significantly lower, at 54.5 percent and 41.2 percent respectively. The low rate for police departments was especially consequential because over 44 percent of the unreported cases were covered by city police. On the other hand, the Highway Patrol covered most of the reported cases, so that, even with their higher than average reporting rate, over half of the unreported cases were covered by the Highway Patrol. These findings may identify opportunities for Montana to raise its already high reporting rate and get closer to full reporting.

In terms of the data reported, the timeliness of uploading cases was outstanding. Almost 99 percent of the cases met the 90 day post-crash reporting requirement. A handful of cases were reported after than limit, but the number was insignificant given the complexity of investigation and process.

With respect to the reported data itself, missing data rates for most fields reported to the MCMIS Crash file are quite low. The rates were somewhat high for driver license class and roadway access, but overall the data are quite complete.

There were some inconsistencies between code values in the Montana crash data and in the MCMIS crash file. For the most part, these inconsistencies did not appear to be reflective of a systematic problem, e.g., a computer programming problem in reformatting the data to submit to SafetyNet. They may be transcription or keypunch errors, though that cannot be determined without a better knowledge of how the data are prepared for SafetyNet.

In many respects, the Montana data and approach to crash reporting facilitate a high reporting rate. The crash report collects all the information needed to determine if a record is reportable through SafetyNet to the MCMIS crash file. Buses tend to be overlooked but they are easily identified in the Montana crash file, and a correction to the *Crash Investigator's Instruction Manual* would reduce any uncertainty as to whether they qualify as reportable vehicles. Improving the use of the commercial vehicle indicator would also clearly raise the overall reporting rate. The crash file, in fact, has all the elements needed to use a computer algorithm to identify reportable cases. There may still be some manual review necessary to ensure that cases are not miscoded, but relying on an algorithm for the primary selection could be helpful in reducing error. The reporting rate for Montana is high relative to many other states that we have evaluated. But the evaluation in this report has identified areas that may be helpful in improving that rate and improving the quality of the data.

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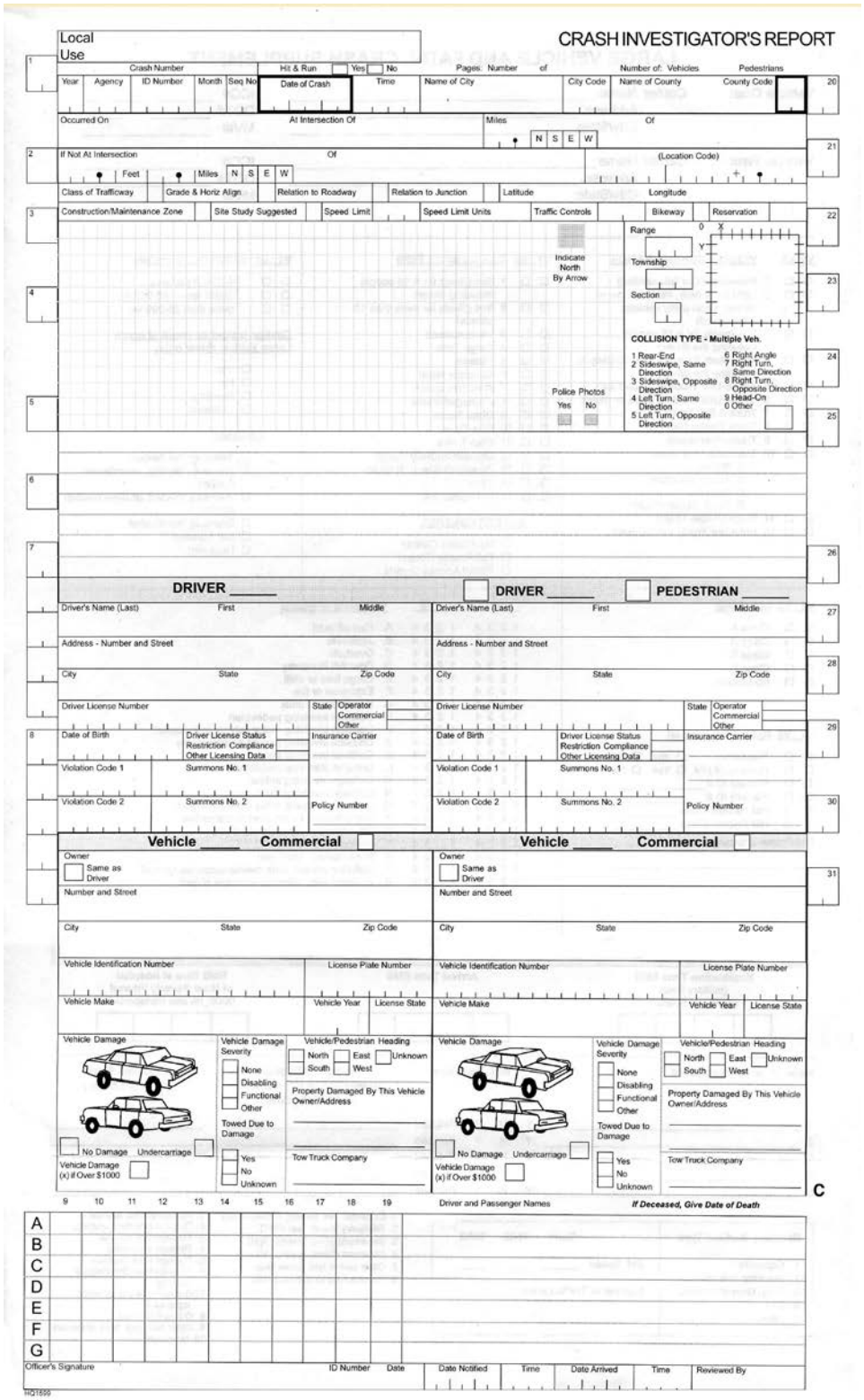
Appendix A Montana Traffic Accident Reports



LARGE VEHICLE AND FATAL CRASH SUPPLEMENT

Vehicle One: Carrier Name:_____ ICC# _____
Address:_____ DOT# _____
City/State:_____ MVI# _____

Vehicle Two: Carrier Name:_____ ICC# _____
Address:_____ DOT# _____
City/State:_____ MVI# _____

V1 V2 VEHICLE CONFIGURATION

- ☐ ☐ 1 Passenger Car **(placarded)**
- ☐ ☐ 2 Light truck (van, mini-van, panel, pickup, sport utility vehicle) **(placarded)**
- ☐ ☐ 3 Bus (seats for 9-15 people, including the driver)
- ☐ ☐ 4 Bus (seats for more than 15 people, including the driver)
- ☐ ☐ 5 Single-Unit Truck (> 10,000 lbs)
- ☐ ☐ 6 Single-Unit Truck (3 axles or more)
- ☐ ☐ 7 Truck & Full Trailer
- ☐ ☐ 8 Truck Tractor (Bobtail)
- ☐ ☐ 9 Tractor/Semitrailer
- ☐ ☐ 10 Tractor/Double Trailer:
  - A Standard
  - B Rocky Mountain
  - C Turnpike
  - D Truck /Trailer-Trailer
- ☐ ☐ 11 Tractor/Triple Trailer
- ☐ ☐ 12 Unknown Truck, can't classify

V1 V2 CARGO BODY TYPE

- ☐ ☐ 1 Bus (Seats for 9-15 people including driver)
- ☐ ☐ 2 Bus (Seats for more than 15 people)
- ☐ ☐ 3 Van/Enclosed
- ☐ ☐ 4 Cargo Tank
- ☐ ☐ 5 Flatbed
- ☐ ☐ 6 Concrete Mixer
- ☐ ☐ 7 Auto Transporter
- ☐ ☐ 8 Garbage/Refuse
- ☐ ☐ 9 Grain Trailer
- ☐ ☐ 10 Pole Trailer
- ☐ ☐ 11 Chip Trailer
- ☐ ☐ 12 Gravel/End/Belly Dump
- ☐ ☐ 13 Pnuematic/Mech. Hopper
- ☐ ☐ 14 Other
- ☐ ☐ 15 Not Applicable

ACCESS CONTROL

- ☐ No Access Control
- ☐ Full Access Control
- ☐ Partial Access Control

V1 V2 GVWR Pwr Unit Only

- ☐ ☐ 10,000 lbs or less
- ☐ ☐ 10,001 lbs — 26,000 lbs
- ☐ ☐ more than 26,000 lbs

Citation issued as result of crash Large Vehicle driver only:

- ☐ Yes
- ☐ No
- ☐ Pending
- ☐ Unknown

Trafficway

- ☐ Two-way, not divided
- ☐ Two-way, divided, unprotected median
- ☐ Two-way, divided, positive median barrier
- ☐ One-way, not divided
- ☐ Not reported
- ☐ Unknown

V1 V2 CDL Class

- ☐ ☐ Class A
- ☐ ☐ Class B
- ☐ ☐ Class C
- ☐ ☐ Class D
- ☐ ☐ No License

V1 V2 Hazardous Material

- ☐ ☐ Placarded ☐ Yes ☐ No
- ☐ ☐ Release of HM ☐ Yes ☐ No
- ☐ ☐ Placard ID #_____
- ☐ ☐ Placard ID #_____
- ☐ ☐ HM Hazard Class _____
- ☐ ☐ HM Hazard Class _____

HM Proper Shipping Name:

_____

V1	V2	Sequence of Events
1 2 3 4	1 2 3 4	A. Ran off road
1 2 3 4	1 2 3 4	B. Jackknife
1 2 3 4	1 2 3 4	C. Overturn
1 2 3 4	1 2 3 4	D. Downhill Runaway
1 2 3 4	1 2 3 4	E. Cargo loss or shift
1 2 3 4	1 2 3 4	F. Explosion or fire
1 2 3 4	1 2 3 4	G. Separation of units
1 2 3 4	1 2 3 4	H. Collision involving pedestrian
1 2 3 4	1 2 3 4	I. Collision involving motor vehicle in transport
1 2 3 4	1 2 3 4	J. Collision involving parked motor vehicle
1 2 3 4	1 2 3 4	K. Collision involving train
1 2 3 4	1 2 3 4	L. Collision involving pedalcycle
1 2 3 4	1 2 3 4	M. Collision involving animal
1 2 3 4	1 2 3 4	N. Collision involving fixed object
1 2 3 4	1 2 3 4	O. Collision involving other movable object
1 2 3 4	1 2 3 4	P. Noncollision: Cross median/centerline
1 2 3 4	1 2 3 4	Q. Noncollision: Equipment Failure
1 2 3 4	1 2 3 4	R. Noncollision: Other
1 2 3 4	1 2 3 4	S. Noncollision: Unknown
1 2 3 4	1 2 3 4	T. Collision w/work zone maintenance equipment
1 2 3 4	1 2 3 4	U. Collision with unknown movable object

FATAL CRASH ONLY:

Notification Time EMS (military time) 0000_not notified ☐☐☐☐

Arrival Time EMS ☐☐☐☐

EMS time at hospital of Most Severly Injured 0000_no one transported ☐☐☐☐

Name of person/s involved	BAC Test Given	Method of Alcohol Determination (On-scene) (use codes below)	Ejection Path (use codes below)
1. _____	Y N ? Refused	_____	_____
2. _____	Y N ? Refused	_____	_____
3. _____	Y N ? Refused	_____	_____
4. _____	Y N ? Refused	_____	_____
5. _____	Y N ? Refused	_____	_____

Roadway Surface Type	Veh1	Veh2	Veh3
1 Concrete	Est. Speed		
2 Blacktop (bituminous)			
3 Slag, Gravel or stone	Number of Traffic Lanes:		
4 Dirt			
5 Other			

1. Evidential Test (Breath, Blood, Urine)
2. Priminiary Breath Test (PBT)
3. Behavioral (Field Sobriety Test)
4. Observed (Smell, speech, etc)
5. Other (saliva test, tissue test)
6. Passive Alcohol Sensor (PAS)

1. Not ejected/not applicable
2. Through side door opening
3. Through side window
4. Through windshield
5. Through back windows
6. Through back door/tailgate opening
7. Out roof opening (sunroof, top down)
8. Out roof (top up)
9. Other path (e.g. back of pickup)
10. Unknown

Appendix B Reportable Vehicle Identification Algorithm

Include where:

1. Body_style=Passenger Car Unknown and VIN_vehicle=Pickup >10K and Commercial_flag=yes.
2. Body_style=Passenger Car Unknown and VIN_vehicle=Bus (School, Cross-country/Intercity, Transit, and Other)
3. Body_style=Van and VIN_vehicle=Van >10K (Large van, Step or Walk-in van)
4. Body_style=Van and VIN_vehicle= Bus (School, Cross-country/Intercity, Transit, and Other)
5. Body_style=Van and VIN_vehicle=Truck (Single Unit Truck or Tractor/Trailer)
6. Body_style=Bus or School Bus
7. Body_style=Pickup Unknown and VIN_vehicle=(Pickup >10K or SUT (10-19.5K)) and Commercial_flag=yes.
8. Body_style=Pickup Unknown and VIN_vehicle=(SUT>19.5K or Tractor/Trailer)
9. Body_style=Truck/Truck-tractor and VIN_vehicle=unrecorded VIN
10. Body_ style=Truck/Truck-tractor and VIN_vehicle=Van >10K(Large van, Step or Walk-in van)
11. Body_ style=Truck/Truck-tractor and VIN_vehicle=Truck (Single Unit Truck or Tractor/Trailer)
12. Body_style=Truck/Truck-tractor and VIN_vehicle= Bus (School, Cross-country/Intercity, Transit, and Other)
13. Body_style=Truck/Truck-tractor and VIN_vehicle=Pickup >10K and Commercial_flag=yes
14. Body_style=Truck/Truck-tractor and VIN_vehicle=Trailer
15. Body_style=Construction equipment and VIN_vehicle= Truck (Single Unit Truck or Tractor/Trailer)
16. Body_style=Other and VIN_vehicle= Truck (Single Unit Truck or Tractor/Trailer)
17. Body_style=Standard Pickup and VIN_vehicle= Bus (School, Cross-country/Intercity, Transit, and Other)
18. Body_style=Standard Pickup and VIN_vehicle=(Pickup >10K or SUT (10-19.5K)) and Commercial_flag=yes.
19. Body_style=Standard Pickup and VIN_vehicle=SUT >19.5K
20. Body_style=Tow Truck in Transit
21. Body_style=Working Construction and VIN_vehicle=Pickup >10K and Commercial_flag=yes
22. Body_style=Working Construction and VIN_vehicle= Truck (Single Unit Truck or Tractor/Trailer)
23. Hazmat_flag=Yes