

**EVALUATION OF 2006 IDAHO CRASH DATA
REPORTED TO MCMIS CRASH FILE**

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Evaluation of 2006 Idaho Crash Data Reported to the MCMIS Crash File

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16. Abstract <p>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 Idaho.</p> <p>MCMIS Crash File records were matched to the Idaho Crash file to determine the nature and extent of underreporting. Overall, it appears that Idaho is reporting 72.9 percent of crash involvements that should be reported to the MCMIS Crash file.</p> <p>Reporting rates vary by crash severity and vehicle type. Overall, more than 90 percent of fatal and injured/transported involvements are reported, but the rate drops to 60.7 percent for crashes that are reportable based on the towed and disabled criterion. Furthermore, 86 percent of the unreported cases fall into the towed and disabled category. It appears that injury-related crashes tend to be reported, while those involving no injury are less likely to be reported. Crashes involving large trucks such as tractor-semitrailers or doubles combinations were more likely to be reported than crashes involving small, single-unit trucks or buses. The reporting rate for the state police is 82.0 percent, while the rate for police departments is 55.7 percent.</p> <p>Missing data rates, except for a few variables, are generally low in the MCMIS Crash file. Compatibility between the vehicle configuration and number of fatalities variables in the Idaho Data file and the MCMIS Crash file is generally good.</p>			
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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)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
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)				
°C	Celsius	1.8C+32	Fahrenheit	°F
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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Evaluation of 2006 Idaho Crash Data Reported to the MCMIS Crash File

1. Introduction

The Motor Carrier Management Information System (MCMIS) Crash file has been 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 selection criteria and crash severity threshold. FMCSA maintains the MCMIS file to support its mission to reduce crashes, injuries, and fatalities involving large trucks and buses. It is essential to assess the magnitude and characteristics of motor carrier crashes to design effective safety measures to prevent such crashes. The usefulness of the MCMIS Crash file depends upon individual states transmitting a standard set of data items on all trucks and buses involved in traffic crashes that meet a specific severity threshold.

The present report is part of a series evaluating the completeness and accuracy of the data in the MCMIS Crash file. Previous reports on a number of states showed underreporting due in large part to problems in interpreting and applying the reporting criteria. The problems were more severe in large jurisdictions and police departments. Each state also had problems specific to the nature of its system. Some states also had overreporting of cases, often due to technical problems with duplicate records. [See references 1 to 25.] The states are responsible for identifying and reporting qualifying crash involvements. Accordingly, improved completeness and accuracy must ultimately reside with the individual states.

In this report, we focus on MCMIS Crash file reporting by Idaho. In recent years, Idaho has reported from 704 to 925 involvements annually to the MCMIS Crash file. According to the 2002 Vehicle Inventory and Use Survey (the last available), in 2002, Idaho had over 85,000 trucks registered, ranking 25th among the states and accounting for 1.6 percent of all truck registrations [26]. Idaho is the 39th largest state by population [27] and generally ranks 38th in terms of the number of annual truck and bus fatal involvements [28, 29].

The method employed in this study is similar to previous studies.

1. The complete police accident report file (PAR file hereafter) from Idaho was obtained for the most recent year available, 2006. This file was processed to identify all cases that qualified for reporting to the MCMIS Crash file.
2. All cases in the Idaho 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 Idaho.
3. Cases that should have been reported, but were not, were compared with those that were reported to identify the sources of underreporting.
4. Cases that did not qualify but which were reported were examined to identify the extent and nature of overreporting.

Police accident report (PAR) data recorded in Idaho's statewide files as of October 19, 2007 were used in this analysis. The 2006 PAR file contains the computerized records of 42,339 units (vehicles and pedestrians) involved in 24,279 crashes that occurred in Idaho.

2. Data Preparation

The Idaho PAR file and MCMIS Crash file each required some preparation before the Idaho records in the MCMIS Crash file could be matched to the Idaho PAR file. In the case of the MCMIS Crash file, the only processing necessary was to extract records reported from Idaho and to eliminate duplicate records. The Idaho PAR file required more extensive work to create a comprehensive vehicle-level file from accident, vehicle, and occupant 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 2006 MCMIS Crash file as of June 4, 2007 was used to identify records submitted from Idaho. For calendar year 2006 there were 834 cases. An analysis file was constructed using all variables in the file. The file was then examined for duplicate records (those involvements where more than one record was submitted for the same vehicle in the same crash; i.e., the report number and sequence number were identical). No such instances were found.

In addition, records were examined for identical values on accident number, accident date/time, county, city, officer badge number, vehicle license number, and driver license number, even though their vehicle sequence numbers were perhaps different. One would not expect two records for the same vehicle and driver within a given accident. Four such duplicates were found, representing two unique occurrences of the examined variables. Only a few variables differed among the two records of each pair, including vehicle sequence number. One record may have been intended as an update, mistakenly resulting in the addition of a second vehicle record for that accident. The record with the latest "Upload date" was kept, and the earlier one deleted. After deleting two records, the resulting MCMIS file contains 832 records.

2.2 Idaho Police Accident Report File

The Idaho PAR data for 2006 (as of October 19, 2007) was obtained from the state of Idaho. The data were stored as a SAS file, representing records at the person level. From this large dataset, a vehicle-level file was created for the present study. The file contains records for 24,279 crashes involving 42,339 units (primarily vehicles and pedestrians). Data for the PAR file are coded from the Idaho Vehicle Collision Report (form ITD-90) completed by police officers.

The PAR file was first examined for duplicate records. A search for records with identical case numbers and vehicle numbers found no such instances. 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, case numbers (such as 06C126063 and 06C126-63, for example). However, cases were also examined to determine if there were any records that contained identical case number, time, place and vehicle/driver variables, even though their vehicle numbers were perhaps different. Two cases would not be expected to be identical on all variables. To investigate this possibility, records were examined for duplicate

occurrences based on the variables case number, accident date/time, crash county, road, investigating officer number, vehicle identification number (VIN), and driver date of birth.

Based on the above algorithm, two duplicate instances were found, representing one unique occurrence of the examined variables. Further examination of the pair revealed that many of the vehicle-specific variables, including vehicle body, model year, license plate state, and cost of damage, had different values, even though VIN and driver birth date were identical. Because it could not be positively determined that these were in fact duplicate cases, both were left in the file.

3. Matching Process

The next step involved matching records from the Idaho PAR file to corresponding records from the MCMIS file. After removing the duplicate cases, there were 832 Idaho records from the MCMIS file available for matching, and 42,339 records from the Idaho PAR file. All records from the Idaho PAR data file were used in the match, even those that were not reportable to the MCMIS Crash file. This allowed the identification of cases in the MCMIS Crash file that did not meet the MCMIS Crash file reporting criteria.

Matching records in the two files requires finding combinations of variables common to the two files that have a high probability of uniquely identifying accidents and specific vehicles within the accidents. Serial number, which is the identifier used to uniquely identify a crash in the Idaho PAR data, and report number in the MCMIS Crash file, are obvious first choices. Indeed, there is a correspondence between the two numbers, and case number was never unrecorded in either file. Serial number in the Idaho PAR file is a nine-digit alphanumeric value, while in the MCMIS Crash file report number is stored as a 12-character alphanumeric value, a combination of alphabetic characters and numbers. It appears that the report number in the MCMIS Crash file is constructed as follows: The first two columns contain the state abbreviation (ID, in this case), followed by ten numeric digits. Since nine of these digits were consistent with the PAR serial number, the corresponding nine digits of the MCMIS report number were extracted, and used in the match.

Other variables typically available for 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. Since crash street was not coded identically in both the PAR and MCMIS files, this variable was not used in the match.

Variables in the MCMIS file that distinguish one vehicle from another within the same crash include vehicle license plate number, driver license number, vehicle identification number (VIN), driver date of birth, and driver last name. Only VIN, driver date of birth, and driver age were available in the PAR file. VIN was unrecorded <0.1% of the time in the PAR data and was unknown in 1.8% of MCMIS cases. In the PAR file, driver date of birth and driver age were each unrecorded in 4.8% of cases, compared to 1.9% of MCMIS cases.

Four separate matches were performed using the available variables. At each step, records in either file with duplicate values on all the match variables were excluded, along with records that were missing values on the match variables. The first match included the variables case number, crash date (month, day), crash time (hour, minute), county, city, officer ID, VIN, and driver date

of birth. The second match step dropped driver date of birth and officer ID. The third match step matched on crash date, crash hour, county, and driver date of birth, dropping case number, minute, city, officer ID, and VIN. After some experimentation, the fourth match included variables case number, date, hour, county, and VIN. This process resulted in matching 97.2% of the MCMIS records to the PAR file.

Table 1 shows the variables used in each match step along with the number of records matched at each step. Matched records were verified using other variables common to the MCMIS and PAR file as a final check to ensure the match was valid. The above procedure resulted in 809 matches, representing 97.2% of the 832 non-duplicate records reported to MCMIS.

Table 1 Steps in MCMIS/Idaho PAR File Match, 2006

Step	Matching variables	Cases matched
Match 1	Case number, crash date, crash time, county, city, officer ID, VIN, and driver date of birth	673
Match 2	Case number, crash date, crash time, county, city, and VIN	75
Match 3	Crash date, crash hour, county, and driver date of birth	59
Match 4	Case number, crash date, crash hour, county, and VIN	2
Total cases matched		809

Figure 1 shows the flow of cases in the matching process. Of the 809 matched cases, 156 are not reportable and 653 are reportable. The method of identifying cases reportable to the MCMIS Crash file is discussed in the next section.

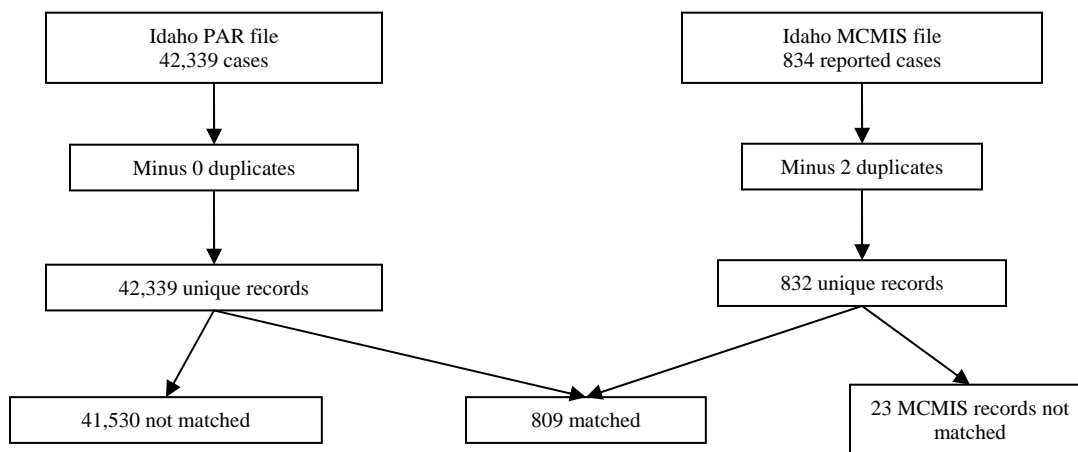


Figure 1 Case Flow in MCMIS/Idaho Crash File Match

4. Identifying Reportable Cases

The next step in data preparation is to identify records in the Idaho data that qualified for reporting to the MCMIS Crash file. Records are identified using the information available in the computerized crash files that were sent by Idaho. The goal of the selection process is to approximate as closely as possible the reporting threshold of the MCMIS file. The MCMIS criteria for a reportable crash involving a qualifying vehicle are shown in Table 2.

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.

The process of identifying reportable records, as set out in Table 2 above, is fairly straightforward in the Idaho PAR file, because Idaho crash data includes most of the variables and levels needed to identify reportable cases. Some states utilize a truck/bus supplemental form with instructions to police officers to fill out that form if any of the involved vehicles meet the criteria for a MCMIS reportable crash. In some other states, there is a commercial vehicle section included as part of the main PAR form. In Idaho, the collision report form (Appendix B) has a section for recording information about commercial vehicles. According to instructions in the Idaho Vehicle Collision Report Form Manual [30], it appears that this section is completed for all commercial vehicles, not just those meeting a certain crash severity threshold. The manual provides a definition of a commercial motor vehicle:

Commercial Vehicle Definition – For collision reporting purposes only, a commercial vehicle is any vehicle equipped to carry property which has six or more tires on the ground (including pickups with dual rear tires), any vehicle displaying a hazardous materials placard, and buses designed to carry 16 or more persons, including the driver.

The definition does not include any information about GVWR, however the commercial vehicle section contains spaces for recording the GVWR for the power unit and all trailers (Appendix B). In addition, there is a commercial vehicle indicator (yes/no) variable in the Idaho PAR file.

Based on the unit type variable, Table 3 shows the relevant body styles used to identify MCMIS qualifying vehicles. A cross-tabulation of the unit type variable and the commercial vehicle indicator variable agrees exactly with the body styles shown in Table 3. That is, all vehicles with body styles shown in Table 3 are coded as commercial vehicles. However, an additional 262 vehicles, coded as pickup/van/panel/sport utility vehicle (unit type – 7), are also coded as commercial vehicles. To check the GVWR of these vehicles, 100 were randomly selected and the vehicle identification numbers (VINs) were decoded. It was determined that the GVWR of 11 of these vehicles exceeds 10,000 pounds, 85 were 10,000 pounds or less, and 4 VINs could

Table 3 Relevant Vehicle Body Style Codes on Idaho Accident Report

15 - Bus
21 – Single unit truck (2 axle/6 tires)
22 – Single unit truck (3 axle)
23 – Truck with trailer
24 – Bobtail
25 – Tractor w/semi trailer
26 – Tractor w/double trailer
27 – Tractor w/triple trailer

not be decoded. Therefore, it is estimated that approximately 11 percent of vehicles coded as unit type=7 in the Idaho PAR file are qualifying vehicles. Based on the relatively low percent, these vehicles are not included in this study as satisfying the 10,000 pound GVWR criterion.

In total, there were 1,827 vehicles identified as trucks, buses, or non-trucks displaying a hazardous materials placard in the Idaho PAR file. Table 4 shows the distribution of vehicle type. The great majority of qualifying vehicles are trucks, while about 6.5 percent are buses. Only one vehicle is identified as a non-truck displaying a hazmat placard. It can be noted that 2,089 vehicles are coded as commercial vehicles in the Idaho PAR file. The difference between 2,089 and the 1,827 shown in Table 4 is 262, the number of vehicles coded as unit type = 7. The hazmat placarded vehicle is a passenger car and is correctly coded as a commercial vehicle according to the commercial vehicle indicator variable.

Table 4 Vehicles Meeting MCMIS Vehicle Criteria, Idaho PAR File, 2006

Vehicle type	N	%
Trucks	1,707	93.4
Buses	119	6.5
Non-trucks with hazmat placard	1	0.1
Total	1,827	100.0

Having identified qualifying vehicles, the next step is to identify crashes of sufficient severity to qualify for reporting to the MCMIS Crash file. Qualifying crashes include either a fatality, an injury transported for immediate medical attention, or a vehicle towed from the scene due to disabling damage. Fatal crashes are readily identified. Variables are coded for determining whether a crash included an injured person transported for medical attention. The Idaho PAR file also has information for assessing the towed and disabled criterion.

There are several variables in the Idaho PAR file that provide injury and hospital-related information. Some variables are recorded at the crash level and others are recorded at the person level. Two variables that are recorded at the person level were used to assess the injured and transported criterion. The first variable is the injury type which describes injury status according to the usual KABCOU scale. The second variable is a transported for medical care variable that describes how an injured person was transported to a medical care facility. This variable has five levels: ambulance, police car, helicopter, private vehicle, and not transported. An injured and

transported variable was created from the injury type and the transported for medical care variables. This variable was merged into a vehicle-level file to create a crash-level injured and transported variable. Therefore, any crash involving an A, B, or C-injury, and a transported person satisfies the criterion.

As a note, a maximum injury severity variable was also created at the crash level from the injury type variable. At the crash level, the Idaho PAR file has number of fatalities and number of injuries variables. The created maximum injury severity variable agrees exactly with both of these variables.

With respect to the towed/disabled criterion, the Idaho PAR data includes two sources of information to identify crashes in which a vehicle was towed due to disabling damage. The towed variable is a yes/no variable indicating whether a vehicle was towed or not. The extent of deformity variable is an ordered variable with increasing levels of damage: none, very minor, minor, minor/moderate, moderate, moderate/severe, severe, and very severe.

According to the Idaho Vehicle Collision Report Form Manual [30], the towed variable is defined to be a towed due to damage variable. Based on the definition it would appear that this variable would be sufficient to identify crashes in which at least one vehicle was towed due to disabling damage. In fact, there is a yes/no check box on the Idaho collision report form (Appendix B) that is specifically designated for vehicles towed due to damage. Instructions to officers state to check yes or no to indicate if the vehicle was towed from the collision scene because of damage sustained to the vehicle as a result of the collision. Furthermore, officers are instructed to check no if the unit was towed due to mechanical problems not associated with the collision, or if the unit was towed as a result of driver incapacity.

However, a cross-tabulation between the towed and the extent of deformity variables shows that approximately 12 percent of vehicles with minor damage are coded as towed due to disabling damage. The percentage increases to about 30 percent for vehicles with minor/moderate damage. In addition, of the 42,339 records at the vehicle level, approximately 40 percent are coded as towed due to damage. Analysis of the towed variable in the 2006 General Estimates System (GES) database [31] shows that approximately 27 percent of vehicles are towed due to damage. Other MCMIS evaluations tend to support this estimate [20, 22]. Based on these considerations, a vehicle is considered towed and disabled if the towed variable indicates the vehicle was towed, and the extent of deformity variable is moderate or greater. This results in an estimated 31.3 percent of vehicles towed due to damage in the Idaho PAR file, which is slightly more than the national estimate of 27 percent, but is consistent with the experience in several other states. A towed and disabled flag variable was created at the crash level to be used for estimating the number of qualifying vehicles satisfying this criterion.

Table 5 shows the numbers of qualifying vehicles that meet the threshold for a MCMIS reportable crash according to the MCMIS criteria. In total, it is estimated that 896 vehicles were reportable to the MCMIS Crash file. Of these, 26 were involved in fatal crashes and 338, or about 37.7 percent, were involved in crashes where at least one person was transported for medical treatment. Based on the towed and disabled variable described above, it is estimated that 532 or about 59.4 percent of reportable vehicles were involved in crashes where at least one vehicle was towed due to disabling damage.

Table 5 Reportable Records in Idaho Crash File, 2006

Crash type	Total	%
Fatal	26	2.9
Injury transported for treatment	338	37.7
Vehicle towed due to damage	532	59.4
Total	896	100.0

5. Factors Associated with Reporting

The procedure described in the previous section identified 896 vehicles involved in crashes as reportable to the MCMIS Crash file. The match process described in Section 3 determined that 832 unique cases were reported to the MCMIS Crash file, of which 809 could be matched to the Idaho PAR data. Of the 809 cases that could be matched, 653 were determined to meet the MCMIS Crash file reporting criteria. Therefore, of the 896 reportable crashes in 2006, Idaho reported 653, for an overall reporting rate of 72.9 percent. In this section, some of the factors that affect the chance that a qualifying crash would be submitted through the SafetyNet system and appear in the MCMIS Crash file are identified. The results are presented in five subsections: overreporting, case processing, reporting criteria, reporting agency and area, and truck/bus fire and explosion occurrence. Analysis of overreporting attempts to identify why cases were submitted that do not meet the MCMIS reporting criteria as defined by Table 2. Case processing deals with timing issues in reporting such as crash month and time lag between crash date and uploading date to the MCMIS Crash file. Reporting criteria includes factors such as vehicle type and crash severity. Reporting agency is associated with differences in reporting rates due to the agency, such as state police or local police, while area investigates reporting by location, such as the county where the crash occurred. Truck/bus fire occurrence examines reportable cases of crashes involving fire or explosion.

5.1 Overreporting

MCMIS evaluations tend to focus on underreporting because sources of underreporting tend to be more prevalent than overreporting. However, almost all states overreport cases to some degree. Overreporting results when cases are submitted to the MCMIS Crash file that do not meet the criteria for a reportable crash. Since 809 MCMIS cases could be matched to the Idaho PAR data, and 653 were determined to meet the reporting criteria, the difference, or 156 cases, were not reportable, and should not have been reported.

Table 6 shows a two-way classification of vehicle type and crash severity, and provides some explanation as to why these vehicles should not have been reported to the MCMIS Crash file. Note that all 156 vehicles do not meet the crash severity threshold for a MCMIS reportable crash as defined in this study. In addition, 31 vehicles do not meet the vehicle criteria since they are not trucks, buses, or hazmat placarded vehicles as defined in Table 3 or according to the hazmat placard variable. Classification of these 31 vehicles by vehicle type shows that 29 are coded as pickup/van/panel/suv. Based on the random sample of 100 of these vehicles that are coded as commercial vehicles, it was shown in Section 3 that about 11 percent have GVWR exceeding 10,000 pounds, so it is possible that some of these are qualifying vehicles. However, none meet

the crash severity threshold for reporting. The 121 trucks and 4 buses are qualifying vehicles, but they were involved in crashes in which there were no fatalities, no persons were injured and transported for medical attention, and no vehicles were towed due to disabling damage as described in this study.

Table 6 Distribution of Non-reportable Vehicles in MCMIS Crash File, Idaho 2006

Vehicle type	Crash severity				Total
	Fatal	Transported injury	Towed/disabled	Other crash severity	
Truck	0	0	0	121	121
Bus	0	0	0	4	4
Other vehicle (not transporting hazmat)	0	0	0	31	31
Total	0	0	0	156	156

5.2 Case Processing

Delays in transmitting cases may partially account for the incompleteness of the MCMIS Crash file. The time lag in extracting and submitting reports to the MCMIS Crash file might explain some portion of the unreported cases. 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 MCMIS file used in this evaluation was dated June 4, 2007, so all 2006 cases should have been reported by that date.

Table 7 shows reporting rates according to month of the crash. Except for the month of June, in which the reporting rate is 88.4 percent, the rates do not fluctuate markedly from the overall rate of 72.9 percent. Some rates are slightly higher than the overall rate and some rates are slightly lower than the overall rate and there does not appear to be much of a seasonal pattern. On the

Table 7 Reporting Rate by Accident Month, Idaho 2006

Crash month	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
January	99	68.7	31	12.8
February	58	75.9	14	5.8
March	69	68.1	22	9.1
April	55	72.7	15	6.2
May	60	71.7	17	7.0
June	69	88.4	8	3.3
July	68	69.1	21	8.6
August	87	77.0	20	8.2
September	79	73.4	21	8.6
October	88	67.0	29	11.9
November	79	74.7	20	8.2
December	85	70.6	25	10.3
Total	896	72.9	243	100.0

other hand, there tend to be more reportable cases in January, and between August and December. January, October, and December are months in which the total percent of unreported cases is greater than 10 percent.

Figure 2 shows the median latency in case submission by month, where latency is the number of days between crash date and the date the case was uploaded to the MCMIS Crash file, minus the 90-day grace period. Therefore, a positive number for a month gives the median number of days cases were submitted after the 90-day grace period. Negative numbers give the median number of days that cases were submitted within the 90-day grace period for a month. Figure 2 shows that Idaho tended to report cases well within the grace period. As shown by the horizontal line, over the entire twelve months cases were submitted approximately 67 days prior to the end of the grace period. For the individual months, the results tend to fluctuate without much deviation about the horizontal line. Even in March, which represents the worst month, cases were submitted about two months (56 days) prior to the end of the grace period, or about one month after the date of the crash. Note that in May, cases tended to be uploaded about 15 days (90-75) after the date of the crash.

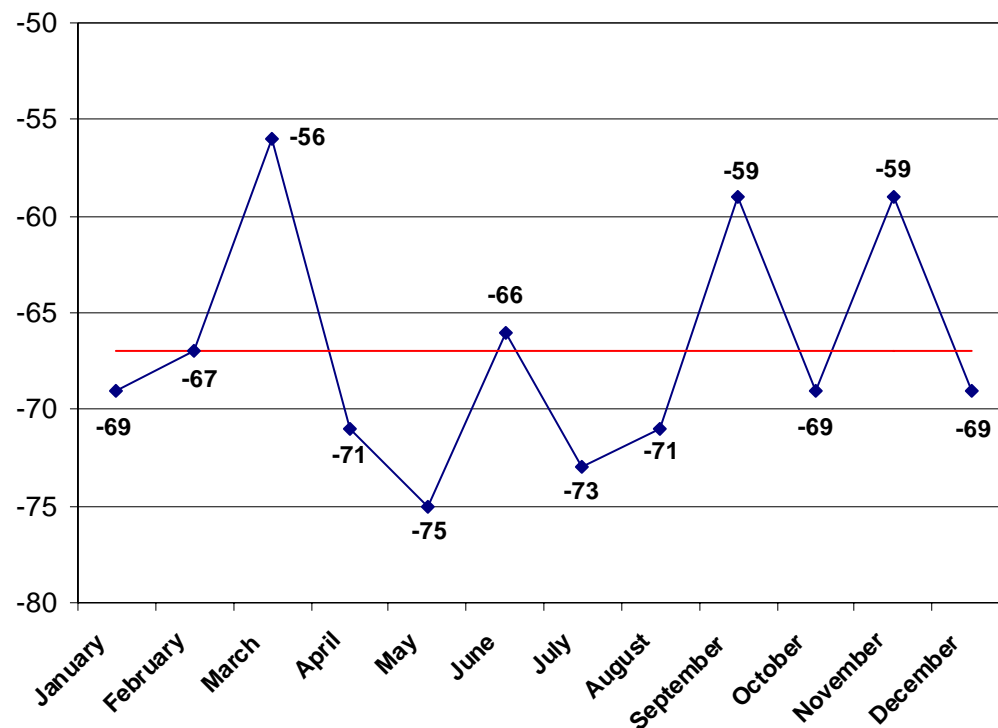


Figure 2 Median Latency (in Days, Minus 90) in Reporting to the MCMIS Crash File, Idaho Reported Cases, 2006

The median latency is reported because the distributions for each month tend to be skewed to the right, meaning that there are a few reported cases with large latency values. These large values are influential and skew the mean (average value) to the right. The median is not influenced by these few large values. For example, over the twelve months the maximum latency (minus 90 days) is 353, while the minimum latency is -89. The plot is based on the 653 matched and reported Idaho cases. Therefore, the median for each month is calculated from approximately 55 vehicles.

5.3 Reporting Criteria

In this section, reporting is investigated according to variables in the Idaho PAR file related to the reporting criteria for a MCMIS-reportable crash, as outlined in Table 2. Previous studies have consistently shown that trucks are more likely to be reported than buses and that fatal crashes are more likely to be reported than injury involvements. Since the criteria revolve around attributes associated with the vehicle type and crash severity, calculating reporting rates for these two variables is a logical starting point for assessing where improvements can be gained.

Table 8 shows reporting rates by vehicle type. Overall, the reporting rate is about 8 percent higher for trucks than for buses. Since trucks represent the majority of reportable cases, the rate for trucks is close to the overall reporting rate. Trucks account for 93.4 percent of the total unreported cases. As shown in Table 4, there is one qualifying passenger car with a hazmat placard, however it is not reportable since it does not meet the crash severity threshold for a MCMIS reportable crash. Therefore, there are no reportable non-trucks with a hazmat placard.

Table 8 Reporting Rate by Vehicle Type, Idaho 2006

Vehicle type	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Truck	850	73.3	227	93.4
Bus	46	65.2	16	6.6
Total	896	72.9	243	100.0

Although Table 8 shows that trucks are more likely to be reported than buses, previous MCMIS evaluations also suggest that certain trucks such as tractor semitrailers are more likely to be reported than single unit trucks. Table 9 shows reporting rates of vehicle type separated into distinct categories of truck types as coded in the Idaho PAR file. The reporting rates for tractor semitrailers and single unit trucks (SUTs) with 3 axles are similar, about 76 percent. However, the reporting rate for SUTs with 2 axles and 6 tires is 59.9 percent. The finding that smaller trucks have lower reporting rates than larger trucks is generally consistent with the results published in other MCMIS evaluations. It can also be seen that tractor semitrailers and SUTs with 3 axles account for 40.3 percent and 11.5 percent of total unreported cases, respectively, while SUTs with 2 axles and 6 tires account for 25.9 percent. The tractor combinations with two or more trailers have the highest reporting rates, but also tend to account for fewer reportable and unreported cases since these truck configurations are less prevalent than some of the more common configurations. Since there is only one category for buses, the result for buses in Table 9 is the same as the one shown in Table 8.

Table 9 Reporting Rate by Detailed Vehicle Body Style, Idaho 2006

Vehicle body type	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Bus	46	65.2	16	6.6
SUT - 2 axle/6 tire	157	59.9	63	25.9
SUT - 3 axle	117	76.1	28	11.5
Truck w/trailer	51	72.5	14	5.8
Bobtail	19	63.2	7	2.9
Tractor w/semitrailer	416	76.4	98	40.3
Tractor w/double trailer	83	80.7	16	6.6
Tractor w/triple trailer	7	85.7	1	0.4
Total	896	72.9	243	100.0

Table 10 shows some very important information with respect to this evaluation. Table 10 shows reporting rates by crash severity. It shows that reporting rates are greater than 90 percent for crashes involving a fatality or an injured person transported for medical attention. However, the rate drops to 60.7 percent for vehicles involved in crashes satisfying the towed and disabled criterion. It appears that Idaho has good measures in place for reporting those crashes that are reportable due to the fatal or injured and transported criteria, but the reporting rate is considerably less for vehicles involved in crashes in which at least one vehicle was towed due to disabling damage. Furthermore, 86 percent of the unreported cases fall into the towed and disabled criterion.

Table 10 Reporting Rate by Crash Severity, Idaho 2006

Crash severity	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Fatal	26	92.3	2	0.8
Injured/Transported	338	90.5	32	13.2
Towed/Disabled	532	60.7	209	86.0
Total	896	72.9	243	100.0

Table 11 shows reporting rates by the maximum injury severity in the crash and enhances the results shown in Table 10. Reporting rates are greater than 90 percent for crashes involving fatalities or injuries, but the rate drops to approximately 50 percent for crashes involving no injuries. Note that the 404 reportable cases involving no injuries represent a subset of the 532 towed and disabled reportable cases shown in Table 10. Some of the 532 towed and disabled cases involved injuries, but may not have involved a person transported for medical attention. Therefore, those cases fall into the towed and disabled category. Table 11 also shows that 82.7 percent of the unreported cases are crashes involving no injuries.

Table 11 Reporting Rate by Detailed Injury Severity, Idaho 2006

Crash severity	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Dead	26	92.3	2	0.8
Incapacitating	113	92.0	9	3.7
Non-incapacitating	164	90.9	15	6.2
Possible	189	91.5	16	6.6
None evident	404	50.2	201	82.7
Total	896	72.9	243	100.0

5.4 Reporting Agency and Area

Beyond the application of the reporting criteria, there can be differences related to where the crash occurs or the type of agency that covered the crash. More densely populated areas with a large number of traffic accidents may not report as completely as areas with a lower work load. The level and frequency of training or the intensity of supervision can also vary. If there are such differences, they may serve as a guide to focus resources in areas and at levels that will produce the greatest improvement. The next set of tables examines areas of the state to see if there are inconsistencies in reporting patterns.

In the 44 counties in Idaho, the number of reportable cases ranges from 1 to 127. Therefore, some of the counties in Idaho are more densely populated than others and additionally, traffic density is also greater in certain counties compared to others. Table 12 shows the top twelve counties in Idaho, ordered in descending order by the number of reportable cases. It is not too surprising that the largest numbers of reportable cases are associated with counties containing the larger cities. For example, Boise is the capital city of Idaho and is located in Ada County. As shown in Table 12, Ada County ranks first in terms of reportable cases and also has the lowest reporting rate among the top 12 counties. The reporting rate in Ada County is about 10 percent lower than the overall average. It also accounts for 19.8 percent of the unreported cases.

The numbers of reportable cases declines considerably after the first few counties shown in Table 12. Cassia, Idaho, and Bannock Counties have reporting rates greater than 85 percent, but these rates are based on relatively few reportable cases. As described above, one hypothesis is that counties that are more densely populated may not report as completely as those that are less densely populated. Although this does appear to be true in Ada County, the reporting rate for the top twelve counties taken as a group is 72.6 percent which is very close to the reporting rate of the remaining 32 counties which is 73.3 percent. The top twelve counties account for 65.4 percent of the total unreported cases.

Table 12 Reporting Rate by County, Idaho 2006

County	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Ada	127	62.2	48	19.8
Canyon	75	70.7	22	9.1
Kootenai	66	68.2	21	8.6
Twin Falls	49	79.6	10	4.1
Elmore	45	77.8	10	4.1
Cassia	42	85.7	6	2.5
Bingham	34	73.5	9	3.7
Bonneville	34	67.6	11	4.5
Minidoka	30	76.7	7	2.9
Power	29	69.0	9	3.7
Idaho	26	88.5	3	1.2
Bannock	24	87.5	3	1.2
Top 12 counties	581	72.6	159	65.4
Other counties	315	73.3	84	34.6
Total	896	72.9	243	100.0

It is also possible that reporting rates are related to the level of reporting agency. Here, agency type may be taken as an indicator of the focus and training of the department. Table 13 shows reporting rates by the various agencies in Idaho. Cases are primarily handled by local police departments, sheriff's departments, or state police. State police and sheriff's departments handle about equal numbers of reportable cases, while police departments handle about half as many. The highest reporting rate among agencies is 82.0 percent for state police. The reporting rate for sheriff's departments is close to the overall rate, while the rate for police departments is 55.7 percent.

Table 13 Reporting Rate by Reporting Agency, Idaho 2006

Reporting agency	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Police Dept	185	55.7	82	33.7
Sheriff's Dept	356	72.8	97	39.9
State police	355	82.0	64	26.3
Total	896	72.9	243	100.0

5.5 Truck/Bus Fire or Explosion

The first harmful event and the most harmful event are recorded at the unit level on the Idaho crash report form. In the context considered here, the unit refers to trucks or buses. Fire/explosion is coded as one of the levels of the event variables. Table 14 shows reporting rates according to fire or explosion for trucks and buses. For trucks there were 9 reportable cases involving fire or explosion, of which all cases were reported. Among buses, there were no fires among reportable cases, so calculation of a reporting rate does not apply.

Table 14 Reporting Rate by Fire/explosion, Idaho 2006

Event	Reportable cases	Reporting rate	Unreported cases	% of total unreported cases
Truck				
Fire/explosion	9	100.0	0	0.0
Other	841	73.0	227	93.4
Bus				
Fire/explosion	0	NA	0	0.0
Other	46	65.2	16	6.6
Total	896	72.9	243	100.0

6. Data Quality of Reported Cases

In this section, we consider the quality of data reported to the MCMIS crash file. Two aspects of data quality are examined. The first is the amount of missing data. Missing data rates are important to 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 Idaho Crash file and in the MCMIS Crash file. Inconsistencies can indicate errors in translating information recorded on the crash report to the values in the MCMIS Crash file.

Table 15 shows missing data rates for selected, important variables in the MCMIS Crash file. There are 832 non-duplicate records in this file. Missing data rates are generally quite 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 zero. Missing data rates for some other variables are higher. Driver license class is completely missing. The variables corresponding to events two, three, and four are missing 29.8, 55.2, and 95.2 percent of cases, though this is not necessarily an indication of a problem, since most crashes consist of a single impact. The body type variable is missing 7.9 percent of cases. The other variables shown in Table 15 are missing less than 5 percent of cases.

Table 15 Missing Data Rates for Selected MCMIS Crash File Variables, Idaho, 2006

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	0.0
Accident hour	0.0	Event one	0.0
Accident minute	0.0	Event two	29.8
County	0.4	Event three	55.2
Body type	7.9	Event four	95.2
Configuration	0.0	Number of vehicles	0.0

Variable	Percent unrecorded	Variable	Percent unrecorded
GVWR class	0.1	Road access	0.7
DOT number *	4.0	Road surface	0.0
Carrier state	1.6	Road trafficway	0.2
Citation issued	1.2	Towaway	0.0
Driver date of birth	1.9	Truck or bus	0.0
Driver license number	2.2	Vehicle license number	0.8
Driver license state	2.6	Vehicle license state	1.2
Driver license class	100.0	VIN	1.8
Driver license valid	1.2	Weather	0.0

* Based on cases where the carrier is coded interstate.

Hazardous materials variable	Percent unrecorded
Hazardous materials placard	21.3
Percentages of hazmat placarded vehicles only:	
Hazardous cargo release	14.3
Hazardous materials class (1-digit)	92.9
Hazardous materials class (4-digit)	14.3
Hazardous materials name	78.6

The table above shows information about the recording of hazardous materials variables. Of the 832 non-duplicate records in the MCMIS Crash file, the hazardous materials placard variable is missing for 21.3 percent of cases. The other percentages in the table pertain only to those vehicles coded with a hazmat placard. Those percentages should be judged accordingly since only 14 vehicles in the entire file are coded as hazmat placarded vehicles.

We also compared the values of variables in the MCMIS Crash file with the values of comparable variables in the Idaho Crash file. The purpose of this comparison is to identify any errors in translating variables from the values in the state crash file to the values required for Safetynet. In some cases, Idaho has adopted similar code levels for certain variables that are used in the MCMIS Crash file.

Table 16 shows the coding of vehicle configuration in the MCMIS Crash file and the record as it appears in the Idaho Crash file. The 809 records are those that were matched between the two files (Figure 1). In general, consistency is very good. The pickup/van/panel/suv configuration in the Idaho PAR file appears to be a source of some inconsistency, but most of the difference is related to 22 vehicles coded as SUTs with 2 axles and 6 tires in the MCMIS file. Given the coding levels available, the classification of the pickup/van/panel/suv configuration as SUTs may represent the best choice.

Table 16 Vehicle Configuration in Idaho and MCMIS Crash Files, 2006

Vehicle configuration		N	%
MCMIS Crash file	Idaho Crash File		
Light trk (only if HM plac)	Pickup/van/panel/suv	1	0.1
Bus (seats >15, incl dr)	Pickup/van/panel/suv	1	0.1
	Bus	34	4.2
SUT, 2-axle, 6-tire	Pickup/van/panel/suv	22	2.7
	SUT - 2 axle/ 6 tires	117	14.5
	SUT - 3 axle	1	0.1
SUT, 3+ axles	Other non-motor veh	1	0.1
	Pickup/van/panel/suv	2	0.2
	SUT - 2 axle/ 6 tires	1	0.1
Truck trailer	SUT - 3 axle	106	13.1
	Bobtail	1	0.1
	Pickup/van/panel/suv	3	0.4
Truck tractor (bobtail)	Truck w/trailer	42	5.2
	Tractor w/semi trailer	3	0.4
	Bobtail	15	1.9
Tractor/semitrailer	Tractor w/semi trailer	371	45.9
	Tractor w/double trailer	1	0.1
	Tractor w/triple trailer	1	0.1
Tractor/triple	Tractor w/double trailer	80	9.9
Unk heavy truck>10,000	Tractor w/triple trailer	5	0.6
Total	Other non motor veh	1	0.1
		809	100.0

Table 17 shows a comparison of the number of fatalities in the crash between the MCMIS Crash file and the Idaho PAR file. This variable agrees between the two files as the numbers of fatalities exactly match.

Table 17 Comparison of Fatals in Crash in MCMIS and Idaho Crash Files, 2006

Number of fatals in crash		N	%
MCMIS Crash file	Idaho Crash file		
0	0	785	97.0
1	1	19	2.3
2	2	5	0.6
Total		809	100.0

7. Summary and Discussion

This report is an evaluation of reporting to the MCMIS Crash file by the state of Idaho in 2006. Records were matched between the Idaho PAR file and the MCMIS Crash file using variables common to both files with low percentages of missing data. After removing duplicate records from both files, 42,339 records remained for matching from the PAR file and 832 records

remained for matching from the MCMIS file. In total, 809, or 97.2 percent of the MCMIS records were matched (Figure 1).

The next step in the evaluation process focused on identifying reportable cases using the Idaho PAR file according to established vehicle and crash severity criteria. The Idaho PAR file has a vehicle type variable for identifying qualifying vehicles (Table 3). Overall, 1,827 vehicles were identified as qualifying trucks, buses, or non-trucks displaying a hazardous materials placard. Of these vehicles, 93.4 percent are trucks, 6.5 percent are buses, and less than 0.1 percent are non-trucks displaying a hazardous materials placard (Table 4). A commercial vehicle indicator variable is also coded in the PAR file. A two-way classification of vehicle type and commercial vehicle indicator shows that all vehicles coded as qualifying vehicles in this study are also coded as commercial vehicles. However, 262 vehicles coded as commercial vehicles are also coded in the pickup/van/panel/suv category. The vehicle identification numbers (VINs) of 100 of these vehicles were randomly selected and decoded. It was found that approximately 11 percent of these vehicles have GVWR greater than 10,000 pounds. Due to the relatively low percent, these vehicles were not included for consideration as qualifying vehicles.

After identifying qualifying vehicles, it is necessary to determine which of these vehicles meet the crash severity criteria for reporting to MCMIS. The Idaho PAR file has an injury type variable at the person level that is coded according to the usual KABCOU injury scale. This variable makes it possible to identify fatal involvements. There is also a transported for medical care variable at the person level that describes the mode of transportation used for transporting injured persons for medical care. In conjunction with the injury type variable, an injured and transported variable was created using the transported for medical care variable. The injured and transported criterion was satisfied if at least one person in the crash had injury severity equal to A or B or C, and the transported variable indicated that the person was transported for medical treatment.

Two variables were used in combination to identify vehicles that were towed and disabled. The Idaho PAR file has a towed variable and an extent of deformity variable. According to the Idaho Vehicle Collision Report Form Manual [30], the towed variable is defined to be a towed due to damage variable. However, examination of this variable shows that approximately 40 percent of vehicles were towed due to damage. Based on previous experience with this variable in other databases [31], and in other MCMIS evaluations [20, 22], suggests that this percentage is too high. Based on these considerations, a vehicle is considered towed and disabled if the towed variable indicates the vehicle was towed, and the extent of deformity variable is moderate or greater. A towed and disabled flag variable was created at the crash level to be used for estimating the number of qualifying vehicles satisfying this criterion.

Using the procedure described above resulted in identification of 896 vehicles involved in crashes that were reportable to the MCMIS Crash file. Of these, 26 were involved in fatal crashes, 338 were involved in injury crashes where at least one person was transported for medical attention, and 532 were involved in crashes where at least one vehicle was towed due to disabling damage. Of the 809 records that were matched between the Idaho PAR file and the MCMIS Crash file, 653 were determined to meet the MCMIS Crash file reporting criteria. Therefore, the overall reporting rate in Idaho in 2006 is estimated at $653/896 = 72.9$ percent. The difference between 809 and 653 suggests that 156 cases were overreported to the MCMIS Crash

file. According to this analysis, all 156 cases did not meet the crash severity threshold for reporting to MCMIS.

Since the overall reporting rate is estimated at 72.9 percent, specific variables were examined to identify sources of underreporting. Reporting rates were calculated and presented in four groups. The four groups are case processing, reporting criteria, reporting agency and area, and fire/explosion. Case processing considers timing issues, reporting criteria deals with vehicle and crash severity issues, agency and area are related to the reporting agency and the county of the crash, and fire/explosion considers fires or explosions in reportable vehicles.

According to crash month, reporting rates did not appear to follow any kind of seasonal pattern or vary in any kind of systematic way. They tended to fluctuate randomly about the overall reporting rate. The minimum reporting rate is 67.0 percent in October and the maximum rate is 88.4 percent in June. In January, October, and December, the percentages of unreported cases are greater than 10 percent. Idaho tended to report cases well within the 90-day grace period between the date of the crash and the date the case was uploaded to the MCMIS Crash file. Overall, cases were uploaded about 67 days prior to the end of the grace period, or in other words, about 23 days (90-67) after the crash date (Figure 2).

Based on vehicle type, the reporting rate for trucks is 73.3 percent, while the rate for buses is 65.2 percent. Larger trucks, such as tractor semitrailers, tractor doubles, tractor triples, and SUTs with 3 axles have the highest reporting rates. Smaller configuration SUTs with 2 axles and 6 tires have the smallest rate at 59.9 percent and account for 25.9 percent of unreported cases.

A significant finding of this study appears to be that reporting rates are greater than 90 percent for crashes involving fatalities or injuries (Tables 10, 11). Idaho seems to have good procedures for reporting crashes that are MCMIS-reportable when injuries are involved. However, the reporting rate drops to 60.7 percent for vehicles involved in crashes in which there are no injuries, but are reportable based on the towed and disabled criterion. In addition, these cases account for 86.0 percent of the total unreported cases. Note that this study uses the strict definition of a MCMIS-reportable crash for identifying reportable cases. That is, based on variables available in the Idaho PAR file, a crash must satisfy the inured and transported criterion, the towed and disabled criterion, or both.

The location of the crash and the reporting agency handling the crash were also investigated. There are 44 counties in the state of Idaho. Ada County ranks first in terms of reportable cases and also has the lowest reporting rate among the top 12 counties. The reporting rate in Ada County is about 10 percent lower than the overall average and it also accounts for 19.8 percent of the unreported cases. With respect to reporting agency, the state police have the highest reporting rate of 82.0 percent. The reporting rate for sheriff's departments is 72.8 percent and for police departments it is 55.7 percent.

There were 9 fire/explosions in reportable cases for trucks, all of which were reported. Among reportable buses, there were no fire/explosions recorded, so calculation of a reporting rate does not apply.

Missing data rates in the MCMIS Crash file were also examined. Except for a few variables such as driver license class, the event variables after the first event, and body type, missing data rates

are generally less than 5 percent. It is common for event variables after the first event to have missing data. Certain variables in the Idaho PAR file and the MCMIS Crash file were also compared for the 809 records that were matched between the two files. There is general agreement between the vehicle configuration variables. The pickup/van/panel/suv category for the vehicle type variable in the Idaho PAR file seems to be a source of coding differences between the two files, but in general the other coding levels agree well. The number of fatalities in the crash variable agrees exactly between the two files.

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- 27 United States Census Bureau, Population Division, Estimates 2000-2005.
- 28 Trucks Involved in Fatal Accidents (TIFA) 1999-2003, Center for National Truck and Bus Statistics, The University of Michigan Transportation Research Institute.
- 29 Buses Involved in Fatal Accidents (BIFA) 1999-2003, Center for National Truck and Bus Statistics, The University of Michigan Transportation Research Institute.
- 30 Idaho Vehicle Collision Report Form Manual, Idaho Transportation Department, Office of Highway Safety.
- 31 National Automotive Sampling System (NASS) General Estimates System (GES) 2006, National Center for Statistics and Analysis, NHTSA.

Appendix A Selection Algorithm to Identify Reportable Records

MCMIS Reporting Criteria	Implementation in Idaho PAR Data
Truck with GVWR over 10,000 or GCWR over 10,000	<p>The unit type variable in the Idaho PAR file was used to identify medium/heavy trucks with GVWR 10,000 lbs or greater.</p> <p style="text-align: center;"> 21 – Single unit truck (2 axle/6tires) 22 – Single unit truck (3 axle) 23 – Truck with trailer 24 – Bobtail 25 – Tractor w/semi trailer 26 – Tractor w/double trailer 27 – Tractor w/triple trailer </p>
or Bus with seating for at least nine, including the driver	<p>The following unit type was used to identify eligible buses:</p> <p style="text-align: center;">15 – Bus</p>
or Vehicle displaying a hazardous materials placard	<p>These vehicles were identified using the hazardous placard variable.</p>
AND	
at least one fatality	<p>The Idaho PAR file uses the usual KABCOU injury scale to define injury.</p> <p style="text-align: center;"> K - Dead A – Incapacitating B – Non-incapacitating C - Possible O – None evident U - Unknown </p>

MCMIS Reporting Criteria	Implementation in Idaho PAR Data
<p>or at least one person injured and transported to a medical facility for immediate medical attention</p>	<p>Using the injury variable described above and the transported for medical care variable, an injured/transported variable was created. The transported for medical care variable is coded</p> <p style="text-align: center;">1 – Ambulance 2 –Police car 3 - Helicopter</p> <p style="text-align: center;">4 – Private vehicle 5 – Not transported</p> <p>The injured/transported criterion was met by the following condition:</p> <p>Injured/transported = injury severity in (A or B or C) and transported for medical care in (1-4)</p> <p>This variable is created at the person level, and merged into the vehicle file as a crash-level variable.</p>
<p>or at least one vehicle towed due to disabling damage</p>	<p>A towed variable was used in conjunction with an extent of deformity variable.</p> <p>The extent of deformity variable has damage levels</p> <p style="text-align: center;">0 – None 1 – Very minor 2 – Minor</p> <p style="text-align: center;">3 – Minor/moderate 4 – Moderate 5 – Moderate/severe</p> <p style="text-align: center;">6 – Severe 7 Very severe</p> <p>This towed due to disabling damage criterion was met by the following condition:</p> <p>Towed = yes and extent of deformity in 4-7</p>

Appendix B Idaho Traffic Accident Reports

Idaho Vehicle Collision Report
 ITD-90 5-95M 27-010500-0 Revised 12/3/96

Agency Code	Officer #	Report District	Case No.	Page 1												
Date of Collision	Day of Collision (Circle) S M T W T F S	Time	Police Dispatched	Police Arrived	EMS Dispatched	EMS Arrived	Location Miles <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> IN <input type="checkbox"/> S <input type="checkbox"/> W <input type="checkbox"/> OF	City or Town								
If Collision location is in: Intersection of 2 streets Parking Lot / Driveway / Alley Non-Intersection	Complete Box #	1 Name of Street <input type="checkbox"/> On Private Property		# of Lanes	Posted Speed	County	Interchange #									
	1, 2	2 In the Intersection with:			Posted Speed	R. R. Crossing #	Latitude (GPS)									
	1, 2, 3	3 Outside an Intersection <input type="checkbox"/> Miles <input type="checkbox"/> Feet <input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> W <input type="checkbox"/> OF		Name of Cross Street or # of Ref. Mile Post Marker		Collision Loc Mile Point	Longitude (GPS)									
UNIT 1 <input type="checkbox"/> Vehicle <input type="checkbox"/> Pedestrian <input type="checkbox"/> Pedalcyclist		Vehicle Owner Last First M.I.				Unit Type										
Driver Last First M.I.		<input type="checkbox"/> Same as Driver		Address		Unit Use										
<input type="checkbox"/> Hit & Run		<input type="checkbox"/> As Driver		Street Address		Home Phone										
Street Address		Home Phone		Vehicle Year	Make (Dodge-Chev.)	Model (Dart-Nova)	Style (2 Dr.)									
City State Zip Code Work Phone		Vehicle Color		License Plate No.		State										
Driver's License No. State Idaho Code # / Violation <input type="checkbox"/> Cited		Vehicle Identification No.		Est. Cost of Damage		Attach 2										
Sex	Date of Birth	Prot Dev.	Injury	Ejection	Trapped	Transported	Insurance <input type="checkbox"/> Yes <input type="checkbox"/> No	Carrier Name	Policy Number							
Passenger Names and Addresses (Unit 1 only, additional passengers on page 3)								Same Address as Driver	Seating	Sex	Date of Birth	Prot Dev.	Injury	Ejection	Trapped	Transported
UNIT 2 <input type="checkbox"/> Vehicle <input type="checkbox"/> Pedestrian <input type="checkbox"/> Pedalcyclist		Vehicle Owner Last First M.I.				Unit Type										
Driver Last First M.I.		<input type="checkbox"/> Same as Driver		Address		Unit Use										
<input type="checkbox"/> Hit & Run		<input type="checkbox"/> As Driver		Street Address		Home Phone										
Street Address		Home Phone		Vehicle Year	Make (Dodge-Chev.)	Model (Dart-Nova)	Style (2 Dr.)									
City State Zip Code Work Phone		Vehicle Color		License Plate No.		State										
Driver's License No. State Idaho Code # / Violation <input type="checkbox"/> Cited		Vehicle Identification No.		Est. Cost of Damage		Attach 2										
Sex	Date of Birth	Prot Dev.	Injury	Ejection	Trapped	Transported	Insurance <input type="checkbox"/> Yes <input type="checkbox"/> No	Carrier Name	Policy Number							
Passenger Names and Addresses (Unit 2 only, additional passengers on page 3)								Same Address as Driver	Seating	Sex	Date of Birth	Prot Dev.	Injury	Ejection	Trapped	Transported
Injured Transported To:								By:								

Front	Seating	Front
1 2 3	Vehicle	1
4 5 6		4
7 8 10	Motorcycle	7
14 Trailing Unit	99 Other	
16 Pedestrian	U Unknown	
17 Pedalcycle		
Passenger Codes - Non Trailing Unit		
11 Sleeper Sect.(Truck Cab)		
12 Other enclosed Passngr./Cargo area		
13 Unenclosed Passngr./Cargo area		
15 Riding on Vehicle Exterior		

Protective Devices	
0 None	4 Child Safety Seat
1 Shoulder Belt Only	5 Helmet Used
2 Lap Belt Only	6 Nonmotorist
3 Shoulder & Lap	
Air Bag Equipped	
7 Non-Activated Air Bag, Belts in Use	
8 Non-Activated Air Bag, No Belts in Use	
10 Air Bag Activated, Belts in Use	
11 Air Bag Activated, No Belts in Use	
Ejection	
1 Not Ejected	1 Not Trapped
2 Totally Ejected	2 Trapped / Extrication unit used
3 Partially Ejected	3 Trapped / other extrication method
T Thrown from cycle etc.	

Injury	
K Dead	
A Incapacitating	
B Non-Incapacitating	
C Possible	
0 None Evident	
U Unknown	
Transported For Medical Care By	
1 Ambulance	
2 Police Car	
3 Helicopter	
4 Private Vehicle	
5 Not Transported	

Unit Type		
1 Pedestrian	8 Pickup with Camper	10 Motorhome
2 Pedalcycle	7 Pickup / Van / Panel / Sport Utility Vehicle	11 Snowmobile
3 Motorcycle	30 Farm Equipment (List)	5 ATV
4 Moped	40 Construction Equip. (List)	28 Train
6 Car		99 Other Non-Motor Veh.
Commercial		
15 Bus	24 Bobtail	
21 Single Unit Truck - 2 axle/6 Tires	25 Tractor w/Semi Trailer	
22 Single Unit Truck - 3 axle	26 Tractor w/Double Trailer	
23 Truck with Trailer	27 Tractor w/Triples Trailer	
Unit Use		Attachments
1 Police	5 Taxi	1 Boat Trailer
2 Ambulance	6 Fire	5 Mobile Home
3 Driver Trng.	7 Wrecker	2 Utility Trailer
4 Government	8 School Bus	3 Travel Trailer
		9 Other
		4 Towed Vehicle

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UNIT # 1	CONTRIBUTING CIRCUMSTANCES - 3 Possible	UNIT # 2
0 None	5 Improper Lane Change	11 Improper Turn
1 Exceeded Posted Speed	6 Following Too Close	12 Failed to Signal
2 Speed Too Fast for Conditions	7 Drove Left of Center	13 Failed to Yield
3 Too Slow for Traffic	8 Off Roadway / Over Corrected	14 Passed Stop Sign
4 Improper Overtaking	10 Improper Backing	15 Disregarded Signal
	11 Tire Defect	16 Tire Defect
	17 Wheel Defect	22 Inattention
	18 Light Defect	23 Vision Obstruction
	19 Other Vehicle Defect	24 Asleep/Drowsy
	21 Alcohol Impaired	25 Sick
	26 Fatigued	27 Physical Impairment
	28 Improperly Parked	31 Previous Accident
	32 Distraction in/on Vehicle (List)	35 Improper use of Turn Lane
	33 Other	99 Other

VISION OBSTRUCTION				
0 None	3 Roadway Slope/Snowbank	7 Bright Headlights	12 Splash/Spray from Other Vehicle	15 Traffic Sign
1 Curve in Road	4 Trees/Crop/Brush	8 Weather Conditions	18 Vehicle Stopped on Roadway	16 Billboard/Fence
2 Hill Crest	5 Reflection from Surface	10 Rain/Snow/Ice on Windows	13 Moving Vehicle	17 Building
	6 Bright Sunlight	11 Cracked/Dirty Windows	14 Parked Vehicle	99 Other








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14 Undercarriage	34 Undercarriage	54 Undercarriage																				
INITIAL Point of Impact																						
PRINCIPLE Point of Impact																						

EXTENT OF DEFORMITY							
0 None	1 Very Minor	2 Minor	3 Minor/Moderate	4 Moderate	5 Moderate/Severe	6 Severe	7 Very Severe

Towed Due to Damage	Towed By:	Towed By:	Towed Due to Damage
<input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Yes <input type="checkbox"/> No

Driver of UNIT # 1	ALCOHOL / DRUG INVOLVEMENT	Driver of UNIT # 2
1 Neither Alcohol or Drugs Detected	2 Yes - Alcohol	3 Yes - Drugs
	4 Yes - Both	
Alcohol Test	Alcohol / Drug Test	
Drug Test	1 None Given	2 Test Refused
	3 Blood Test	4 Urine Test
	5 Breath Test	6 Field Test
BAC Test Results:	Drug Used (if known):	Drug Test Results
BAC Test Results:	Drug Used (if known):	Drug Test Results

UNIT # 1	COMMERCIAL VEHICLE	UNIT # 2
Refer to Instruction Sheet before completing		
Cargo Body		
1 Bus	2 Van/Enclosed Box	3 Cargo Tank
4 Flatbed	5 Dump	6 Concrete Mixer
7 Auto Transporter	8 Garbage/Refuse	9 Other
10 Pickup Bed		
# Axles	GVWR-Power	GVWR-All Trailers
ICC # For Load	DOT # For Load	
Hazardous Material	Placard: <input type="checkbox"/> Yes <input type="checkbox"/> No	Spilled: <input type="checkbox"/> Yes <input type="checkbox"/> No
Haz-Mat #		
Carrier Name & ICC# or DOT# for Load obtained from...		
1 Shipping Papers	2 Vehicle Side	3 Driver
4 Log Book	9 Other	
(If Carrier different from Vehicle Owner)	Carrier Name	(If Carrier different from Vehicle Owner)
Address		Address
City	State	City
Zip		State
		Zip

	Unit # of Units Involved	Event Location	EVENTS - List events for ALL units in the order they occurred	Case No.	Page 3
			1 Overturn 2 Separation of Units 3 Cargo Loss/Shift 4 Jack-Knifed 5 Ran off Road 6 Down Hill Runaway 7 Fire/Explosion 8 Gas/Inhalation 9 Other Noncollision 10 Loss of Control 11 Fell/Pushed/Jumped 12 Non-Collision Injury 13 Immersion 71 Came Back on Road 72 Drove L/R of Center One Veh. Collision With 14 Pedestrian 15 Pedalcycle 16 Railroad Train 17 Domestic Animal 18 Wild Animal 19 Other Object Not Fixed 20 Parked Vehicle on Private Property 21 Impact Attenuator 22 Bridge/Pier/Abutment 23 Bridge Parapet End 24 Bridge Rail 25 Overpass 26 Guardrail Face 27 Guardrail End 28 Median Barrier 30 Highway Traffic Sign Post 31 Overhead Sign support 32 Street Light Support 33 Utility Pole 39 Other Pole 40 Delineator Post 41 Culvert 42 Curb 43 Ditch 44 Embankment 45 Fence 46 Mailbox 47 Tree 48 Building Wall 49 Other Fixed Object	Sideswiped Same 52  Sideswiped Opposite 53  Angle 58  Turning Events Head-On 54  Angle 59  Rear-End 56  Same Dir 62  50 Head-On 51 Rear-End 60 Backed Into 61 Parked Veh. 99 Other	


THE EVENT LOCATION	1 On Roadway 2 Left Shoulder 3 Right Shoulder	4 Roadside (Includes Sidewalk) 5 Outside Right of Way 6 Off Roadway - Loc Unknown	7 Median 8 Gore 9 Other	A In Parking Lot B Parking Lot Access Road P Private Property
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UNIT # 1	FIRST EVENT RELATIONSHIP TO JUNCTION	UNIT # 2												
<input type="checkbox"/>	0 Nonjunction 1 In Intersection 2 Intersection Related 3 At Driveway/Alley 4 Driveway/Alley Related 5 On Ramp 6 Ramp Related 7 At Railroad Crossing 8 Railroad Crossing Related 9 Other	<input type="checkbox"/>												
<input type="checkbox"/>	GENERAL DIRECTION OF TRAVEL (If turning, select direction before turning)	<input type="checkbox"/>												
FIRST Harmful Event	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:25%;">General Direction of Street</th> <th style="width:25%;">Unit Direction</th> <th style="width:25%;">General Direction of Street</th> <th style="width:25%;">Unit Direction</th> </tr> <tr> <td><input type="checkbox"/> South / North</td> <td><input type="checkbox"/> North <input type="checkbox"/> South</td> <td><input type="checkbox"/> South / North</td> <td><input type="checkbox"/> North <input type="checkbox"/> South</td> </tr> <tr> <td><input type="checkbox"/> West / East</td> <td><input type="checkbox"/> East <input type="checkbox"/> West</td> <td><input type="checkbox"/> West / East</td> <td><input type="checkbox"/> East <input type="checkbox"/> West</td> </tr> </table>	General Direction of Street	Unit Direction	General Direction of Street	Unit Direction	<input type="checkbox"/> South / North	<input type="checkbox"/> North <input type="checkbox"/> South	<input type="checkbox"/> South / North	<input type="checkbox"/> North <input type="checkbox"/> South	<input type="checkbox"/> West / East	<input type="checkbox"/> East <input type="checkbox"/> West	<input type="checkbox"/> West / East	<input type="checkbox"/> East <input type="checkbox"/> West	FIRST Harmful Event
General Direction of Street	Unit Direction	General Direction of Street	Unit Direction											
<input type="checkbox"/> South / North	<input type="checkbox"/> North <input type="checkbox"/> South	<input type="checkbox"/> South / North	<input type="checkbox"/> North <input type="checkbox"/> South											
<input type="checkbox"/> West / East	<input type="checkbox"/> East <input type="checkbox"/> West	<input type="checkbox"/> West / East	<input type="checkbox"/> East <input type="checkbox"/> West											
<input type="checkbox"/>		<input type="checkbox"/>												
MOST Harmful Event		MOST Harmful Event												
<input type="checkbox"/>		<input type="checkbox"/>												
Driver / Ped Action		Driver / Ped Action												
<input type="checkbox"/>		<input type="checkbox"/>												

Sketch the scene

Indicate road names and show all lanes

Show North by Arrow in Circle



Driver Actions

- 1 Going Straight
- 2 Turning Right
- 3 Right Turn on Red
- 4 Turning Left
- 5 Left Turn on Red
- 6 U-Turn
- 7 Merging
- 8 Changing Lanes
- 10 Passing
- 11 Negotiating Curve
- 12 Stopped in Traffic
- 13 Slowing in Traffic
- 14 Starting in Traffic
- 15 Parking
- 16 Entering Drivwy./Alley
- 17 Leaving Drivwy./Alley
- 18 Backing
- 20 Avoiding Obstacle
- 21 Avoiding Veh./Ped.
- 22 Pursuing Vehicle
- 23 Fleeing Pursuit
- 24 Racing
- 25 Parked Vehicle
- 26 Driverless Vehicle in Motion

Pedestrian/Pedalcycle Actions

- 30 Crossing at Painted Intersection
- 31 Crossing at Unpainted Intersection
- 35 Crossing at Non-Intersection X-walk
- 36 Crossing Not at Intersection
- 40 Walk/Ride with Traffic in Bike Lane
- 41 Walk/Ride with Traffic No Bike Lane
- 42 Walk/Ride Facing Traffic in Bike Lane
- 43 Walk/Ride Facing Traffic No Bike Lane
- 50 Standing on Roadway
- 51 Playing on Roadway
- 52 Working on Roadway
- 60 Enter/Leave School Bus
- 70 Not on Roadway
- 99 Other

Property Damage (Name of Object Struck - Owner Name and Address)	Estimated Damage
	\$

Narrative / Additional Information / Additional Passengers (indicate unit # and all information for additional passengers)

WITNESSES Name	Address	State	Home Phone	Work Phone
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<input checked="" type="checkbox"/> Investigating Officer's Name and #	Date of Report	Photos <input type="checkbox"/> Y <input type="checkbox"/> N	Approved By	Date
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Send ORIGINAL to: Office of Highway Safety, P. O. Box 7129, Boise, Idaho 83707-1129